TachoSil SEALANT MATRIX

Clinical Cases
General Surgery

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TachoSil® — General Surgery Clinical Cases

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1 Total thyroidectomy as a treatment for a thyroid nodule suspected as malignant

Avilés Oliveros A, Medina Pedrique M, Pérez-Flecha M, Moreno A, Cruz Cidoncha A, García-Ureña MA

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Introduction

Thyroid nodules attract clinical interest when the patient detects them through self examination; a doctor discovers them during a routine physical examination; or when they appear during a radiology procedure such as a carotid ultrasound, a neck or thorax computerized tomography (CT) or a positron emission tomography (PET) exploration.

Their clinical importance is principally related with the need to exclude thyroid cancer, which represent between 4 to 15 percent of all thyroid nodules. We present the case of a 50 year old female, who after receiving the vaccination against SARS CoV2 (Pfizer), felt a left supraclavicular lump, and upon performing an ultrasound of the same, a nodule was found in the thyroid region.

Completing the study using a fine needle puncture and aspiration (PAAF), papillary thyroid carcinoma (Bethesda Category V) is suspected, as such, surgical treatment by means of total thyroidectomy is indicated[1,2].

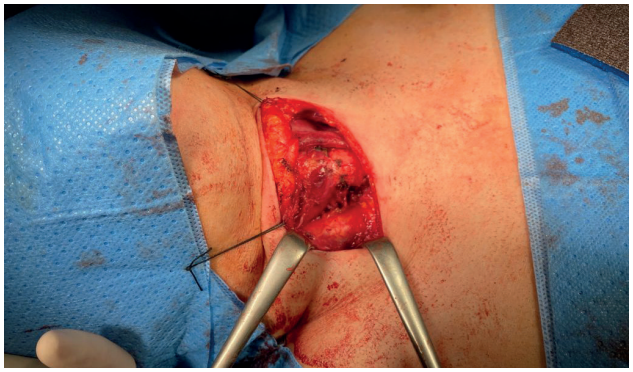


Image 1: Surgical bed, right side.

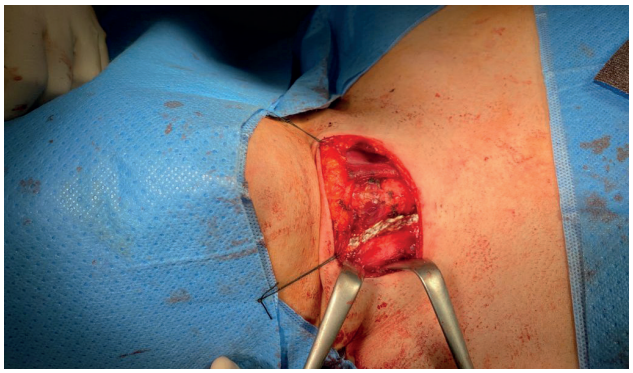
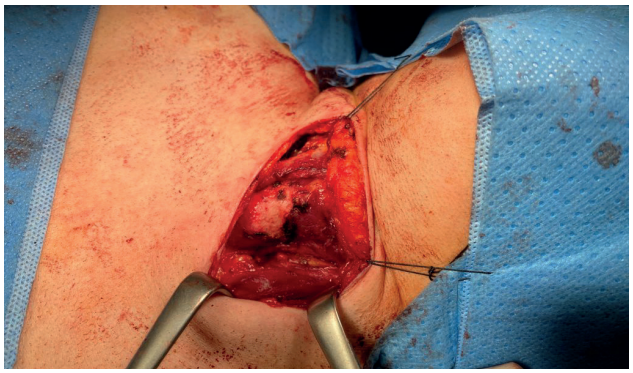


Image 2: Right side after the placement of TachoSil®.



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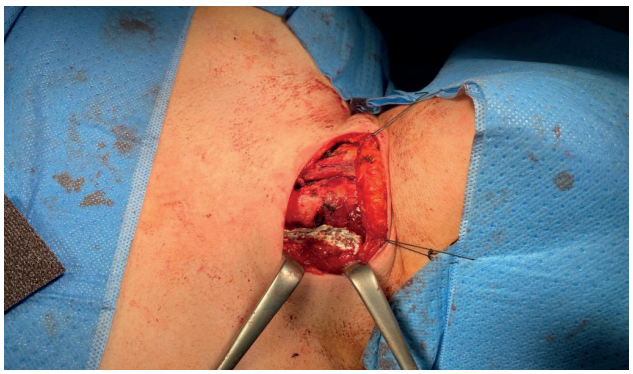

Image 4: Left side after the placement of TachoSil®.

Clinical case

Describes the case of a 50 year-old female without notable personal history, except for a surgical hysterectomy, and with a family history of hypothyroidism in aunts and female cousins, that comes to the Emergency Room (ER) because two days before she had received the SARS CoV2 (Pfizer) vaccine and had felt a painful left supraclavicular lump as well as pain in the location of the vaccine. The patient did not have a fever or other device symptoms.

In the initial physical exploration a small circular rolling tumor is felt, that is not adhered to deep surfaces, painful to the touch that gives the impression of adenopathy. An ambulatory ultrasound of soft tissue of the area where it is found is requested, although it seems to be adenopathy reactive to the vaccine. Since no other associated symptoms are present, except for the pain in the area of the vaccine, the patient is discharged with treatment adjustments and recommendations based on observation and analgesics.

In the ambulatory ultrasound, a mass is explored in the left supraclavical. Which corresponds to adenopathy with preserved fatty hilum that has a mild cortical thickening. Taking into account the background of the COVID-19 vaccination in the upper left arm and just before the appearance of the mass, suggests that it is related to the same. The study of the thyroid region is expanded, identifying a solid, slightly hypoechogenic well defined nodule of 17 x 25 mm. The nodule corresponds to the Thyroid Imaging Reporting and Data System (TIRADS). The TIRADS classification of thyroid nodules is based on a point scale according to ultrasound criteria of malignancy, with 4 indicating suspicion of malignancy.

Afterwards, an LTD PAAF is performed resulting in papillary thyroid carcinoma with Bethesda category V. This category includes lesions with some characteristics that suggest, but do not determine, papillary thyroid cancer or of other types. In general, the nodules in this category have a malignancy risk of 50—75% so these patients should be sent to surgery.

The study is completed with thyroid hormone analysis resulting in a T. S. H. of 3.0700 µU/ml and a free T4 1.04 ng/dl

The patient was directed to the tumor committee, the risks and benefits of the surgery are explained and is placed on the waiting list for a total thyroidectomy.

Surgical intervention was performed with intraoperatory findings of a right thyroid nodule and a very fibrotic thyroid gland intimately adhered to the trachea. Intraoperatory identification of bilateral recurrent nerve, adhered and with firm fibrous tracts towards the thyroids. Four parathyroid glands were identified, which were preserved. To perform an adequate hemostasis, two TachoSil® were placed, one on each side and the surgical field is photographed before and after their placement on both sides *(→Images 1, 2, 3 and 4).*

After the surgery, the surgical mass is sent to the Anatomy Pathology service resulting in a diagnosis of a follicular adenoma of Hurtle cells (oncotic) in LTD.

Postoperative evolution was satisfactory, the patient did not have a fever, with good oral tolerance and without dysphonia. Presented discrete clinical signs of hypocalcemia associated with mild hypocalcemia in the blood test, so treatment with vitamin D and calcium was initiated, with a positive response. During the stay, endocrinologic service performed follow-up.

The use of the TachoSil® medicated matrix resulted useful in stopping the bleeding in the surgical bed and for the hemostasis of the same; the patient did not present post surgical complications of bleeding or cervical hematoma.

Discussion

The prevalence of thyroid nodules increases with age, being 10 times greater in the female sex. Although by physical examination 4—8% of adults present thyroid nodules, ultrasound identifies them in 20—67% of the patients and 50% of the cases studied appear in autopsies[2,3,4].

Thyroidectomy is considered the treatment of choice for thyroid nodules classified as suspicious for malignancy according to the Bethesda anatomopathological classification.

The Bethesda classification system for the study of thyroid lesions permits pathologists to perform systemized, unified, homogeneous reports and permits establishment of the therapeutic attitude of the patient and the selection of patients that will be candidates for surgical treatment[4].

The correct identification of both recurrent nerves is of crucial importance during the surgery to prevent injury to the same since their harm could cause from a change in the tone to a respiratory obstruction.

On the other hand it is also of special importance to perform an adequate hemostasis of the surgical bed to prevent fundamentally, the appearance of a hematoma that could compress the airways and be potentially mortal.

Conclusion

The aggressive angiomyxoma is a mesenchymal tumor. The importance of the thyroid nodule, is not radicated in its elevated prevalence, but rather, although the majority are benign, in 4—15%, depending on the series, correspond to thyroid cancer. For this reason in the evaluation of the nodule it is fundamental to discard malignancy of the same, following the diagnostic protocol of physical, analytical exploration, radiological exploration (ultrasound) and PAAF depending on the radiological conclusions.

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2

Hemostatic matrix as a support medium for the prevention of the recurrence of Chron's disease

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Introduction

In the last 10 years, the incidence of Chron's Disease (CD) has been increasing progressively[1]. In spite of the constant appearance of new latest generation medical treatments such as monoclonal antibodies that achieve reduction of the clinical impact of the disease, many patients present severe or chronic outbreaks with stenosing or fistulizing conditions that require surgical bowel resection.

So, around 60% of these patients will require a surgical intervention in the course of their illness and 80% of this will require a re-intervention[2]. However, although these intestinal resection surgeries suppose a better quality of life for the patient in the majority of the cases, they are associated with complications resulting from the gastrointestinal surgical act itself.

Currently, a consensus on which anastomotic technique to employ does not exist; latero-lateral or end-to-end. There doesn't even exist a difference in the recurrence rate between the manual of the mechanical technique. Nonetheless, recent studies exist where the anastomosis most used in the last 5 years for surgery in CD have been compared, with significant differences in the endoscopic and clinical postoperative recurrence rate in the patients subjected to Kono-S anastomosis.

According to Kono T et al., the success of the results described with anastomosis Kono-S are focused on the support column, classic location for postsurgical recurrences in CD[3]. Therefore, it is in the column where the opportunity for the participation of the medicated matrix as a support appears.

Image 1: Pre-terminal ileum stenosis, viewed by Abdominal-Pelvic CT scan.

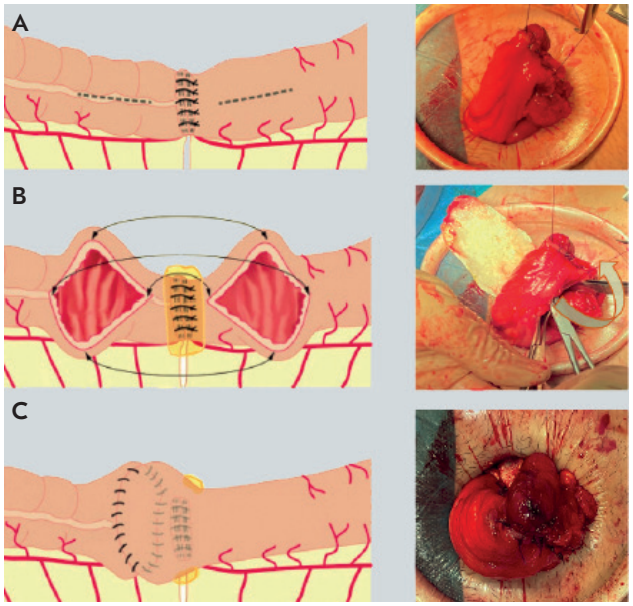

Image 2: Placement of a medicated matrix as a reinforcement column in the Kono-S anastomosis. **2A:** Placement direction. **2B:** Placement, in the first place, over the mesentery border. **2C:** Full column wrap, view of the matrix after the finalization of the anastomosis.

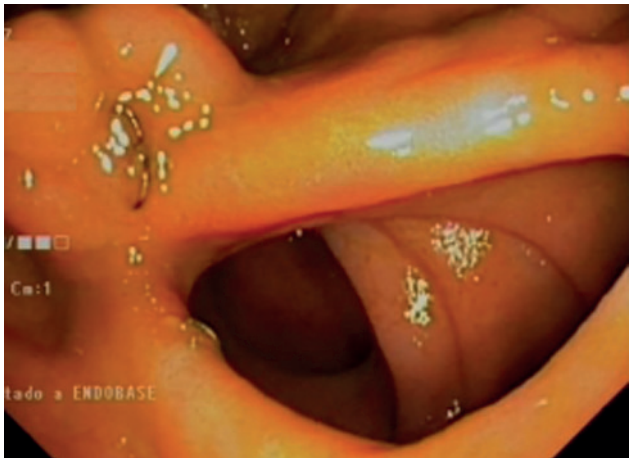

Image 3: Ileocolonoscopy control at 6th months after the surgery, without evidence of signs of endoscopic recurrence in Kono-S anastomosis with column reinforcement of medicated matrix, Rutgeerts i0.

Clinical case

To describe the application of the medicated matrix for the control of hemostasis, the following case was selected: a 43 year old male with Crohn's Disease (CD) with a pattern of inflammatory-stenosis of the ileocolic region, with a history of prior episodes of self-limited sub occlusions in the last year, in treatment exclusively with mesalazine, that comes to the emergency room at the hospital due to abdominal pain, nausea and lack of bowel movements.

Urgent complete blood count (CBC) drawn on admission revealed increased RFA with CRP 45 mg/L, 15,000 mg/L (87% neutrophils) and lactate in normal range. The microbiological study of the feces is negative and the calprotectin is elevated (1,220 µg/g).

A computerized tomography of the abdominal-pelvic region with intravenous contrast is requested *(→ Image 1)*, that reveals findings compatible with Crohn's disease with a pattern of stenosis with a progressive change in the caliber of the left iliac fossa that generated a pre-stenotic dilatation of proximal ileum and jejunum loops.

The clinical symptoms were managed, initially, using a nasal-gastric tube, fluid therapy and iv corticoids, with clinical sub occlusion symptoms improving in 48 hrs. After which, an oral diet was well tolerated, obtaining hospital discharge at 72 hours after ingressing, with a request for an ambulatory magnetic enterography resonance (MER) for evaluation in Surgery external consultation.

Finally, the patient had their surgery external consultation appointment 15 days after discharge where the results of the MER were observed, describing a slight circumferential thickening and stenosing that affected the last 10 cm of the ilium that were not associated to inflammatory changes in the acute phase. With all of these results and the patient's desire to achieve a long-term solution for his sub occlusive symptoms, he was offered an ileocolic resection with Kono-S anastomosis to resolve the repetitive sub occlusive symptoms, which he accepted.

A month later, a laparoscopic ileocolic resection with Kono-S anastomosis was performed, with placement of a hemostatic and sealing agent on the support column of the anastomosis coinciding with the mesenteric border *(→ Image 2)*, which was found ingurgitated and thickened due to the chronic inflammatory

episodes, increasing the risk of postoperative complications such as micro-leaks or bleeding when performing the anastomosis. The patient evolved favorably during the postoperative period with adequate oral tolerance, being discharged 4 days after the intervention.

After 6 months of follow-up there have been no signs of endoscopic recurrence, obtaining a Rutgeerts i0 score in the ilium colonoscopy control at 6 months *(→Image 3)*, nor clinical symptoms that could suggest a clinical recurrence.

Discussion

Since the creation of the Kono-S anastomosis in 2011, its use in surgery for CD has been increasing supported by its positive results of morbidity and recurrence, proposing an alternative to the anastomoses used to date with moderate rates of clinical recurrence in patients intervened for CD[4].

The natural history of postoperative CD leads to an endoscopic recurrence (ER) in close to 50% of the patients an the surgical recurrence (SR) in the form of stenosis, fistulas and/or intra-abdominal abscesses, in more than 20% of the patients intervened at 5 years, requiring re-interventions[5].

Risk factors that affect the recurrence rate are described in literature and include active tobacco use, diabetes mellitus, prior gastrointestinal surgeries, anastomotic dehiscence, active treatment with steroids or anti-TNFα among others. However, although an international consensus does not exist regarding which anastomosis procedure should be performed in CD surgery, in the last decade, more and more studies describe the positive results of postoperative morbidity and mortality, so much so that Luglio, G. et al., published a randomized clinical trial in 2020 comparing the ER and the SR of the Kono-S (KS) anastomosis and the conventional mechanical latero-lateral (LL), describing a lower rate of ER in the KS group of 22.2% compared to 62.8% of the LL (p > 0.001, odds ratio (OR) 5.91) at 6 months after the surgery and a longer time free of SR in the KS group (hazard ratio 0.36, p > 0,037), with KS in the binary logistical regression analysis being the unique variable significantly associated with a minor risk of ER (OR 0.19, p > 0.001)[6].

The preparation of the Kono-S anastomosis represents a change with respect to the rest of the anastomosis used in CD, directed at improving not only the luminal diameter, but the entire anastomosis. It is based on two fundamental pillars: in the first place, the construction of a support column that maintains the diameter and the dimension of the anastomosis preventing the distortion and the stenosis associated with the recurrence of the disease at the site of the anastomosis, especially on the mesenteric side where it tends to produce the classic relapse and in the second place, the preservation of the vascular and innervation bundle, both important factors for the correct healing of the anastomosis.

This is why, just as it has been described in the clinical case, we can make use of the medicated matrix improving the two theoretical pillars of the Kono-S anastomosis: sealing, by reinforcing the anastomotic column situated over the two lines of staples, treating possible micro-leaks; and hemostatic, by coinciding this localization with the mesenteric border, diminishing one of the frequent bleed points, avoiding the risk of ischemia of the anastomotic borders.

Therefore, we propose an alternative at the time of performing the Kono-S anastomosis using reinforcement with a medicated matrix, that favors the integrity of the anastomosis and diminishes relapses.

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3

Hepatic subcapsular hematoma after laparoscopic cholecystectomy. Clinical case

Cidoncha-Secilla A, Badia-Closa J, Campos-Serra A, Gracia-Roman R, Pallisera-Lloveras A, García-Monforte N; García-Borobia FJ, Navarro-Soto S

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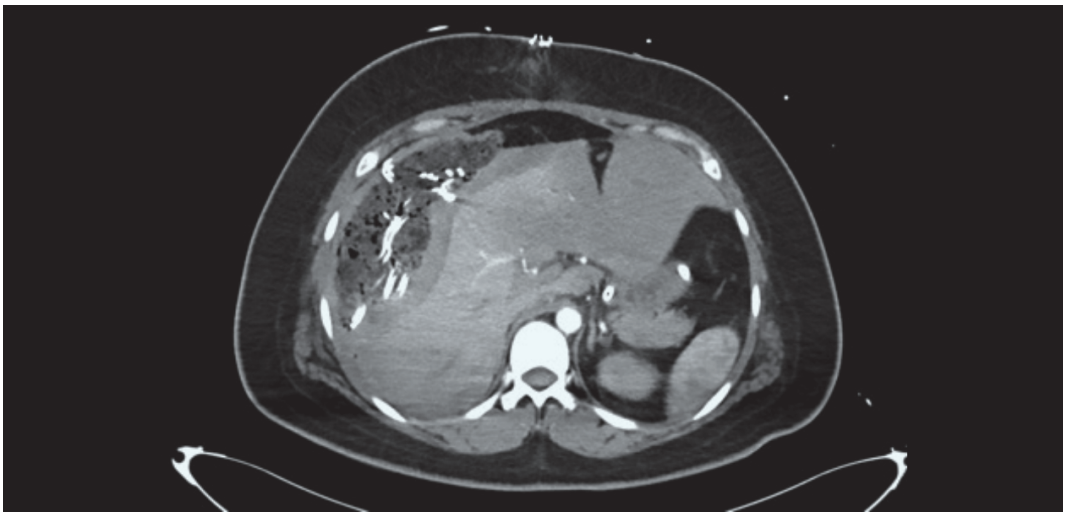

Image 1: Angio-CT: subcapsular hematoma and hepatic packing. Without signs of active arterial bleeding.

Introduction

Description of a case of hepatic subcapsular hematoma after a laparoscopic cholecystectomy due to acute cholecystitis and review of the published bibliography.

Review the clinical manifestations, etiology, diagnosis and treatment of hepatic subcapsular hematoma in the post-operatory after a laparoscopic cholecystectomy.

Clinical case

Female patient of 32 years old with acute cholecystitis of 4 days of evolution, intervened performing a laparoscopic cholecystectomy without intra-operatory incidents. In the immediate post-operatory a hypotension episode with tachycardia and hematic decline through the abdominal drainage occurs, with a 2 point decline in the hemoglobin.

An immediate emergency re-intervention is performed using exploratory laparoscopy finding a large hepatic subcapsular hematoma. Given the patient's instability a subcostal laparotomy with hepatic packing is performed leaving the abdomen open with negative pression therapy. Afterwards an angio-TC is carried out that evidences a large hepatic subcapsular hematoma without signs of active bleeding *(→ Image 1)*.

At 48 hours after surgery the patient is re-intervened removing the hepatic packing observing slight venous bleeding without evidence of active arterial bleeding, proceeding with placement of TachoSil®[1] with the objective of performing a major hemostasis in the surgical bed and upon abdominal closure[1].

The patient has a correct clinical and analytical postoperative evolution and is discharged 10 days after ingressing.

Discussion

The hepatic subcapsular hematoma after a laparoscopic cholecystectomy in an infrequent complication, but may become very serious[2,3].

It tends to appear during the first days after the surgery, although cases have been described in which it appears various weeks after the intervention.

Once the hematoma appears, it progresses because the expansion of the latter itself damages the subcapsular vasculature, perpetuating it.

Factors that increase the risk of its appearance have been described such as the use of non-steroidal anti-inflammatory drugs or anticoagulants, the presence of hepatic hemangiomas, anatomical variations of the hepatic vascular system and the unobserved lesion of the hepatic capsule during the surgery[2,3].

The patients present symptoms of abdominal pain in the right hypochondria, hypotension and tachycardia. In cases of a hematoma rupture important anemia, shock and peritoneal irritation can appear.

In the cases where the patient is hemodynamically stable, conservative treatment can be performed. It is recommended to complete the analysis with a hepatic angio-TC and in the case that active bleeding is observed, if the patient remains hemodynamically normal, perform embolization.

Those patients that are hemodynamically unstable or it is necessary to perform a surgical or radiological intervention, various treatments have been described such as: hematoma debridement or percutaneous drainage of the hematoma, hepatic packing, etc.

In our case, hepatic packing was sufficient and the patient did not present further complications.

Given that no evidence exists in the literature, the treatment must be tailor-made to each patient in function of the clinical manifestations and the prior experience of the surgical team.

Conclusion

Although laparoscopic cholecystectomy is one of the most frequently performed surgical interventions, it is not free of complications.

The hepatic subcapsular hematoma is an infrequent complication, but may become very serious. Based on our experience, we propose hepatic packing as a therapeutic option, that can be maintained during 24—48 hours and removed afterward.

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4

Use of TachoSil® as a hemostatic on Denonvilliers fascia in laparoscopic abdominoperineal amputations

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Introduction

The approach to lower third rectal cancer by laparoscopy is one of the most complex procedures in colorectal surgery.

The Denonvilliers fascia is a barrier between the anterior face of the rectum and the urogenital structures and marks the anterior dissection limit in these interventions[1].

Respecting the integrity of this structure, as well as the control of the hemostasis in this area of difficult access supposes a true challenge and may implicate lesions of the adjacent nerve structures. In addition, controversies exist in the literature about the exact anatomical limits of this fascia and on occasion for rectal tumors the excision of the anterior face may be indicated.

We present two cases of patients with the diagnosis of lower third rectal cancer on which were performed an abdominal-perineal amputation by laparoscopy and a TachoSil® hemostatic reinforcement was applied over the Denonvilliers fascia.

Clinical case 1

Male of 84 years of age with PA of HBP, that appears with a lower rectal adenocarcinoma, at 1 on the left internal margin, in addition to an upper synchronous tumor and with a single hepatic metastasis in segment III. Pre-operative T2N0M1 status.

Presented in the tumor committee where neoadjuvant treatment with radio chemotherapy treatment on the rectal tumor and control by radiofrequency treatment of the hepatic metastasis is decided.

A laparoscopic abdominoperineal amputation is performed without incidence and the patient is discharged on the 10th day without complications except urine retention which required a bladder catheterization.

Definitive stage: ypT2; ypN1b, with 2 foci of adenocarcinoma at 1 and 8 cm from the pectineal line, for which adjuvant chemotherapy is prescribed following surgery.

Image 1: Application of TachoSil® on Denonvilliers after an abdominoperineal amputation.

Clinical case 2

Male of 62 years of age with lower rectal adenocarcinoma and preoperative stage T3N0M0.

Presented in the tumor committee where neoadjuvant treatment with radio chemotherapy treatment on the rectal tumor followed by surgery is decided.

The abdominoperineal amputation is performed using laparoscopy without incidence, after the intervention, is discharged on the 7th day without complications.

Definitive stage: ypT1; ypN0, with adenocarcinoma at 3 cm of the pectineal line.

In both patients, on completion of the abdominoperineal amputation slight bleeding over the Denonvilliers fascia is observed on the posterior face of the prostate, for which, in addition to the habitual hemostatic maneuvers, a collagen matrix of TachoSil® was placed as a hemostatic reinforcement *(→ image 1)*, that stopped the bleeding without the need for more aggressive actions. During the post-operatory neither suffered local complications.

Discussion

The Denonvilliers fascia, o peritoneal-prostate fascia, is a dense collagen tissue that separates the rectal wall and the anterior mesorectum, from the male urogenital organs (prostate, and seminal vesicles), and in their posterior area we find a lax areolar to vascular tissue, that is used as a surgical plane[1,2,3].

On the antero-lateral face of the rectum, on the external face of the Denonvilliers fascia, the neurovascular confluences of the pelvic plexus are located that can easily be injured during the dissection or hemostatic maneuvers, causing functional urogenital impotence[3,4].

In addition, this fascia is more prominent in people that have had pre-operative radiation therapy. Which could affect the surgical plane, favoring local bleeding.

In our cases the application of TachoSil® as a hemostatic reinforcement helped achieve a rigorous hemostasis and probably reduced local postoperative complications.

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5

Application of TachoSil® as a hemostatic and sealant in cephalic duodenopancreatectomy for GIST in Váter blister

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Introduction

Gastrointestinal stromal tumors (GIST) constitute the most common mesenchymal tumor in the gastrointestinal system and 1% to 2% of all gastrointestinal neoplasms correspond to them.

They develop along the digestive tract, being more frequent in the stomach (50% to 70%), followed by the jejunum and ileum (20% to 30%). Duodenum GIST are relatively infrequent, which is why their clinical symptoms, study and treatment constitute controversial material[1,2].

The GIST are most frequent in male patients and symptoms appear around 60 years of age, when they have reached a size that produces symptoms related to the effect of the mass or digestive hemorrhaging, although with greater frequency they are asymptomatic and are discovered in an incidental manner[1,2,3].

Histologically, they originate in the interstitial cells of Cajal (ICC) that form a cellular network around the myenteric plexus and the muscle layers of the gastrointestinal wall and express the KIT protein (c-kit), positively react to the CD117 stain and are carriers of a gene mutation that codifies the type III receptor of the tyrosine kinase.

The complete surgical resection of the tumor with free margins that may include adjacent organs, constitutes the only healing treatment for GIST, with the most important factors that determine survival being the mytosis count and tumor size[1,2,3].

Below we present the clinical case of a patient that underwent a cephalic duodenopancreatectomy for a GIST in the second segment of the duodenum, with a satisfactory post operatory after the use of TachoSil® as a reinforcement at the level of the pancreatic jejunal anastomosis to prevent the appearance of a pancreatic fistula.

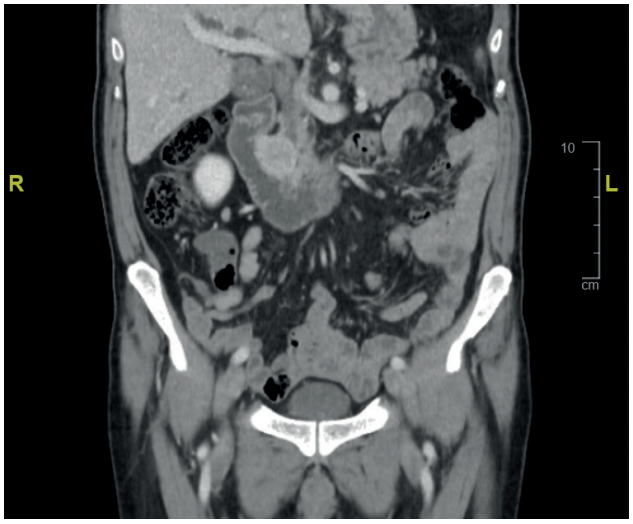

Image 1: Coronal section of abdominal computerized tomography where a mass adjacent to the head of the pancreas and second portion of the duodenum are observed.

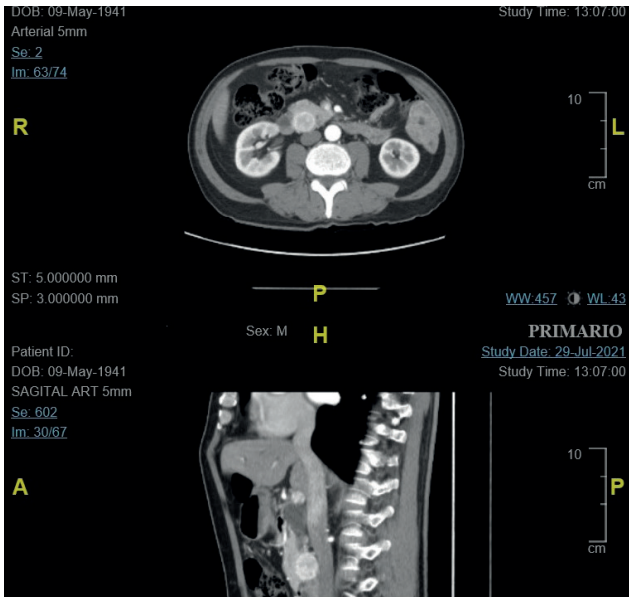

Image 2: Computerized tomography slices of the abdomen that show the presence of a tumor on the head of the pancreas.

Clinical case

Male of 80 years of age with history of arterial hypertension, diabetes mellitus well controlled with oral antidiabetics and anti-coagulated due to auricular fibrillation.

Comes to Emergency Room (ER) with choluria evolution of two weeks accompanied by constitutional syndrome with asthenia and unquantified weight loss.

Physical exploration reveals mucocutaneus jaundice and slight pain upon palpitation of the RHC, without defense or signs of peritoneal irritation. Analytically, moderate hypertransaminasemia and an increase in bilirubin up to a total of 6.8 in detriment to conjugated bilirubin, so the patient is interned to complete the obstructive jaundice study.

An abdominal CAT is performed *(→ Images 1 and 2)* which shows a marked dilatation of the intrahepatic and extrahepatic biliary tract secondary to tumor at the head of the pancreas of 35 x 25 mm radiologically suggestive of a neuroendocrine tumor, without apparent locoregional or distant dissemination in extension studies. With these results, a chromogranin A is requested, that is found in the normal range and an octreoscan is performed, without identifying pathological captation, so it is decided to complete the study with endoscopy to take biopsies, prior to programming surgery. The pathological anatomy of fine needle puncture and aspiration (PAAF) shows an epithelial neoplasm of plasmacytoid habitus suggesting a neuroendocrine tumor although, paradoxically, the immunohistochemical results are negative for neuroendocrine markers.

During hospitalization, the hyperbilirubinemia progressively decreases and the transaminases are normalized so the patient is discharged and scheduled for a cephalic duodenopancreatectomy.

The intervention is carried out with a subcostal lateral laparotomy, identifying an indurate tumor on the head of the pancreas that significantly conditions the dilatation of the biliary tract without finding lesions in extension. A standard cephalic duodenopancreatectomy is performed using the Whipple technique, during the dissection there is bleeding at the root of the colic vessels in the upper mesenteric vein and in the portal vein, both resolved with loose stiches and application of TachoSil® as a hemostatic *(→ Images 3 and 4)*.

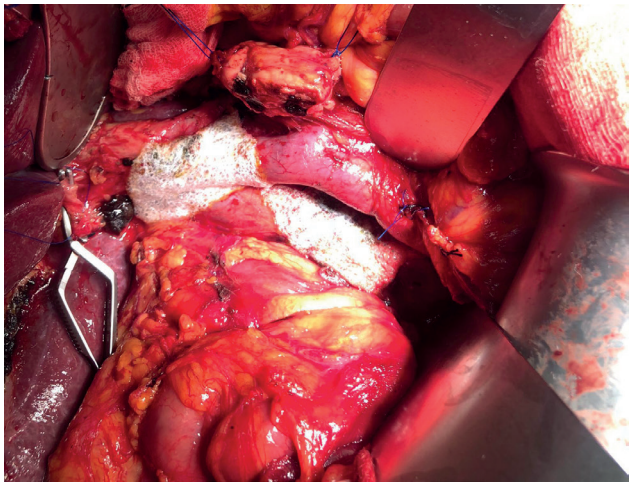

Image 3: TachoSil® periportal and in superior mesenteric vein.

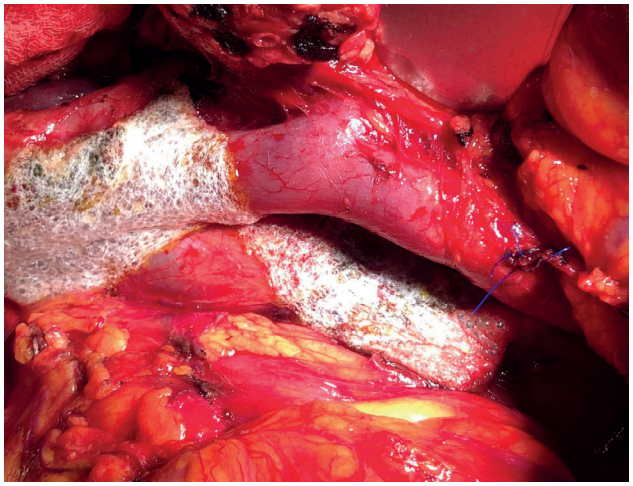

Image 4: TachoSil® periportal and in superior mesenteric vein.

Once the mass is resected, reconstruction with Blumgart type pancreatic-jejunal anastomosis is performed.*(→ Image 5)* with TachoSil® reinforcement, *(→ Image 6)*, endo-lateral hepaticojejunal, antecolic gastrojejunal, and lateral Roux-in-Y loop foot. The nasojejunal nutrition tube is left in place to begin enteral nutrition the first postoperative day and proceed to closure in planes with placement of incision catheters for better postoperative pain control with the continuous infusion of levobupivacaine at 0.25%.

The patient is discharged on the 10th postoperative day without incidents. The pathological anatomy finally showed a mesenchymal tumor of the gastrointestinal stroma (GIST) originating in the Váter blister, a low grade by the mitotic index of 2/5 mm^2, with intense C-kit expression and negative neuroendocrine markers that conditioned dilatation of the biliary tract to the pancreatic conduit without infiltration.

Discussion

Although duodenum gastrointestinal stromal tumors are relatively rare, they represent 30% of all of the primary duodenal tumors, with greater frequency originating in the second portion of the duodenum, followed in order by the third, fourth and first portion[1,2,3].

With respect to the diagnosis, the endoscopic biopsy rarely permits a correct diagnosis, showing chronic inflammation or normal duodenum mucous, with the radiology computerized tomography study being the most available to date to identify and diagnose GIST, being hyper vascular tumors that show an intense contrast in the arterial phase.

The endosonographic can't discern between a GIST and another type of tumor on the intestinal wall, such as a leiomyoma; which is why fine needle aspiration biopsy is recommended for a histological diagnosis of the lesion, although it is difficult to obtain sufficient material for an appropriate histological diagnosis. For this reason, on most occasions the definitive diagnosis will be postoperative[4].

In spite of current knowledge about its biology, these tumors behave erratically, so much so that all GISTs are associated with the risk of recurrence, knowing that 40% to 50% of all of the patients with potentially curing resections will develop metastasis or recurrences[2,3,4].

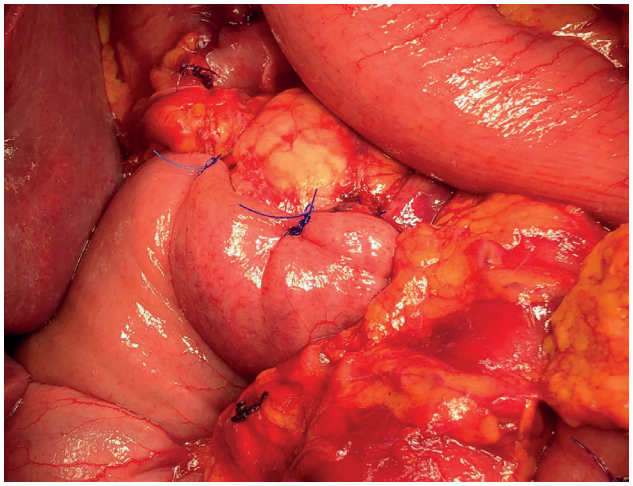

Image 5: Pancreatic jejunal anastomosis.

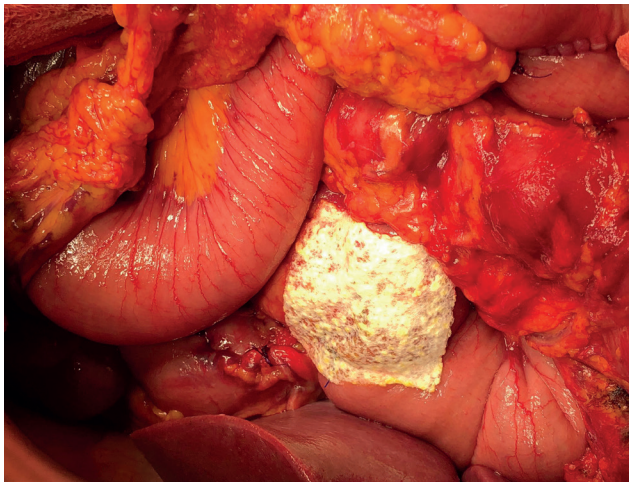

Image 6: TachoSil® in pancreatic jejunal anastomosis.

On certain occasions, as in the case of large size tumors, adjuvant treatment withe Imatinib will be administered which acts as a potent inhibitor of wild KIT and various types of mutated KIT that are found in the GISTs. Imatinib is also used as a first line of adjuvant treatment in patients with advanced GIST, improving illness free survival as well as global survival[4,5].

Healing treatment will be surgical, deciding the most appropriate type of surgery in function of the location and size of the tumor, being able to choose a conservative treatment with a local or wedge resection, although as many as 86% of the duodenum GIST cases have been treated by duodenopancreatectomy[4,5].

The application of TachoSil® can contribute in a significant way to reduce the incidence of pancreatic fistulas after cephalic duodenopancreatectomy due to duodenum GIST and therefore for postoperative collections that contribute to greater morbidity and lengthen the hospital stay in these types of interventions.

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6 Hepatectomy after radioembolization of a giant hepatocarcinoma

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Introduction

Hepatocarcinoma represents 75—85% of the primary liver tumors and is the fourth cause of death from cancer in the world. The principal risk factors are chronic viral liver disease, the relationship with alcohol and the metabolic syndrome. It is more frequent in the male sex and currently the incidence is increasing due to the increase in obesity and diabetes[1,2,4,5].

The diagnosis is made through imaging tests, CT or magnetic resonance, that show an intense uptake in the arterial phase and a posterior wash in the venous stage (washout). To evaluate the prognosis of hepatocarcinoma not only should the tumor stage be considered, but also the hepatic function and the presence of symptoms related to the tumor. In function of these parameters the patients can be treated through resective surgery, transplant, local ablative treatments, chemo/radioembolization or systemic treatments according to the BLCC (Barcelona-Liver-Cancer-Clinic)[1,2,4,5,6].

The trans arterial radioembolization (TARE) with yttrium 90 (90Y) permits a directed treatment of high doses of beta radiation directed at the parenchymal tumor to be carried out, preserving a healthy parenchyma. Its original indications were for cases of advanced hepatocarcinoma but currently it is being used as neoadjuvant in patients undergoing curative treatment[3].

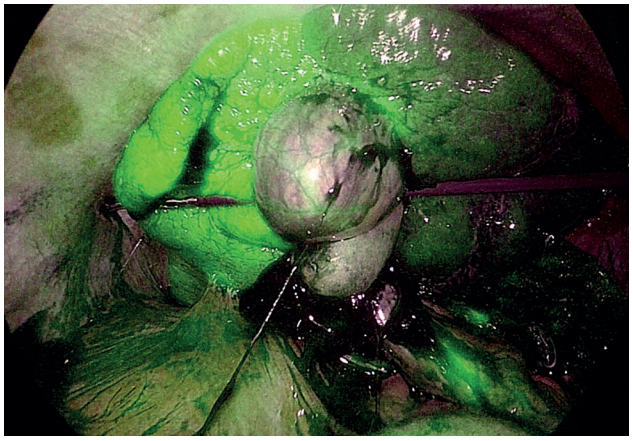

Image 1: Delimiting of the ischemic surface with green indocyanine.

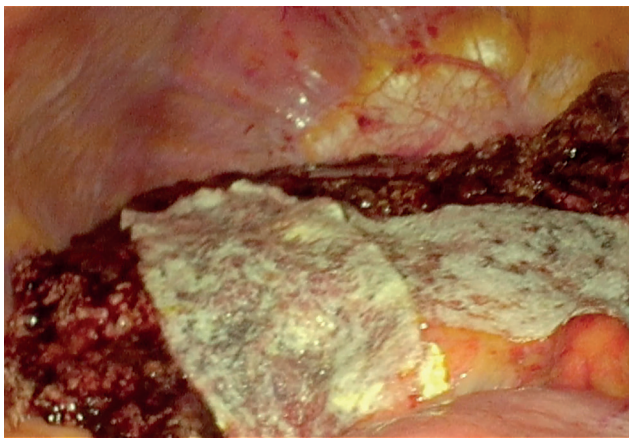

Image 2: Hepatic surface covered with TachoSil®.

Clinical case

Below we present a case of a 68 year-old patient diagnosed with a giant hepatocarcinoma on a healthy liver. The hepatic study begins with analytic alteration of cholestasis enzymes. An abdominal ultrasound is requested which reveals a large mass of 7 cm on the right liver. The study is completed with a magnetic resonance that highlights the previously described mass with bleeding foci and central necrosis. It presents the differential diagnosis between fibrolamellar hepatocarcinoma, cholangiocarcinoma and cavernous sclerosing hemangioma. A biopsy is performed that confirms the diagnosis of slightly differentiated hepatocarcinoma, Analytically it shows normal Carcinoembryonic Antigen (CEA) and Ca 19.9 and alpha-fetoprotein of 23.132, negative for virus. The extension study was completed which was negative. It is presented to the multi-disciplinary tumor committee and due to the size of the tumor suggesting radioembolization with intention of reducing the size. Patient is directed to the center of reference for treatment. In the posterior controls by CT and MRI it shows a positive response with reduction of the size of tumor as well as compensatory hypertrophy of the rest of the parenchyma. A central hepatectomy with laparoscopy is suggested (H4'58) that is performed 8 months after the radioembolization. Through an intra-glissonian approach an anatomical resection of the right anterior pedicle and the segment 4b is performed, delimiting the ischemic areas using the intravenous infusion of indocyanine *(→ Image 1)*.

Intermittent hilar clamping is performed during 98 minutes to carry out the hepatic transection. The hemostatic control of the hepatic surface is performed with bipolar coagulation and three TachoSil® *(→ Image 2)*.

The patient evolved favorably during the post operative period being discharged 4 days after the intervention with normal hepatic function.

The pathological anatomy *(→ Images 3 and 4)* shows a unique hepatocarcinoma of 13 cm moderately differentiated with extensive areas of necrosis (45% of the tumor volume), free margins of 0.5 cm without perineural invasion, with small spleen invasion corresponding to ypT3N0.

Currently in follow-up in the external hepatobiliary and hepatology surgical offices remaining disease free at 6 months of the surgery.

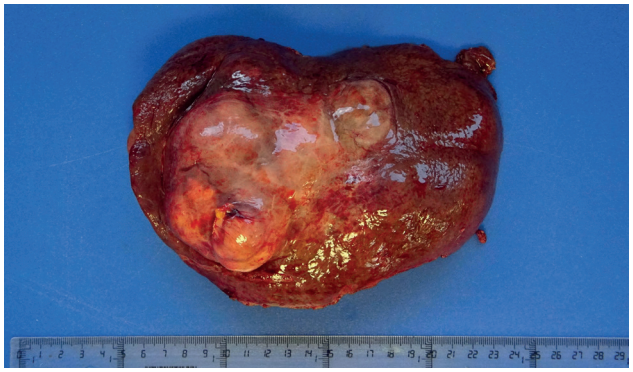

Image 3: Surgical sample.

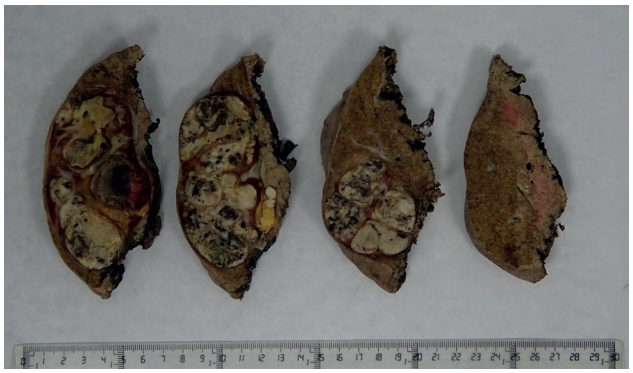

Image 4: Macroscopic anatomy of the hepatic lesion.

Discussion

Hepatocarcinoma presents a therapeutic challenge for the multidisciplinary team that diagnosis this group of patients. Radioembolization can offer therapeutic surgical options to patients that due to the size of their tumor would not be apt for this type of management. Likewise, minimally invasive surgery offers these patients a better postoperative recovery and a minimum alteration of the hepatic hemodynamic.

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7

Retroperitoneal neuroendocrine tumor of unknown origin. A surgical and onco-pathological challenge

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Introduction

Neoplasms of unknown origin represent 4—5% of total invasive cancers, with neuroendocrine tumors (NET) responsible in <5% of this situation[1].

The NET are a very heterogenous group of cancers of diverse biology, histology and behavior. Normally they are slow growing and tend to have secretion of hormones/vasoactive substances, although not all comply with these requirements. The aggressive variants, NE carcinomas, are diagnosed in advanced stages and with poor prognosis. Usually the diagnosis is routinely in an accurate and precise manner. Among the NET, only 10—14% are of unaffiliated origin[2], an infrequent situation. An atypical case of a patient that was intervened for a pelvic retroperitoneal mass of difficult surgical management is presented, diagnosed with probable NET of unknown origin metastatic stage. Case review and literature.

Image 1: Bulky retroperitoneal pelvic presacral mass.

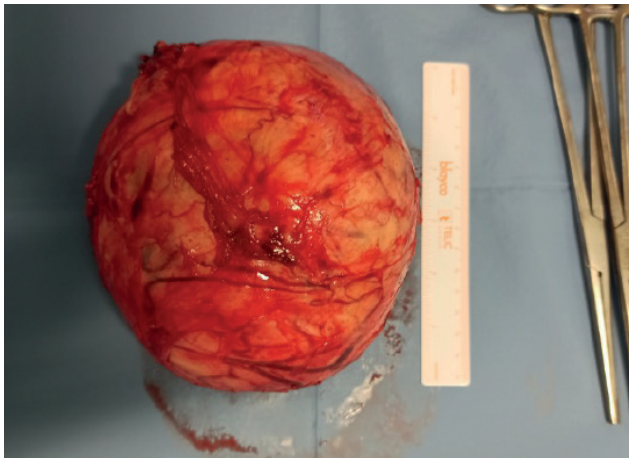

Image 2: Tumor resection in block. Estimated size >15 cm.

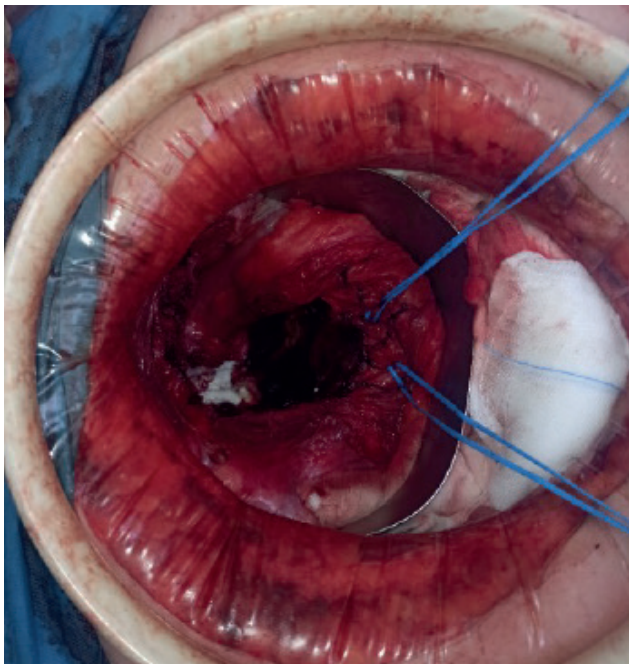

Image 3: Hemostatic medicated matrix covering the bloody bed after the resection.

Clinical case

Female patient of 56 years of age, ex-smoker as only background note, being evaluated by Gynecology for myoma seen in ultrasound. Study is expanded with a pelvic MRI that described a mass of 14 x 12 x 12 cm, extraperitoneal and that could correspond to a neurogenic tumor without being able to discard other origins nor clear dependency. An extended computed axial tomography (CAT)was performed that ratified the described radiological suspicion *(→Image 1)*, in addition undetermined hypodense hepatic nodules in segments V and VI.

A hepatic Magnetic Resonance Imaging (MRI) confirmed the lesions of characteristics suggestive of metastasis, that were punctured by core needle biopsy (CNB). The histology was malignant neoplasm probably metastatic but very little represented in the biopsy and without the possibility of a complementary immunohistochemical study (IHC).

The red blood cell distribution width (RDW) was normal and the coloscopy informed extrinsic compression in the rectum, and the PET-CAT showed pathological metabolic uptake in the presacral and hepatic regions. Faced with this situation, it was decided to perform surgery on the primary mass. The approach was supra- and infraumbilical median laparotomy focusing on the uterus myoma upon which a hysterectomy with double adnexectomy was performed. The peritoneum was opened from the left parietocolic goiter to access the retroperitoneum, and descended to the minor pelvis where the mass was encased, amply vascularized and retro rectal.

An excision in block was performed *(→Image 2)* and bleeding began fundamentally venous of sacro vessels, with a loss of 1.500 cc, very difficult to dominate in spite of complete habitual hemostasis measures. Various sheets of medicated matrix were applied as a hemostatic agent and with vigorous compression finally achieving improved coagulation *(→Image 3)*.

The post operatory transcurred normally and the patient was discharged. The preliminary result of the Pathological Anatomy (PA) of the sample informed the retro rectal mas suggestive of extra-adrenal pheochromocytoma (paraganglioma) but without being totally conclusive; a second opinion was requested from a specialized center that suggested, because of the histology and IHC, a well differentiated neuroendocrine tumor G1 without being able to completely confirm it.

In the imaging tests it was never associated to organ dependence. The patient did not have the clinical carcinoid syndrome, and the result of the hormone profile was normal. After the PA information, a PET/CAT 68-Ga-DOTATATE was performed with multiple metastatic bone lesions of the tumor that expressed somatostatin receptors. With the data available, treatment with lanreotide and zoledronic acid was initiated on behalf of Oncology.

Since the second opinion of the PA was not clearly conclusive, it was sent to a third party in another specialized center, that also provided references that suggested probable NET G1, but once again, inconclusive. Currently there is a sample in the National Center of Oncology Investigations where NGS (next generation sequencing) is being performed to see if it is possible to provide greater information that helps clarify this rare tumor.

The patient remains asymptomatic although the hepatic nodules have grown very discreetly, continues in treatment and control by Oncology.

Discussion

The NETs constitute a group of very heterogenous neoplasms whose evolution and prognosis are conditioned by their histologic appearance, proliferation rate (mitotic count and Ki67) and their degree (low G1, intermediate G2 or high G3)[3].

In the G1 and G2, the behavior tends to be indolent, not as the G3s that tend to be aggressive and present metastasis in multiple locations. According to the literature, just as in the case of this patient, when an NET of an unknown primary site (UPS) is recognized histologically, the majority correspond to well differentiated and low grade, despite which they initially present with systemic disease[4].

The histology degree may be the only prognosis parameter available for this group of metastatic tumors, since the IHC stains are not definitive, the molecular patters of genetic expression can overlap making a concrete diagnosis difficult[5].

In this case, the IHC study positively proved for chromogranin, synaptophysin, CD56, CKAE1/A3 and EMA, orienting to NET. The lack of a Zellballen pattern, inhibin, GATA3, PAX8 and other parameters, permitted the reasonable but not definitive exclusion of other origins. In addition to the traditional multiple CAT, occasionally the initial evaluation requires images that can be crucial in the detection of NETs of UPS. This is the case of PET combined with Galium 68-DOTATATE, an analog radio marker of the somatostatin that constitutes a first line diagnostic method in these situations, since 80% of the well differentiated NET of UPS have high concentrations of somatostatin receptors[6]. This test has demonstrated increased sensitivity of diagnosis with respect to the gammagraphy with indium pentetreotide-111 (OctreoScan)[7]. If the primary is not identified, endoscopies must be performed even though the endoscopic video capsule is not routinely recommended. Treatment of well differentiated NETs of UPS is similar to those of the gastrointestinal tract[8].

In function of the clinical situation, they may need local control therapy (surgical resection, arterial hepatic embolization, etc.) or systemic. Somatostatin analogues (octreotide, lanreotide), must be considered to inhibit the tumor growth in patients with evidence of expression of receptors of this hormone just as it has been referenced in the CLARINET study.

The RT with peptide receptors with marked somatostatin analogues (Lu-177 DOTATATO) appear reasonable (NETTER1 study) and may be considered everolimus in those NET of the lung or gastrointestinal tract (RADIANT-4 study). The role of chemotherapy, fundamentally capecitabine/temozolomide, is controversial but may be considered in clinically very aggressive tumors. From the surgical point of view, the foresight and planning for possible complication of this type of surgery is very important. Very large tumors are accompanied by important vascularization that makes hemostasis more difficult, along with the intrinsic anatomical obstacles in pelvic surgery, making this case a complex intervention.

To control the pelvic retroperitoneal venous bleeding various techniques have been proposed such as ligation of the iliac vessels, local hemostatic agents, packing, fastening of pins in the sacrum, electocauterization or the use of wax on the bone[9].

Occasionally, arterial embolization can be used to reduce the blood loss of the venous return bleeding[10] and it is recommendable to alert radiology interventionists in similar cases. In cases of massive bleeding no measure has demonstrated clear superiority over the rest, but good planning and knowledge of the possible application of each one of them increases the possibility of success.

The case presented assumed an anatomopathological diagnostic challenge with the implications for the oncologists that this brings with it, and therapeutic approach in the surgical aspect. The knowledge of this entity and of the different strategies that can be carried out, could help improve the prognosis of these patients.

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8

Giant phyllodes tumor and breast disfiguring. Immediate reconstruction in a complex case

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Introduction

Breast PT are biphasic fibroepithelial neoplasms, with an epithelial glandular component comprised of lobes and ducts, surrounded by hyper cellular mesenchymal, and that typically appear in the pathology exam with a leaf shape by finding papillary projections, giving them their name of "phyllodes"[1].

They are extremely rare, representing <1% of all breast tumors[1]. The WHO classifies them according to their different biological behaviors based on the nuclear atypias, mitotic activity, appearance of the margins and their differentiation[2].

According to the aforementioned, they are benign in >60—70%, 16—25% are malignant and the rest are borderline[2]. In fact the benign can reoccur locally, which is why resection with ample margins or mastectomy constitute the treatment of choice.[3].

On the other hand, those tumors >10 cm are considered "giant", and represent less than 10% of the PT. These giant tumors posses vascularization according to their size which makes the resection and hemostasis difficult. There is very little literature for this type of surgery with immediate reconstruction (IR), and even less for combined autologous-implants. The following is the unusual case of a patient with borderline PT of 45 cm, with a complex demolition period and reconstructed with an autologous latissimus dorsi flap (ALDM) combined with implant, as well as a review of the literature.

Image 1: Phyllodes tumor of the right breast during physical exploration.

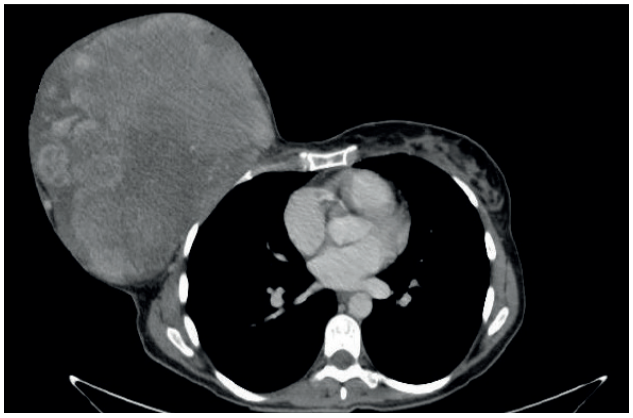

Image 2: CAT prior to surgery with radiological dimensions and characteristics of the tumor. Highlight of neovascularization.

Image 3: Short term result of mastectomy with immediate reconstruction using latissimus dorsi flap with prothesis and contralateral breast symmetrization by mastopexy. Micropigmentation of the right nipple is pending for a definitive result.

Clinical case

A 42 year old patient without history of interest, comes for consultation due to a tumor in the right breast (RB) with an evolution of one year of progressive growth. An MRI performed in another center informed a lesion of 18 x 14 x 16 cm suggestive of a BIRADS-5 lesion, with loss of follow-up during more than 6 months and without histology for the diagnosis, as well as its evident growth. The physical examination (PE) showed a totally disfigured breast occupied by a giant tumor *(→ Image 1)*.

The study was updated with a CT that described RB with heterogenous mass, abundant vascularization and necrotic areas that suggest PT, probably degenerated *(→ Image 2)*, with sub centimetric locoregional adenopathies. A core needle biopsy (CNB) of the lesion was congruent with the radiologic suspicion, showing areas of stromal growth in the periphery ductal and acinar structures for PT at least borderline. A mastectomy was performed, made very difficult due to the size of the mass. that was enormously vascularized given its growth. During the excision, in spite of the use of sealing energy, there was significant hemorrhagic diathesis. Control of the bleeding was through adhesion of various medicated matrixes as a hemostatic agent, combined with compression, achieving the stoppage of the bleeding. Excision of various pathological axillary adenopathies and resection of the infiltrated pectoralis major. The IR was performed using ADLM with an island of 14 x 8 cm and placement of a tissue expander. The PE of the piece showed dimensions of 45 x 32 x 25 cm and it was reported as borderline PT widely neovascularized, with 3 mitosis/field and a proliferation index <5%, with free margins. The adenopathies resulted reactive.

Once the expansion was completed, that was limited due to slight capsular contraction, a circular/radial capsulotomy was performed and the expander was replaced with a prothesis, in the same surgical act over the MI a fibroadenoma excision and symmetrizing mastopexy were performed. Due to the characteristics of the case adjuvant radiotherapy (RT) was proposed, that the patient declined. During follow-up, the oncological, functional, aesthetic and subjective results are correct with two interventions *(→ Image 3)*. The definitive result will culminate with the micropigmentation of the nipple, that was postponed due to the current situation of the COVID pandemic.

Discussion

PT must be completely resected with free margins >1 cm, specifically borderline and malignant cases to reduce the possibility of a local recurrence[4]. In those unusual giant cases, the mastectomy is necessary to respect the aforementioned precept[5]. Breast reconstruction surgery is growing since the loss of the body image is one of the major negative factors in the quality of life and rehabilitation of the survivors[6]. Doing it immediately also reduces the number of interventions to be undergone[7], so when it is feasible, this must be the preferred option. The ADML is one of the best options for reconstruction both immediate or afterward. Normally, achieving an ideal shape and volume is extremely demanding in a reconstruction in only one stage, as such in the last decade adding volume using implants has been proposed[8].

The role of radiotherapy is controversial on occasion but according to recent revised studies it is indicated in malignant and borderline PT in order to reduce local relapse[9], while the role of chemotherapy is more limited and is reserved only for malignant cases albeit with certain caution[10].

In spite of the scarce frequency of these types of tumors, some giant tumors similar to this case have been reported (Tarun, et al., 50 x 25 cm; Sarvanandan R, et al., 40 x 35 cm; Dong Xia, et al., 47 x 37 cm; Islam S, et al. 50 x 50 cm)[11,12,13], but other publications whose treatment was mastectomy with IR autologous with wide dorsal combined with alloplastic have not been found. It merits highlighting that neither the infiltration of the pectoralis major nor the profuse vascularization of the giant PT are problems for performing this surgery, although planning for the possible tendency for abundant bleeding and having sufficient strategies for a correct hemostasis is necessary.

In this case, the pre-surgical computed axial tomography showed the foreseeable difficulty due to the vasculature of the tumor and we applied numerous measures to control it. In summary, it is recognized that the results of the oncoplastic procedures have high rates of survival and low rates of local recurrence and need for re-intervention, where the IR provides psychosocial, emotional and functional improvements for a healthier psychology, self-esteem, sexuality and body image.

To carry out the aforementioned, the symmetrization aspect of the oncoplastic surgery also has an important role. In our experience, we consider that it can be performed even in giant PT, very vascularized and infiltrated, as in this case. In expert hands, the IR combined with autologous-alloplastic is a safe and viable option, to be considered due to its good results at all levels and with the need for few interventions.

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9

Izbicki technique for the treatment of chronic pancreatitis in patient with incomplete pancreas divisum

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Introduction

Chronic pancreatitis is a chronic inflammation and fibrosis of the pancreas, with a prevalence between 13.5—52.4 cases/100,000 inhabitants[1]. Of multifactorial etiology, considering tabaco and alcohol as the most important environmental risk factors. Nonetheless, the second most frequent cause is considered to be idiopathic, although more genetic factors are being found such as the mutation of the SPINK 1 gene, the PRSS1 or hereditary such as cystic fibrosis (mutation of the CFTR gene). Other frequent causes include hypercalcemia, hypertrygliceridemia, autoimmune diseases and anatomic alterations such as the annular pancreas, the Oddi sphincter dysfunction or pancreas divisum[2,3].

The most accepted hypothesis for the development of chronic pancreatitis is a first cell damage, in the majority of cases secondary to acute pancreatitis, with a posterior sustained intra-cellular activation of the trypsin in the acinar cells with damage and cellular death of the same, creating inflammation and posteriorly, in the case of repeated episodes, fibrosis[2].

Its diagnosis is defined by clinical criteria: abdominal pain, exocrine insufficiency, leading to malabsorption, malnutrition and steatorrhea and endocrine insufficiency with development of diabetes mellitus. Image criteria are Computerized Tomography (CT) and/or Nuclear Magnetic Resonance; pancreatic calcifications, ductal dilatations and atrophy. In case of doubts, an endoscopic ultrasound (EUS) can be of help for the diagnosis. Multiple classifications have been proposed to valuate the severity and/or evolution of the illness, however, a consensus for its use has not been reached[3,4].

The treatment, initially, consists in the modification of habits: tobacco and alcohol abstinence and the treatment of the exocrine and endocrine deficiencies. With the administration of pancreatic enzymes and nutritional supplements with multi-vitamins (especially those that contain fat soluble vitamins) and a low fat diet, the symptomology can be controlled in some cases[1,2,5]. For chronic pain refractory to adequate analgesic treatment, in up to 30—50% of patients, with lithiasis and/or stenosis of the pancreatic conduct, an endoscopic or surgical treatment may be of benefit[2,3].

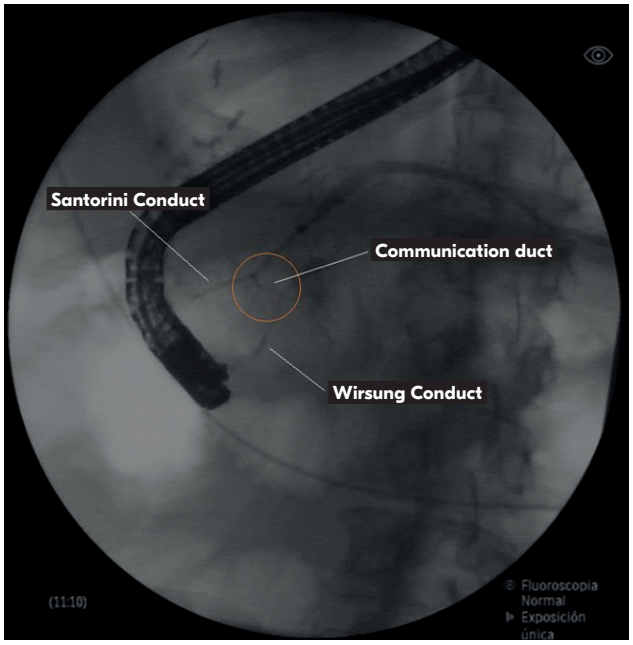

Image 1: Image of ERCP where the Santorini conduct is visualized with distal dilatation and drainage through the papilla minor, Wirsung conduct con communication duct between the two ventral and dorsal systems.

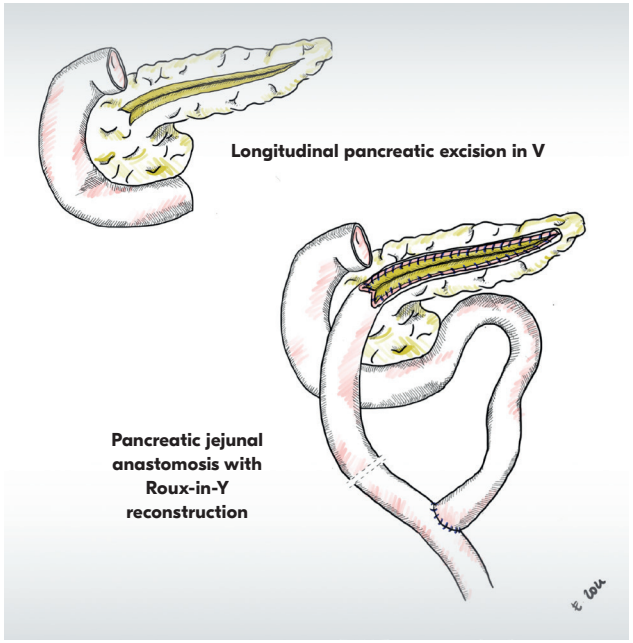

Image 2: Izbicki technique scheme.

Clinical case

We present the case of a male patient of 62 years of age without known allergies, one pack a day smoker and ex moderate alcoholism, currently abstinent. With relevant pathological history of: arterial hypertension, dyslipidemia and left iliac aneurysm surgery.

The patient appears in the first episode of acute pancreatitis that requires hospitalization in another center, initially identified as biliary by ultrasound with biliary mud. For which subsequently, is intervened performing a laparoscopic cholecystectomy.

Since then, the patient has had multiple hospitalizations initially for acute pancreatitis, later being diagnosed with chronic pancreatitis using magnetic resonance cholangiopancreatography (MRCP), with secondary recurrences and incomplete pancreas divisum. On multiple occasions endoscopic retrograde cholangiopancreatectomies (ERCP) and Endoscopic ultrasound (EUS) are performed for assessment and pancreatic drainage, showing evidence of a thin Wirsung's duct with communication with the thin Santorini conduct but that seems to drain the pancreatic dorsal conduct *(→ Image 1)*. Unsuccessful attempt to cannulate the minor papilla, in spite of multiple attempts. On one of the occasions, stenosis of the distal common bile duct secondary to the inflammatory process is also evident and minimum dilatation of the bile duct to the stenosis, leading to the performance of a sphincterotomy and material is collected for cytology (negative for malignant cells).

The patient persistently returns due to recurrence of chronic pancreatitis, with abdominal pain requiring habitual analgesics and with development of exocrine insufficiency, with weight loss and malnutrition, requiring pancreatic enzyme replacement therapy. It is decided to complete the study with an MRCP with Secretin, for a better visualization of the pancreatic conduct system[5], confirming lesions suggestive of chronic pancreatitis with a globular pancreatic head with calcifications and body/tail discretely atrophic. In this study it is confirmed that the pancreatic drainage is through the papilla minor and that presents a filiform drainage through the papilla major.

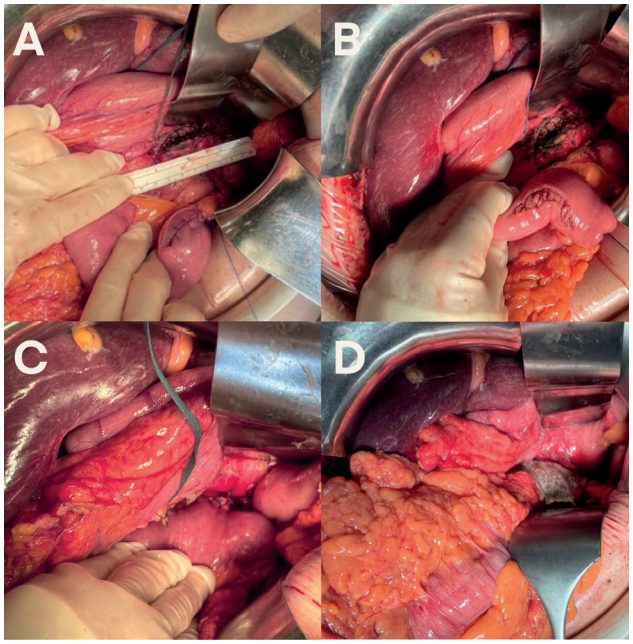

Image 3: Images of the intervention. **3A:** Longitudinal pancreatic excision in V. **3B:** Incision in jejunal handle. **3C:** Laterolateral pancreatic jejunal anastomosis. **4D:** Placement of a medicated matrix for the control of the hemostasis and pancreatic fistula (TachoSil®).

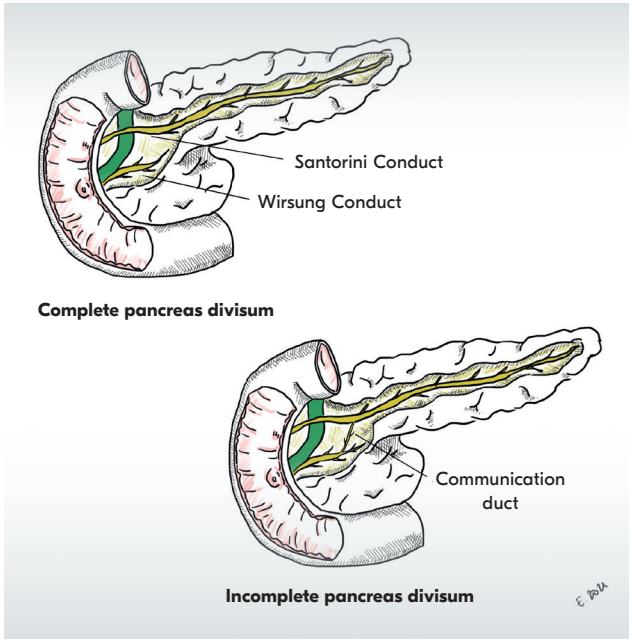

Image 4: Complete or incomplete pancreas divisum scheme.

The case is presented to the multidisciplinary committee in our center and due to the persistence of flare-ups of the chronic pancreatitis and the impossibility of an endoscopic drainage of the papillary minor, surgical intervention is chosen. A resective surgery is planned; a Whipple type cephalic duodenopancreatectomy (CPD) or a cephalic pancreatectomy with preservation of the Beger duodenum, or a derivative surgery according to the intra-operatory findings.

Through an amplified right subcostal laparotomy, descent to the hepatic angle and Kocher maneuver is performed visualizing the inferior vena cava with difficulty due to significant fibrosis. Opening of the trans cavity is performed observing a hard pancreas. Due to the retraction and fibrosis secondary to the multiple episodes of pancreatitis, the impossibility of the dissection of the superior mesenteric vein (SMV) of the inferior pancreatic margin and of the hepatic ilium and gastroduodenal artery is evident. An intra-operatory ultrasound is performed that shows calcifications on the pancreatic head and an not dilated Wirsung duct.

Considering the local conditions, that make the dissection and control of the portal vein and superior mesenteric vein (SMV) impossible, the performance of a resective surgery is discarded, be it CPD or a Beger intervention, so it is decided to perform a derivation of the pancreatic conduct according to the Izbicki technique (longitudinal pancreatic excision in V with reconstruction Roux-in-Y).

With the intra-operatory ultrasound the Wirsung conduct is located and is punctured with a needle. Afterward, a longitudinal incision is made through the entire length of the Wirsung conduct with V opening and a pancreatic jejunal anastomosis with continuous sutures of PDS 3/0 is performed with posterior placement of a medicated matrix for the control of the hemostasis and pancreatic fistula (TachoSil®) *(→ Images 3 and 4)*.

Reconstruction Roux-in-Y is carried out, with the loop foot with continuous sutures of PDS 2/0 termino-lateral manual sutures. Finally, a gentle peripancreatic aspiration drainage is left in place.

During the first 48 hours post operatory, the patient presents a paralytic ileums so a nasogastric tube (NGT) is introduced, an abdominal CT is performed to discard postsurgical complications. In the context of vomiting, a left basal pneumonia appears, possible from aspiration, so empirical intravenous (iv) antibiotic therapy was started. In successive days the NGT is removed and a progressive diet is reintroduced. The patient has a biochemical leak at the level of the peripancreatic drainage with posterior normalization of the analysis of the amylases in the drainage, being able to remove it afterwards without complications. The patient is discharged the thirteenth postoperative day with domiciliary hospitalization to complete the iv antibiotic treatment for the pneumonia.

In the external follow-up visits the patient presents a good general state, with correct oral tolerance, weight increase and without new episodes of chronic pancreatitis flare-ups at 5 months of the intervention.

Discussion

In the case we present the patient has multiple co-factors for the development of a chronic pancreatitis: alcoholism and smoking, an anatomic anomaly of incomplete pancreas divisum with drainage mainly through the papilla minor and as a trigger, acute biliary pancreatitis.

The pancreas divisum is the most frequent congenital malformation of the pancreas with a prevalence of 5—10%. It is due to a lack of fusion of the dorsal and ventral pancreatic conducts during the primary phases of the embryogenesis. In the case of complete pancreas divisum (70% of the cases), the two conducts have no communication between them, resulting in the dorsal conduct or the Santorini, predominately, drains through the papilla minor and the ventral conduct or Wirsung drains through the papilla mayor. In the incomplete pancreas divisum (15% of the cases) there is a branch of communication between the two systems being primarily, the principal drainage through the papillary minor[5,7] *(→ Image 4).*

In 95% of the patients with pancreas divisum are asymptomatic, being diagnosed accidentally in image tests for other motives. The 5% remaining can present symptoms of acute recurring pancreatitis and even develop chronic pancreatitis.

It has been postulated that the small size of the papilla minor, may give way to an inadequate drainage of the pancreatic secretions and, as a consequence, a hyper pressure and intraductal dilatation that could provoke the abdominal pain and even an acute pancreatitis (although it is considered a co-factor in the presence of other factors, not a trigger)[7].

The Gold Standard for treatment is endoscopic drainage of the papilla minor, performing a sphincterotomy, balloon dilatations or the placement of a prothesis at the level of the same[5], In the cases that this treatment is not effective or cannot be performed, the treatment of choice is surgery.

In the case of the chronic pancreatitis without anatomic alterations, the treatment of biliary stenosis and of the peripancreatic collections, currently, are also performed using endoscopic techniques: ERCP (with sphincterotomy and placement of a prothesis) or EUS (with puncture, drainage or blockage of the celiac plexus or other techniques) or percutaneous guided by imaging. Even so, cases of persistent chronic pain that don't respond to intensive analgesic treatment and endoscopic treatments, should be considered for surgery[1].

Surgical treatment for chronic pancreatitis will depend on the course of the illness, of the characteristics of the pancreas and of the anatomic variations of the patient[1].

The different surgical techniques can be classified as: resective, derivative or mixed[7,8,9] *(→ Table 1).*

Given the characteristics of our patient, once the conservative treatments were exhausted, it was decide to perform a surgical intervention. Given the intra-operatory findings, and the impossibility of performing a resective surgery, because of the local characteristics of the pancreas due to the fibrosis secondary to the chronic pancreatitis, it was decided to perform a derivative technique.

In the case of our patient, according to the preoperative tests (MRCP and EUS) and in the intra-operatory ultrasound, presenting a Wirsung of <7 mm for which, finally, it was decided to perform a longitudinal pancreatic excision in V with pancreatic jejunostomy following the Izbicki technique.

RESECTIVES	MIXED	DERIVATIVES
Cephalic duodeno pancreatectomy with or without pyloric preservation *(Whipple technique)*	Partial resection of the pancreatic tail with opening of the pancreatic conduct with pancreatic jejunostomy Roux-in-Y or pancreaticoagstrostomy *(Puestow technique)*	Opening of the pancreatic conduct with latero-lateral pancreatic jejunostomy *(Partington-Rochelle technique)*: if Wirsung conduct >7 mm
Cephalic pancreatectomy with duodenectomy in the second portion of the duodenum (including minor and major papilla) with end-to-end duo-deno-duoduodenostomy and pancreatic jejunostomy and Roux-in-Y hepatic jejunostomy *(Nakao technique)*	Partial resection of the pancreatic head and isthmus **with** preserva-tion of the duodenum with pancreatic jejunostomy Roux-in-Y *(Beger technique)*	Pancreatic longitudinal excision in V with latero-lateral pancreatic jejunostomy *(Izbicki technique)*: if Wirsung conduct <7 mm
Distal pancreatectomy	Partial resection of the pancreatic head and isthmus **without** pres-ervation of the duodenum with pancreatic jejunostomy Roux-in-Y *(Bern technique)*	
Total pancreatectomy	Total resection of the head with opening of the Wirsung conduct with pancreatic jejunostomy Roux-in-Y *(Frey technique)*: if Wirsung conduct >7 mm	

Table 1: Classification of the surgical techniques used in chronic pancreatitis.

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10

Use of a collagen matrix in the treatment of a renal laceration secondary to a penetrating stab wound

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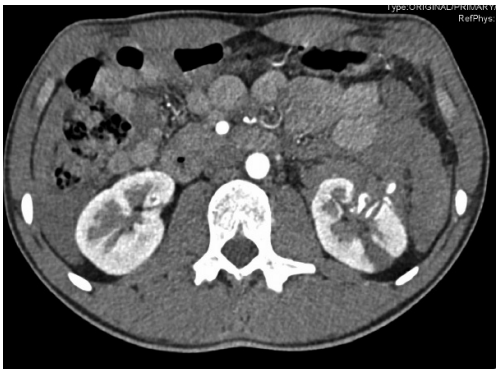

Image 1: Abdominal CT on diagnosis, where left renal laceration with active bleeding in the arterial phase is observed.

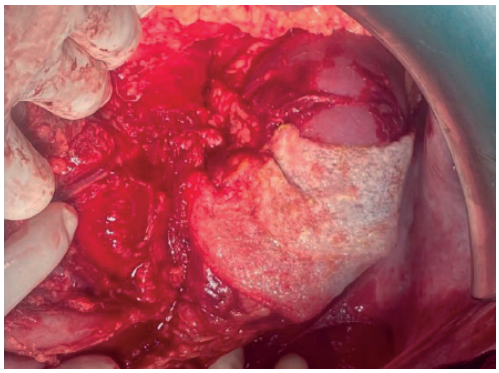

Image 2: Application of TachoSil® on renal laceration.

Introduction

We present the clinical case of an 18 year old male referred to Emergency after suffering penetrating abdominal stab wound, with renal involvement, that required urgent laparotomy where perforation of hollow viscera and a renal laceration are observed. We present use of TachoSil® in the repair of the same.

Clinical case

Male of 18 years of age, without history of interest, that is brought to Emergency Room (ER) of our center for out-of-hospital emergency services after suffering a penetrating abdominal stab wound.

Upon arrival to ER, the patient is hemodynamically stable; physical exploration reveals a penetrating wound on the left flank of approximately 4 cm in length, with exposure of epiploic fat.

An emergency abdominal computerized tomography (CT) is performed *(→ Image 1)*, in which an extensive free distribution hemoperitoneum, together with isolated bubbles of pneumoperitoneum in the proximity of the transverse colon are observed. In addition, a perirenal hematoma and renal laceration with involvement of both cortices and spinal cord injury, together with active bleeding dependent on intrarenal arteries. Given the findings of the imaging study and the lesion mechanism, an urgent exploratory laparotomy is performed.

A median laparotomy approach is performed, showing abundant hemoperitoneum (2L), contained retroperitoneal hematoma and two perforations of the transverse colon close to the splenic angle, so segmental resection and anastomosis of the transverse colon were performed. In addition, a prior laceration of the lower renal pole with active bleeding is found. Hemostatic stiches with vicryl 1/0 and teflon are applied with partial control of the bleeding, so two sheets of collagen matrix TachoSil® are applied, with complete hemostatic control *(→ Image 2)*.

The patient has an initial positive postoperative evolution, maintaining hemodynamic stability and moving to the general ward after 24 hours of monitoring in the Intensive Care Unit.

In the follow-up abdominal computerized tomography performed on the fifth postoperative day, the formation of a pseudoaneurysm on the left kidney is observed, so an embolization of it is performed by a radiology interventionist. At 2 months a control ultrasound is performed, finding scar tissue in the lower renal pole and a perirenal collection, with patient completely asymptomatic so conservative handling of the same is decided.

Discussion

The use of TachoSil® as a sealant and hemostat has been demonstrated in diverse fields, such as general surgery, cardiac and urology surgery, demonstrating efficacy in the prevention of local hemorrhaging complications[1,2,4]. In addition to its extended use in elective surgery, its use in emergency surgery[3] can help to facilitate, in cases such as the one we presented, the organic preservation after and adequate control of the bleeding.

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11

Use of a collagen matrix in the prevention of tracheal fistula. Case study

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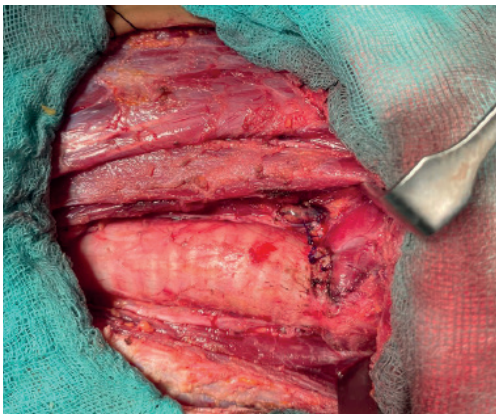

Image 1: Suturing of a tracheal laceration during a total thyroidectomy.

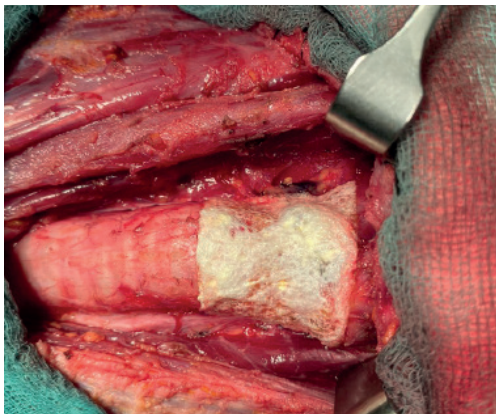

Image 2: Application of the TachoSil® collagen matrix over tracheal suture.

Introduction

We present the case of a 31 year old female with thyroid papillary carcinoma with cervical lymph node involvement, in which a total thyroidectomy central lymphadenectomy and functional lateral lymphadenectomy are performed.

During surgery, there was an accidental injury to the first tracheal cartilage, which was repaired using TachoSil®.

Clinical case

Female of 31 years of age, without history of interest, in which a study is initiated upon the appearance of a lateral cervical mass with growth in recent months.

In the diagnostic cervical ultrasound a heterogenous right thyroid nodule is identified, with interior calcifications. A fine needle aspiration puncture (PAAF) is performed, diagnosing malignant tumor cells, with findings compatible with papillary carcinoma. At the same time, two lesions on the right level III are identified, one solid and the other cystic, that also present PAAF compatible with metastasis of papillary thyroid carcinoma.

A total thyroidectomy is performed, with central and functional right lateral lymphadenectomy, with intraoperatory monitoring of both recurrent laryngeal nerves and right spinal nerve.

During the dissection maneuvers a small laceration at the level of the first tracheal cartilage is produced, that is sutured with loose stitches PDS 3/0 *(→ Image 1)*.

To reinforce the suture and minimize the risk of tracheal fistula a TachoSil® collagen matrix is applied as a sealant over the suture line *(→ Image 2)*.

Intraoperative tracheal air-tightness test is performed after the placement of TachoSil®, no evidence of air leaks are found.

In the post-operatory the patient presents a favorable evolution, without appearance of cervical hematoma nor signs of tracheal fistula development. Only a transitory hypocalcemia was seen, that was corrected with the use of intravenous profusion and oral supplements of calcium and vitamin D.

Discussion

Thyroidectomy is one of the most frequent endocrine surgeries, with a low rate of complications, being the most common recurring lesions and post surgery hypocalcemia. The tracheal lesion during this surgery is rare, normally it is not perceived or is generated postoperatively secondary to an ischemic lesion of the tracheal tissue.

The use of TachoSil® in the repair of the tracheal perforations, both those found in the same surgical event as well as those diagnosed posteriorly, are found described in the literature[1,2,3]. In this case, we applied TachoSil® over the suture bed to favor the sealing of the tracheal cartilage in the lesion detected during the surgery.

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12

Use of TachoSil® in right hepatectomy for hepatic hydatid disease

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Image 1: Abdominal CT: Calcified hydatid cyst hepatic segment VII.

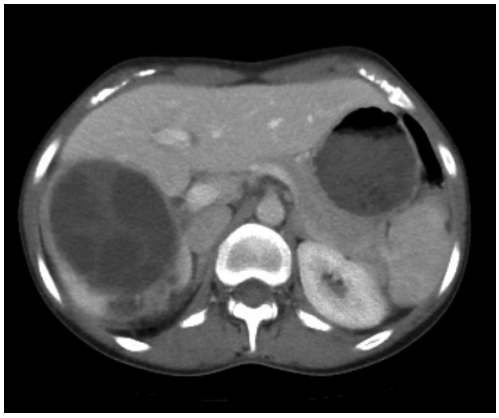

Image 2: Abdominal CT: Multivesiculated hydatid cyst hepatic segment VI.

Introduction

Hydatid disease is a cosmopolitan zoonosis that is associated to considerable healthcare costs, particularly in endemic livestock areas. It affects the liver, alone or in association with other viscera in more than 70% of the cases[1,2].

Surgical treatment of hepatic hydatid cysts has benefited from the progress in hepatobiliary surgery, as well as in the development of a multimodal therapeutic strategy that includes percutaneous, medical and endoscopic treatments. Currently, the surgery associated to albendazole, is the treatment of reference for cysts that are not receptive to percutaneous treatment, as well as other complicated cysts. Its objective is to completely eradicate the parasitic elements, avoiding peritoneal dissemination, residual cavity collapse and to treat possible biliary fistulas. In the election of the surgical technique[1] (resection of the prominent dome, total or subtotal peri cystectomy, hepatectomy) taking into consideration the anatomical location as well as the characteristics of the cyst[1,2,3].

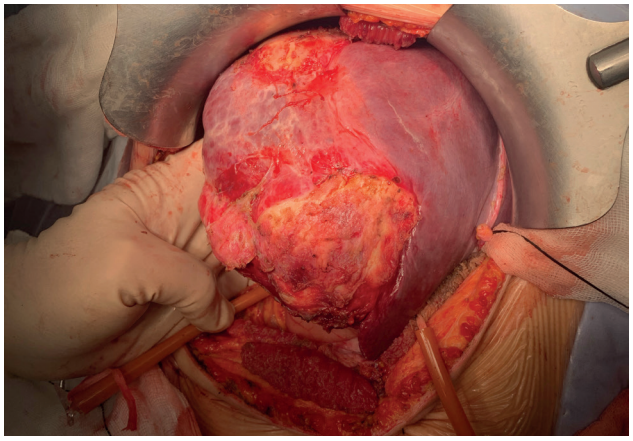

Image 3: Hepatic hydatid cysts.

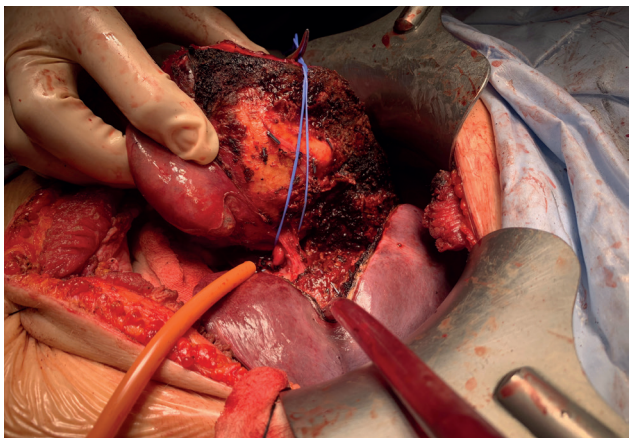

Image 4: Right hepatic pedicle.

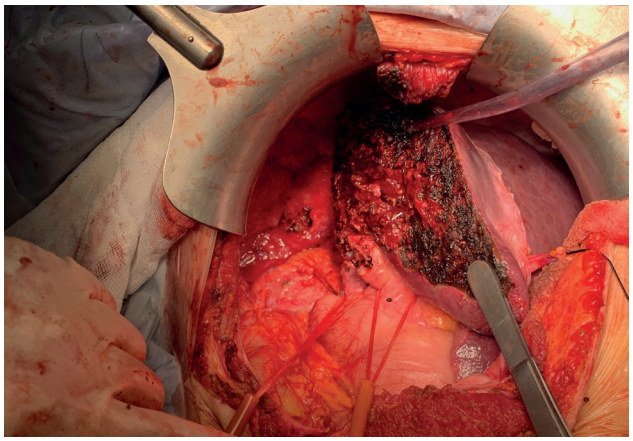

Image 5: Surgical bed right hepatectomy.

Clinical case

Female of 40 years of age, without personal history of interest, referred to surgical consultation due to findings of hydatic cysts in thorax CT requested by pneumonology to study persistent bronchial mucous. Asymptomatic from the digestive point of view.

Lives with vaccinated domestic animals, lived her childhood in rural areas in contact with non-vaccinated animals.

Faced with findings suggestive of hydatic cysts in abdominal slices of the thorax CT, the study was extended with an abdominal CT, abdominal ultrasound and blood analysis with serology.

In the ultrasound a calcified lesion of approximately 4 cm is found in the hepatic dome and a large size multiseptated cystic lesion in the right hepatic lobe of approximately 8 cm at maximum diameter compatible with hydatid cysts.

In the abdominal CT a densely calcified sub-capsular cyst of 4.5 cm in segment VII *(→ Image 1)* is identified, as well as another cyst with a calcified wall with vesicles inside it measuring 8.7 cm in segment VI *(→ Image 2)*. There is no evidence of communication with the biliary tract nor rupture of the peritoneum.

The blood analysis revealed total bilirubin of 1.5 mg/dl and anti Echinococcus antibodies +1/1,280.

Faced with these findings, initial medical treatment with albendazole during 8 weeks is proposed with posterior surgical resection of the described lesions.

Intraoperative findings include hepatic lesions compatible with hydatid cysts *(→ Image 3)*, one of them multi-vesiculated occupying segments V, Vi and part of VII and another partially calcified occupying segment VII and firmly adhered to the diaphragm. After isolation of the hepatic pedicle and the inphrahepatic vena cava, a right hepatectomy is performed with intraparenchymatous section of right pedicle *(→ Image 4)* and the accessory right hepatic vein with endograft. The hepatic resection is finalized *(→ Image 5)*, without evidence of bleeding nor intraoperatory biliary fistula, it is decided to place in the surgical bed a medicated matrix for control of hemostasis and sealing (TachoSil®) *(→ Image 6)*.

The patient was discharged on the 6th postoperative day without incidents.

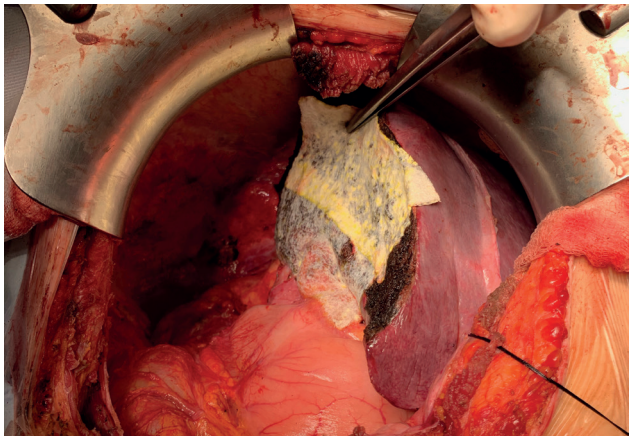

Image 6: TachoSil® in hepatectomy bed.

Image 7: Right hepatectomy piece.

Image 8: Right hepatectomy piece with hydatid cysts.

The pathological anatomy report described the piece as right hepatectomy with hydatid cysts *(→Images 7 and 8)*, with presence of inflammatory changes in the hepatic parenchyma adjacent to the cysts, without other relevant histological alterations.

In the successive follow-up consultations, the patient remains asymptomatic.

Discussion

Surgical treatment of hepatic hydatid cysts has benefited from the progress in imaging test and hepatobiliary surgery. It is part of a multidisciplinary strategy that includes medical, percutaneous and endoscopic treatments. These advances have facilitated the standardization of the radiological classification, of the therapeutic indications and of the methods of long-term monitoring[3,4,5].

Currently, the treatment of reference for cysts that are not receptive to percutaneous treatment, as well as for complicated cysts, is surgery, associated with albendazole. In the preoperative, the endoscopic interventionist has an important role in the management of urgencies and of biliary complications.
In this surgical context, excellent results short and long-term results can be obtained with a technique centered on the elimination of the parasite without peritoneal dissemination and an adequate management of cystobiliary fistulas should they appear[4,5].

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13

Clinical use of the TachoSil® hemostatic in hepatic transplant

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Introduction

We present a case with the application of the hemostatic TachoSil® in a hepatic tear during a multi-organ extraction process, prior to a liver transplant, carried out by the HBP surgical and abdominal transplant team of the University Hospital Complex of A Coruña.

Clinical case

Donor

Female of 70 years of age, without known medication allergies, intervened for perforated duodenal ulcers in her youth, and with medical history of arterial hypertension (AHT), dyslipidemia, hyperuricemia, anxious-depressive syndrome and atrial fibrillation being treated with Sintrom®, that suffers a hemorrhagic stroke 72 hours before.

The patient is transferred to Emergencies in our hospital, ingresses in the Intensive Care Unit (ICU) after the performance of a cranial Computerized Axial Tomography (CAT) that shows a right-left frontoparietal intraparenchymal hemorrhage, with significant displacement of the medial line and consequent intercranial hypertension.

A few hours later shows clinical signs of cerebral herniation followed by brain death. The hospital transplant coordination proceeds to request the donation from the family, that accepts.

The patient is considered as a potential doner of liver, kidneys and corneas.

Extraction

During the multivisceral abdominal extraction, the extraction team finds an old xipho-pubic median laparotomy and an abdomen with a very blocked supramesocolic compartment, no doubt motivated by the adhesions due to the secondary peritonitis of the perforated ulcers in her youth. The extraction technique is known as the "Nafazato technique or block extraction", a variant of the habitual technique in which the liver-kidney block is extracted together from the donor and the division of the viscera are performed on the table, to later be implanted in different recipients.

Motivated by the dissection of the liver of said adherences, a tear in the Glisson capsule in segment II is produced *(→ Image 1)*. This hepatic decapsulation without a doubt will provoke important "sheet" bleeding at the moment of the reperfusion of the graft in the recipient.

Image 1: Image bank: hepatic tear segment II.

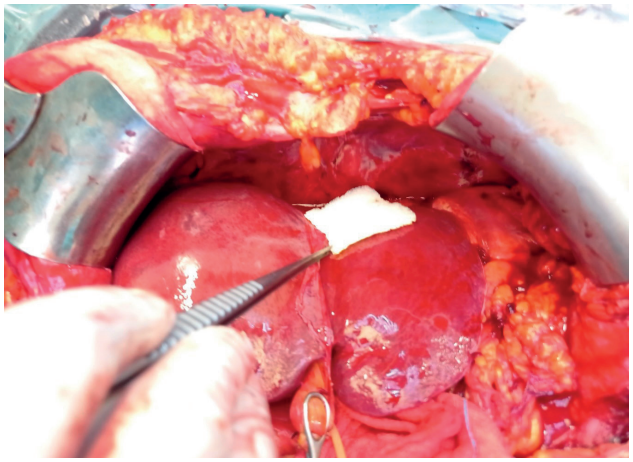

Image 2: Surgical image: application of a moistened TachoSil® patch.

Recipient

The graft will be implanted in a 58 year old patient, in hepatic insufficiency due to ethyl alcoholic cirrhosis, with frequent hydropic decompensations and hepatic encephalopathy (stage Child C) currently registered on the floor of the Digestive Hepatology Unit. Also suffering from an important coagulation alteration (INR 2.1) and thrombopenia (43,000 platelets).

Implant

Once the recipient enters the surgery room and the anesthetic procedures are completed, the intervention begins with the hepatectomy of the sick liver.

Afterward the new liver is implanted. First, anastomosis of the suprahepatic veins in the inferior vena cava of the recipient is performed, which is followed by suturing of the portal veins, with which the graft is ready to be revascularized and finalize the cold ischemia phase.

It is at this time that the bleeding due to the decapsulation of segment II will manifest itself. And right now, we are going to apply a TachoSil® patch over the bloody surface *(→ Image 2)*, applying pressure with a compress over it against the liver, during 5 minutes *(→ Image 3)*, stopping the bleeding *(→ Image 4)*.

Afterwards the transplant is finalized with arterial and biliary anastomosis, placement of drains and closure of the abdominal wall.

Postoperative evolution

The evolution was very favorable. The patient had no signs of bleeding and did not require any more transfusions. Discharged from the intensive care unit (ICU) in two days and from the hospital ten days later.

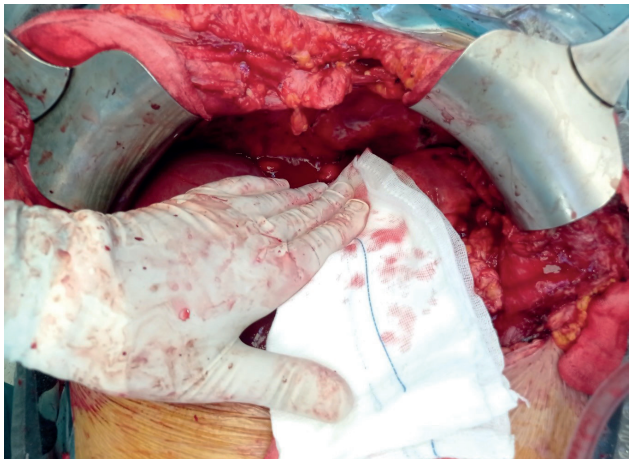

Image 3: Compression for 3 minutes with a dry compress over the patch.

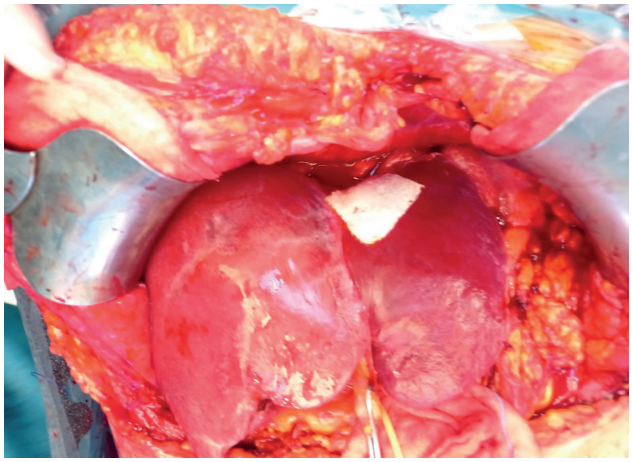

Image 4: Final hemostasis with TachoSil® Patch.

Discussion

The risk of postoperative bleeding is always a principal cause for concern in any surgery. In the case of liver transplants, with a coagulopathic recipient by definition, with a long surgery, implanting a hypothermic hepatic graft; and during the following hours, as it could not be otherwise, underperforming, the hemostasis challenge is major[1].

If, in addition, we add the difficult extraction due to the adherences from prior surgeries, with the possibility of tears in the donor liver, the situation becomes critical.

It is in this context where the appearance of the new hemostatic products such as TachoSil® become a determining support in the armamentarium of transplant surgeons[3]. In this case rapidly and effectively detaining the "sheet" bleeding of a hepatic tear, so difficult to control by other methods, such as electrocoagulation or hemostatic suture[2].

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14

Hepatic metastases CMI and technology for the difficult segments

Major hepatic resection, laparoscopic approach to the posterior segments

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Introduction

The major revolution in abdominal surgery in recent decades has been the introduction of minimally invasive surgery. This technique has taken longer to be adopted in hepatic surgery due to the intrinsic difficulty of this surgery, the complexity of its technique and the lack of surgeons with advanced training in laparoscopic surgery. But above all due to the complex hepatic anatomy, multiple anatomic variants and the variability of the lesions of each patient.

In the year 1992 the first hepatic surgery using laparoscopy in the world took place, it was published by Gagner et al. After the published consensus on hepatic laparoscopic surgery by Louisville and Morioka, laparascopic hepatic surgery has experienced great development and standardization that has permitted many surgeons to learn about it.

Hepatic metastasis of colorectal origin is currently the principal indication for hepatic surgery. The last guides of consensus published by Southampton[1] recommend the laparoscopic approach for the treatment of hepatic metastasis of colorectal origin, with parenchymal sparing surgery being the mainstay of treatment for these patients.

In hepatic surgery, laparoscopy had demonstrated the same results with respect to survival and recurrence, but there are many advantages that laparoscopic surgery[2] has demonstrated over the years among which can be found less postoperative pain, less infection, lower rate of hernias, early ingestion, mobilization and recovery of the patient, which leads to a shorter hospital stay in addition to a better aesthetic result. In addition to the multiple advantages specific to laparoscopy in the aforementioned, it has also demonstrated better results with respect to hematic losses and lower need for transfusions[3].

Currently resection using a minimally invasive approach for hepatic tumors, both benign and malignant localized in peripheral hepatic segments, it is well established and even considered the choice according to the guides of consensus. The performance of these major hepatic resections or the resection of the difficult hepatic segments (segments I, IVa, VII, VIII)[1] are technically more demanding and, even though it is feasible and safe when it is performed by groups with experience, its use is not very extensive. The posterosuperior segments present a technically difficult laparoscopic approach, fundamentally due to the limited view, which could lead to occasionally insufficient surgical margins or conversions to laparotomic surgery. However, with the increase in the experience of laparoscopic hepatic surgery and the continued development of surgical techniques and instruments, diverse publications[4,5] have demonstrated their viability and safety in recent years.

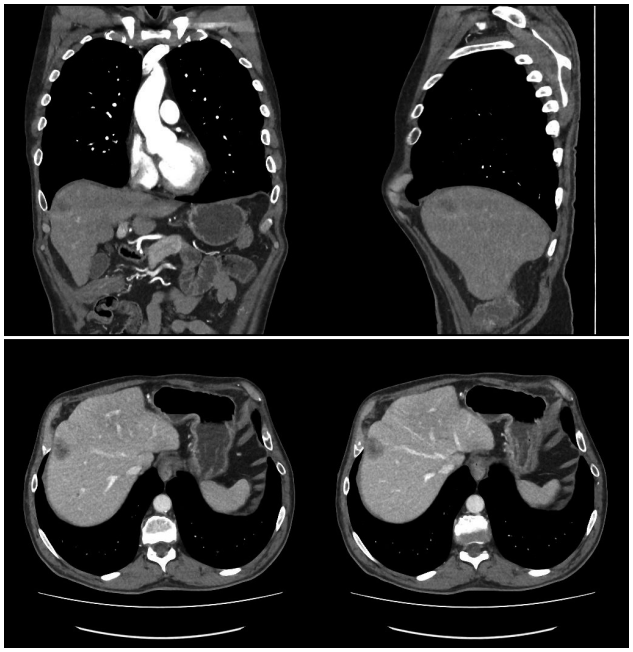

Image 1: CT hypodense subcapsular lesion in segment VIII of 24 x 30 mm.

Image 2: Position of the trocars.

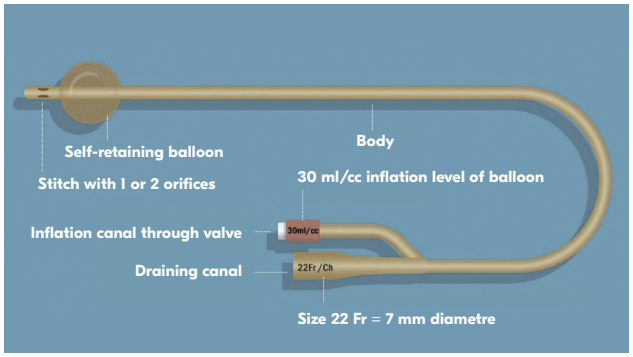

Image 3: Foley tube used to perform Pringle maneuver.

Clinical case

We present the case of a hepatic resection of the difficult segments in our center.

A 61 year old patient, whose only history of interest is dyslipidemia, diagnosed with Sigma adenocarcinoma, after detecting positive blood hidden in the feces during the screening program. In the colonoscopy at 25 cm of the anal margin a proliferative lesion is found, vegetating and ulcerated involving the entire circumference of the colonic lumen, which stenoses the lumen but permits the passage of the colonoscope. Multiple biopsies are taken, with results of pathological anatomy (PA) Adenocarcinoma of the large intestine and is marked with Indian ink proximal and distal to the lesion.

The intervention is in July 2019. High anterior laparoscopic resection of the rectum-sigmoid was performed. Colo-rectal T-T mechanical anastomosis with EEA31. The 4th post-operatory day presents suture dehiscence requiring suture and protective ileostomy using a laparotomic approach. Favorable posterior clinical evolution.

In the study of the surgical piece, is diagnosed with stage pT3pN2B colon Adenocarcinoma.

Receives adjuvant treatment with XELOX x 7 cycles (last 2 without oxaliplatin) that finalizes in February 2020.

During follow-up by Oncology in a control CT a subcapsular hypodense lesion is observed in segment VIII of 24 x 30 mm, with markers in control analytical tests within normal limits *(→ Image 1)*.

With these findings the case is presented in the multidisciplinary committee proposing surgical treatment using a laparascopic approach.

The patient is intervened as programmed under general anesthesia in September 2021. The patient is positioned in the supine decubitus position with legs together and arms outstretched, with the surgeon and assistant alternating between the right and left side of the patient in different stages of the procedure.

A laparoscopic approach is performed under direct vision with supraumbilical trocar slightly lateralized to the left of Hasson. Carbon dioxide was in sufflated to establish pneumoperitoneal and the intrabdominal pressure was sustained at 12 mm Hg. A pure laparo-

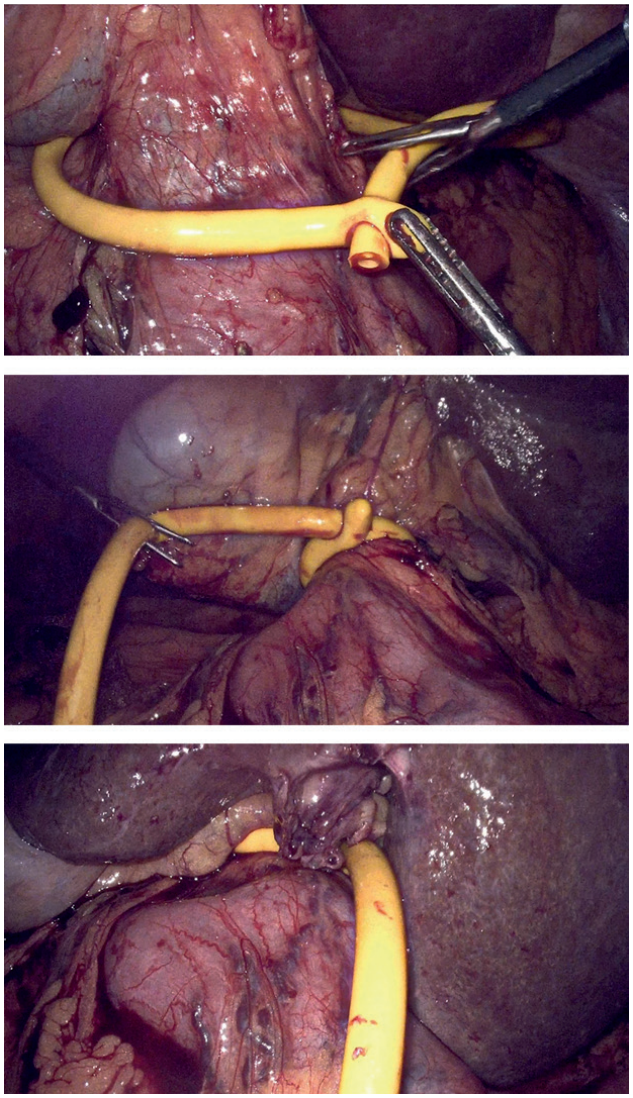

Image 4: Laparoscopic intracorporeal Pringle maneuver.

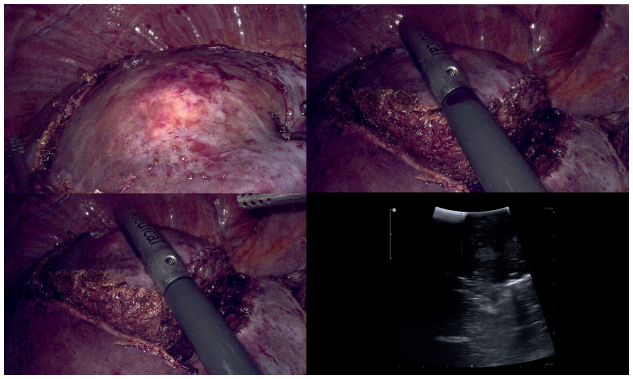

Image 5: Hepatic resection following "diamond technique" guided by intraoperatory ultrasound.

scopic procedure was performed utilizing a rigid 3D 10 mm 30° video laparoscope (Karl Storz). The central venous pressure (CVP) was maintained between 1—3 cm H^2O.

And the placement of the rest of the trocars is: two trocars of 5 mm one in epigastrium and another on right flank and one trocar of 10 mm in HCD *(→ Image 2)*. Findings space occupying lesions (SOL) of 3 cm in segment VIII.

The laparascopic approach begins by placing an intracorporeal Pringle with a Foley tube. It is necessary to customize the Foley tube for its laparoscopic use and so we can introduce it through a trocar of 5mm, to do so it is necessary to cut the Foley tube, removing the drainage canal and the valve inflation canal *(→ Image 3)*. To perform this maneuver we open the hepatic-gastric ligament with the ultrasonic knife, and we lift the liver tractioning the falciform ligament to access the Winslow hiatus and we pass the Foley tube behind the portal triad *(→ Image 4)*.

Starting with a hepatic release through the section of the round ligament and partial section of the falciform ligament. The laparoscopic hepatic resections of segment VIII in general, do not require complete release of the right lobe of the liver. A caudal retraction of the liver using traction of the falciform ligament allows us to access the postero-superior part of the liver.

A guided laparoscopic hepatic resection is performed with intraoperatory ultrasound. When starting the operation we performed an ultrasound to evaluate the entire liver that allowed us to exclude other lesions, in addition to determining the exact size, location and margins of the tumor resection. To do so we marked the margins of the resection with electrocoagulation at 2—3 cm of the borders of the lesion being guided with the laparoscopic ultrasound *(→ Image 5)*.

These marks made on the hepatic capsule with electrocoagulation are seen as acoustic shadows in the ultrasound, permitting the surgeon to evaluate the relationship between the tumor and the planned hepatic resection line.

Following, we start by opening the hepatic capsule and gradually entering into the hepatic parenchyma employing the ultrasonic scalpel, this device permits the performance of a dissection and exposition of the tubular structures both vessels such as biliary conducts that subsequently we with HemO loks. In this

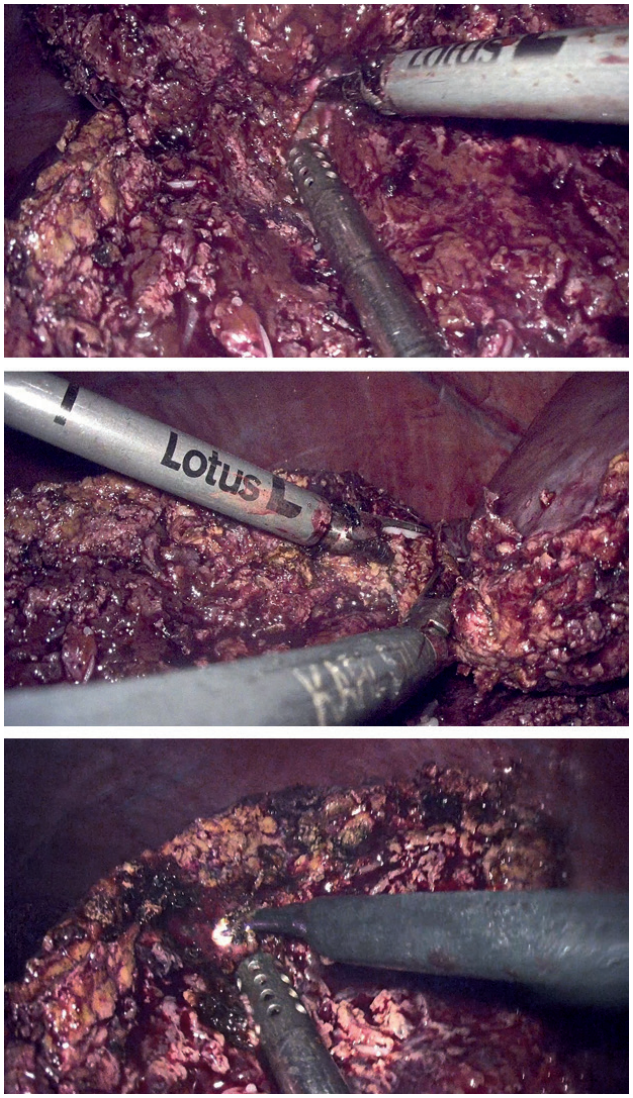

Image 6: Dissection of hepatic parenchyma. Hepatic transection with ultrasonic knife to dissect and expose the structures. Electrocoagulation for hemostatic control.

patient, for the hepatic resection, we used a Pringle maneuver of 15 min *(→ Image 6)*.

Hemostasis was performed with electrocoagulation, and to complete the control of the hemostasis TachoSil® was placed in the bed. This product contains two principal active ingredients: fibrinogen and thrombin. The yellow side of TachoSil® is the active side, when this enters into contact with the blood, in our case, the fibrinogen and the thrombin are activated and form a fibrin network. This signifies that TachoSil® adheres to the surface of the tissue, the blood coagulates producing a local hemostasis and the tissue is sealed. In *(→ Image 7)* we show the handling of the patch for its use in minimally invasive surgery.

The surgical piece was extracted in a bag through the widening of the supraumbilical incision *(→ Image 8)*. Suturing continues in block trocar Hasson. Infiltration of surgical wounds with local anesthesia. Skin staplers applied. No intra-abdominal drainage was required. The surgical time was 150 minutes with blood loss of 50 cc. We show the surgical piece and its margins *(→ Image 9)*.

The patient has a favorable post operatory evolution being discharged withing 24 hours.

The pathological anatomy confirms the presence of adenocarcinoma metastasis with free surgical margins.

Discussion

Hepatic metastasis of colorectal (CRC) origin is the principal indication for hepatic surgery in our environment. Hepatic resection is the principal treatment for these lesions since it increases the survival of these patients. Minimally invasive surgery is an approach for abdominal surgery that provides numerous advantages to the patients. Laparoscopic hepatic surgery in patients with metastasis of CRC origin is significantly associated with lower morbidity than the laparotomic approach.

Due to the great variability of clinical presentations, multidisciplinary management and an individualized treatment of these patients are necessary. The multidisciplinary management and the advance in the treatments and surgical techniques have contributed to the increase in the rate of resectability of hepatic metastasis with CRC origin in recent years.

Image 7: How to use and place TachoSil® in the resection bed, using a minimally invasive approach. To do so the yellow face of the product is placed over the area where we want it to produce its hemostatic effect, just as is seen in the images.

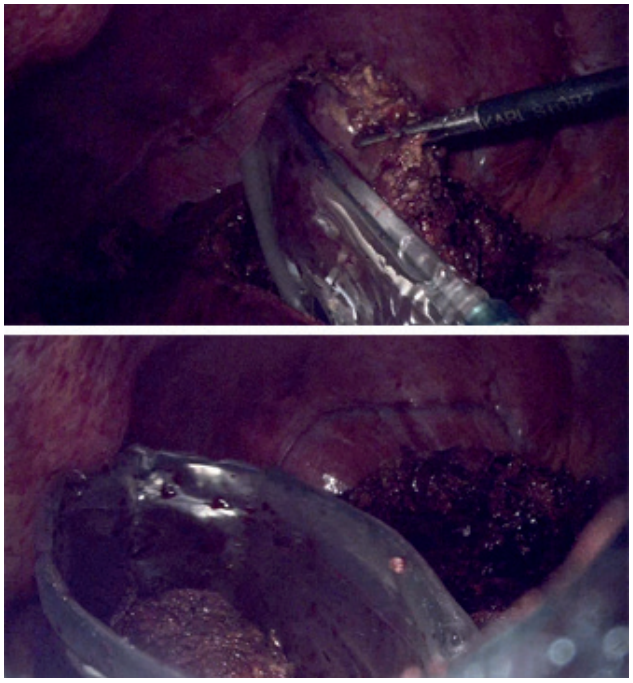

Image 8: Extraction of surgical piece using retrieval bag.

At the time of establishing the surgical treatment it is important to consider the number of hepatic metastasis, the size, their anatomic distribution and the vascular relationships presented be it with suprahepatic veins or the portal pedicles. To do so, CT tends to be the first diagnostic method utilized. Although other complementary tests exist, such as for example MRI that is more useful when detecting small lesions in steatosis livers or in patients in which after neoadjuvant chemotherapy (CT) the lesions have disappeared.

Considering all of this information for each patient we can define the degree of difficulty of the hepatic surgery to be performed. For this, diverse scales have been published that classify the different hepatic resections in a pre-operative manner addressing their difficulty taking into account the anatomic characteristics (IWATE[6]), the type of procedure performed and the risk of the appearance of complications. These scales of difficulty try to classify the procedures for laparoscopic hepatic surgery in a more objective way considering the technical difficulty and the risk of complications to be able to adequate them to degree of experience of the surgeon. These scales intend to guide the hepatic surgeons in the learning and technical development during the learning curve for laparoscopic hepatic surgery. Major hepatectomies show the greatest conversion rate to laparotomy surgery and also the highest rate of complications. Such that the patients with hepatic metastasis must be operated in hospitals of reference with experienced surgeons and that also have the techniques and adequate technology. It has been demonstrated that in centers that meet these conditions the post surgical mortality of hepatic surgery is of 1—3%, although these vary according to the complexity of the surgery.

We present the case of a segment VIII hepatic resection. Laparoscopic hepatic resections of lesions in the postero-superior segments are technically demanding due to their deep location and relation to the vena cava. However, in diverse publications the viability and security of these has been demonstrated in centers with experience in advanced laparoscopic hepatic surgery.

Various surgical techniques are described for the laparoscopic approach to the postero-superior segments. Some authors have proposed the use of intercostal trocars or a transthoracic approach as a way to improve the vision and facilitate the hepatic resection

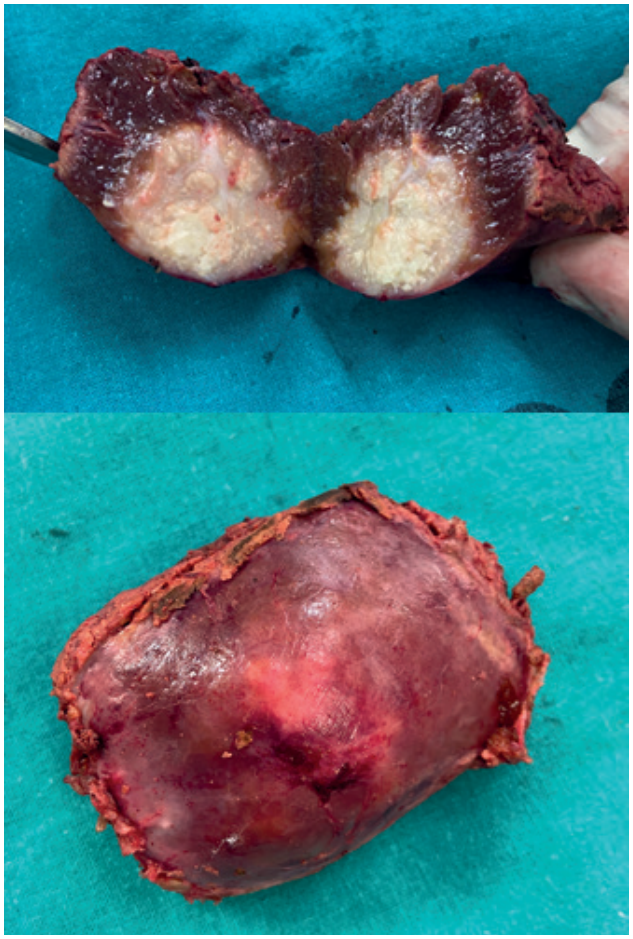

Image 9: Surgical piece and macroscopic margins.

preserving the parenchyma without compromising the resection margins. However these technique could produce pulmonary lesions and a risk of gas leaking from the abdominal cavity toward the pleural space with the consequence of subcutaneous emphysema or pneumothorax tension during surgery. To try to avoid these potential complications, other authors have proposed an abdominal approach with the trocars in an inverse L disposition around the medial and inferior face of the lesion. This configuration permits four plane section aligned with the transection devices in a diamond shape. This diamond technique[9] was originally described by Abu Hilal et al., and demonstrates that it is possible and safe to perform laparoscopic hepatic parenchymal sparing resections for non-perforating hepatic lesions without compromising the postoperative and oncological results.

To perform a safe hepatic surgery it is necessary to have the technology and adequate resources, in addition to performing it in a center that has the necessary support to carry out the optimum handling of any potential complication. In addition, it is recommendable to have a torniquet around the hepatic hilum prepared to be able to perform the Pringle maneuver in any hepatic laparoscopy. This can be used in a regulated manner with clamping or in the case of an accident to control an eventual bleed (arterial/portal). In our case, to perform the hepatic surgery we have placed an intracorporeal Pringle using a vesical tube, as can be seen in *(→Image 4)*.

The transection of the hepatic parenchyma must be performed very meticulously, taking into consideration the intrahepatic vascular anatomy. Diverse instruments and technologies are available that can be used to perform the transection and at the same time an optimum hemostasis. However, a universal agreement about the optimum[1] technique does not exist. We have used the ultrasonic scalpel, this technology allows us to seal the vessels rapidly and safely, in addition to coagulating the tissue and facilitating the dissection of the hepatic parenchyma using only one instrument. We have also used clips to carefully perform a hemostasis of the bed using intermittent vascular clamping (Pringle), permitting us to prevent hemorrhages during the hepatic parenchyma transection, and in this way diminishing the blood loss of the patient during surgery.

The intraoperative ultrasound is considered an essential tool to perform a correct hepatic surgery, also in a minimally invasive approach, as is reflected in the Southampton[1] guides. This technique helps to identify the location of the lesions, discard previously unknown lesions, plan the surgery delineating the resection margins and monitoring the margins throughout the hepatic parenchyma transection.

With respect to the technique, in this case we have performed a parenchyma sparing surgery, this is the current trend in hepatic surgery since it permits performance of more limited hepatic resections reducing the risk of postcopulatory hepatic insufficiency. It is important to perform this technique using ultrasound for control in order to avoided lesions to the vascular pedicles. Particularly for hepatic metastasis of colorectal origin, this strategy is important since a new hepatic surgery may be necessary due to the important number of patients that present recurring hepatic metastasis during their follow-up, and it will be necessary to consider a surgical rescue. In addition, a minimally invasive surgical approach will facilitate a new abdominal surgery.

Conclusion

The minimally invasive surgical approach to hepatic surgery has shown slow growth among surgeons due to its technical complexity. In recent years due to the technological development this surgery has been increasing in many hospitals.

Resection of hepatic metastasis of colorectal origin is the only potentially healing treatment. The objective of the surgery is to obtain a resection of the entire metastatic disease leaving a sufficiently functional hepatic remnant, according to the parenchyma sparing technique and with a minimally invasive approach whenever it is possible. To do so it is necessary to have a team with advanced experience in hepatic surgery, a multidisciplinary committee that allows a personalized assessment of each patient and the adequate technological equipment for its performance.

In conclusion, minimally invasive surgery using a laparoscopic approach is a feasible and safe alternative for the treatment of malignant hepatic illness, including for tumors located in the posterosuperior segments. However, experience in advanced laparoscopic hepatic surgery is essential to guarantee the safety of the patient and adequate oncological results.

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15

Application of TachoSil® in hepatic surgery using robotic surgery approach

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Introduction

Hepatic surgery has traditionally been characterized by the complexity of its procedures and the potentially high rates of morbidity and mortality in inexperienced hands.

The robotic approach has been gradually introduced in hepatic surgery and has notably increased in recent years[1].

Nonetheless, few centers currently perform robotic liver surgery and the experience in robot assisted surgeries continues to be limited in comparison to the laparoscopic approach[2,3].

In this review, we will show the technique of the use of the TachoSil® hemostatic matrix by purely robotic means.

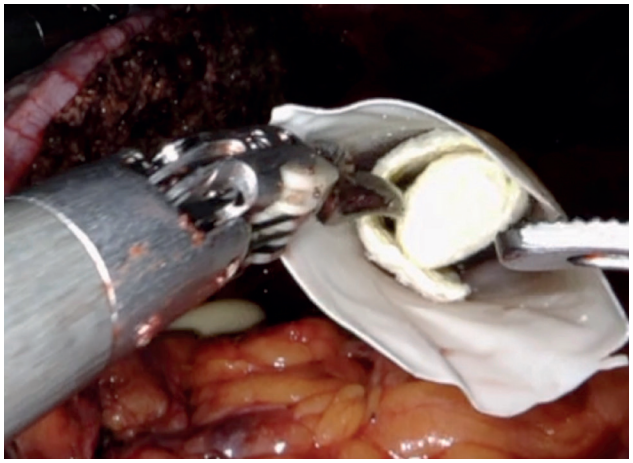

Image 1: The TachoSil® matrix is rolled up into the finger of a surgical glove. It is carefully extracted with the help of Endowrist Maryland tweezers and Endowrist Tip-up.

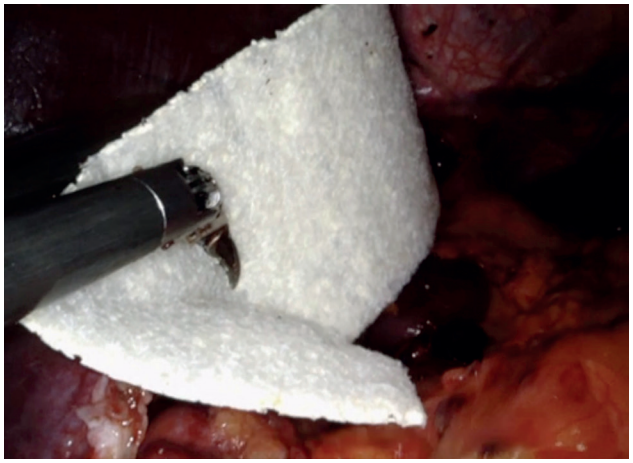

Image 2: The TachoSil® matrix is carefully manipulated while extended over the hepatic surface.

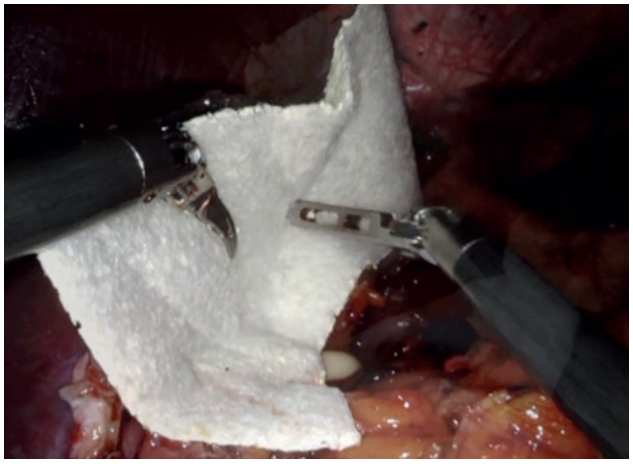

Image 3: The Endowrist Maryland tweezers and Endowrist Tip-up work together, pressuring the matrix in its total extension.

Clinical case

A total of 53 consecutive patients underwent robotic hepatic resection (da Vinci Xi, intuitive com., U.S.A.) From June 2019 through October 2021. The patients were prospectively followed and retrospectively reviewed. The characteristics of the clinical-pathologies and the short-term post operatory results were analyzed. The data is expressed as median and add in brackets (Digital Error). The study was approved by the Institutional Review Board. In all of the patients, the TachoSil® matrix was applied over the surface of the cut. To do so, the matrix is rolled up and introduced in the finger of a surgical glove using an auxiliary trocar and is extracted and applied with a damp gauze assisted by the Endowrist Maryland, Endowrist tip-up and Endowrist Cadiere robotic terminals (*→ Images 1 to 5*).

Results

The median age of the patients was of 59.55 years, of which 24 (45%) were female. The average BMI was 29.41 kg/m^2. Eleven patients (20.75%) were cirrhotic. The patients were divided according to the type of resection in the following way: 12 segmentectomies, 4 wedge resections, 17 left lateral sectionectomies, 8 bisectionectomies, 3 sectionectomies V—VI and 5 sectionectomies IVb—V, 2 right anterior sectionectomies, 1 right posterior sectionectomy, 6 left hepatectomies and 3 right hepatectomies. Malignant lesions were present in 39 patients (72.5%). In 16 patients an extra-glissonian approach was performed with identification of the corresponding hiliar pedicles and use of ICG.

Average surgical time was 258.11 minutes and 2 patients were transfused intra-operatory (3.7%). Inlet occlusion was used in 43 cases (81%) and the average total clamping time was 32.62 min. There was only one conversion due to an uncontrollable hemorrhage. The major post operatory complications (Clavien-Dindo > IIIb) occurred in 3 patients (5.6%) and the mortality was 1.8%. None of the patients required hospital readmission. Average hospital stay was 5.6 days.

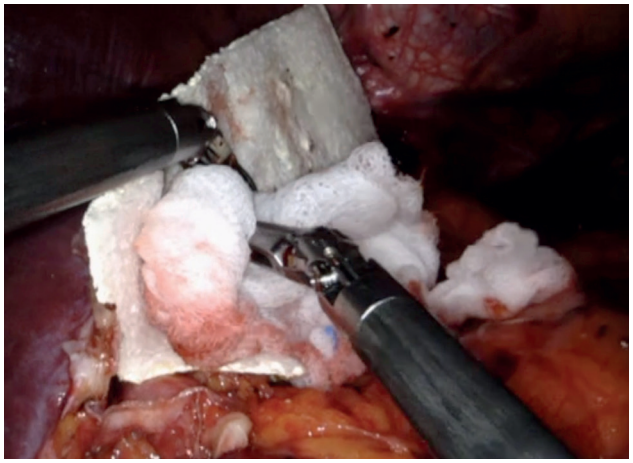

Image 4: With the help of a slightly damp gauze, the matrix is pressured over the surface of the cut.

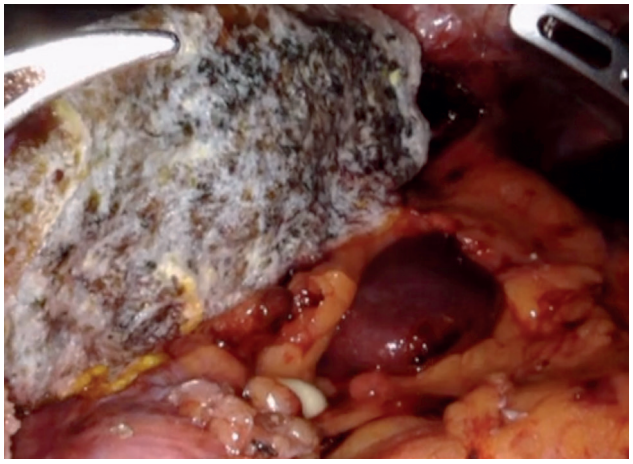

Image 5: Final view of the matrix perfectly extended and adhered.

Conclusion

Even though robotic hepatectomy is a safe and feasible procedure with favorable results in the short term, it implies a demanding learning curve that requires a high level of training, ability and skill. The application of the TachoSil® matrix is safe and relatively simple to adjust to the surface of the hepatic cut thanks to the availability of the robotic terminals that act jointly.

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16

Combination of major hepatic surgery, cytoreductive surgery in a single procedure

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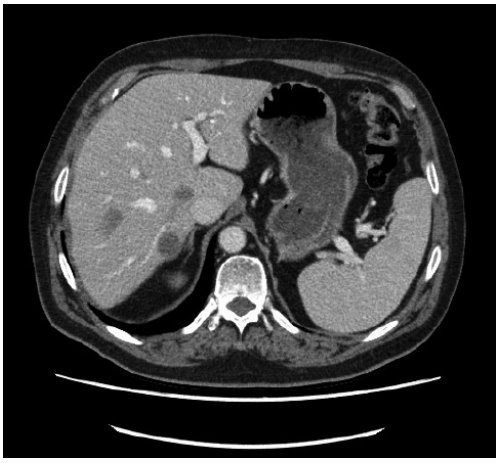

Image 1: Abdominal CAT performed after adjuvant therapy, identifying the presence of hepatic metastasis in the right hepatic lobe.

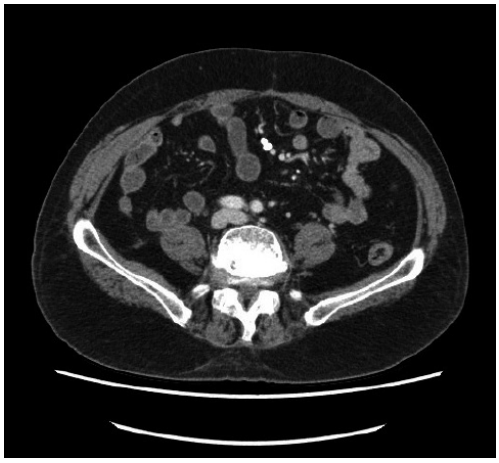

Image 2: Abdominal CAT after adjuvant therapy with FOLFIRI + Bevacizumab, the presence of implants at the level of the right retroperitoneal can be observed.

Introduction

Synchronous hepatic and peritoneal involvement in cancer of colorectal origin continues to be a challenge for the oncology surgeon. Experience in past decades in hepatic surgery and the peritoneal carcinomatosis has lead to the proposal of new therapeutic options for these types of patients[1].

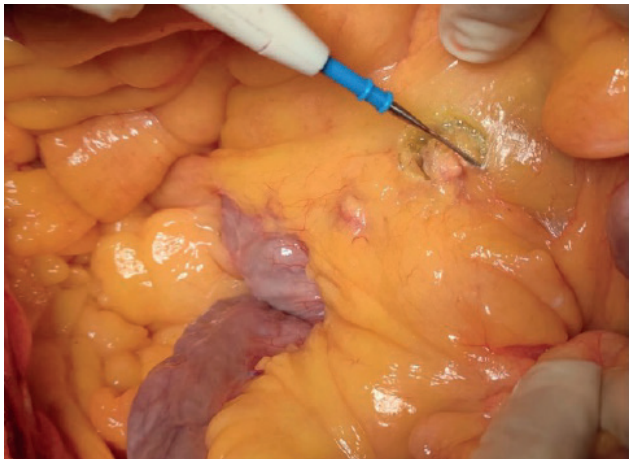

Image 3: Multiple peritoneal implants are observed in the mesentery of mid-jejunum.

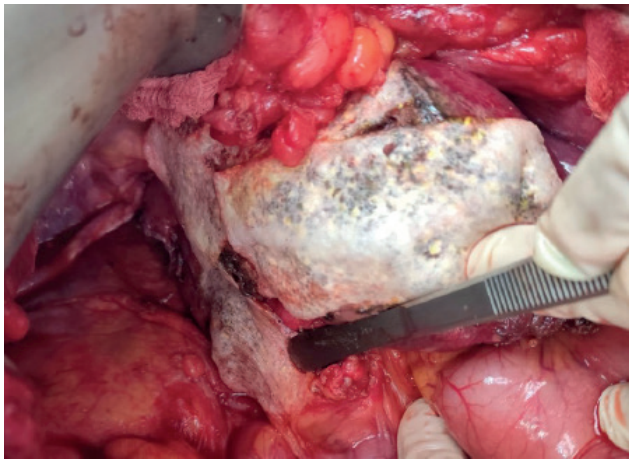

Image 4: Right hepatectomy. At the level of the surgical bed the placement of an adhesive collagen matrix (TachoSil®) can be observed.

Clinical case

We present the clinical case of a male of 68 years of age without base pathology intervened in emergencies in June 2020 due to intestinal obstruction secondary to stenosing neoplasia of perforated cecum. In the abdominal CAT prior to the surgery a perforated cecum neoplasm was identified with a 34 x 29 x 35 mm retroperitoneal collection with a retrograde dilatation, as well as suspicious adenopathies at the periaortic level and in both bilateral iliac chains.

During the intervention no hepatic or peritoneal metastasis were found, a right colectomy with mechanic ileocolic anastomosis was performed. The pathology study of the surgical piece confirmed the clinical suspicion: Moderately differentiated colon adenocarcinoma of 4 cm with infiltration in its muscular layer and pericolonic adipose tissue, with 2 of 27 adenopathies positive (Stage pT4b N1a).

At 6 weeks from the intervention systemic adjuvant chemotherapy treatment is initiated (XELOX 4 cycles) followed by 4 cycles of capecitabin. In the control CAT multiple SOLs are found in the hepatic lobe, the largest size being present in the right hepatic segment VII (30 x 28 mm). In addition multiple foci lesions were detected in soft parts of the right iliac fossa (the largest of 22 x 12 mm) compatible with peritoneal metastasis.

Subsequently 7 cycles of FOLFIRI + Bevacizumab were administered, in the control CAT a partial response was evidenced by reduction of the size of the hepatic metastasis (the largest went from 30 x 28 mm to 25 x 22 mm) as well as reduction of the peritoneal implants (from 22 x 13 mm to 15 x 10 mm) *(→ Images 1 and 2)*.

After completing the eighth cycle of FOLFIRI without Bevacizumab, the patient opted for an elective intervention performing cytoreductive surgery with right hepatectomy, resection of peritoneal implants end block *(→ Image 3)* and 15 cm distal jejunum, omentectomy, resection of retroperitoneal implants and omentectomy. After the right hepatectomy an adhesive collagen matrix with a layer of fibrinogen and human thrombin (TachoSil®) was left in the hepatic resection bed *(→ Image 4)*.

After completing the cytoreductive surgery hyperthermic Intraperitoneal chemotherapy (HIPEC) was performed with mitomycin C in 35 mgr/m^2 doses during 60 minutes at 42°C, and posterior eventroplasty with polypropylene mesh 15 x 15 mm.

The post operatory transcurred correctly, presenting only one complication of an adynamic ileum the fifth day that was resolved in 24 hours with conservative treatment.

Conclusion

Cancer of colorectal origin continues to be one of the first causes of death by cancer in western countries[2]. The dissemination of colorectal cancer can be by different routes (hematogenous, lymphatic or coelomic to the peritoneum).

The liver is the place where metastasis most frequently develops with an incidence of 25%, followed by peritoneal implants (15%). Synchronous affectation of both locations is approximately 8%[2] and classically it is considered a terminal illness with a survival of 3 to 6 months[3].

The combination of modern systemic chemotherapy with greater experience in hepatic surgery and of peritoneal carcinomatosis in specialized centers has improved the oncological results and survival of the patients[4].

The indication of a single procedure in those patients with synchronic hepatic and peritoneal affectation must be discussed in multidisciplinary committees[2]. Currently there in no maximum limit defined for hepatic metastasis that contraindicate cytoreductive surgery with HIPEC[2].

The combination of both procedures (hepatic surgery combined with cytoreductive surgery and HIPEC) does not increase the post operatory morbidity or mortality, although it is true that these patients have a worse prognosis than if only the hepatic or peritoneum were affected exclusively[5].

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17

Triple function of TachoSil® in a case of urgent hepatic surgery

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Introduction

Hemorrhage is a normal physiological response to a tissue lesion that involves the vascular system. The hemostasis process triggers in response to hemorrhage. This is a complex process whose function is to limit the loss of blood through an injured vessel and four physiological events take place: vasoconstriction, formation of the platelet plug, formation of fibrin and fibrinolysis.

When bleeding is produced, the hemostasis mechanism can be achieved using traditional methods, such as manual pressure or torniquets, compressive bandages, ligatures, sutures, etc. This can also be obtained with the help of electrocauterization using a monopolar or bipolar electro scalpel.

On occasions this hemostasis is difficult to achieve, with the result of the aforementioned techniques being insufficient. Sometimes this is due to the location of the bleeding, the organ that is affected or the deregulation of the patient's own coagulation.

To assist in these situations in recent years different hemostatic and sealing products have appeared. Among them TachoSil®, an adhesive matrix covered with human fibrogen and human thrombin stands out. This matrix is indicated as support treatment in surgery to improve hemostasis and promote tissue sealing when the standard surgical technique is insufficient. In addition, TachoSil® requires no special storage requirements (temperature below 25°C) and, therefore, is ready to be used[1].

In hepatic surgery, intra and postoperative surgery is one of the most important prognosis factors, with significant impact in the morbimortalidad of these patients. In this type of surgery the effectiveness of this product has been more than demonstrated, with diverse studies that corroborate the hemostatic and sealing effectiveness, without notable risks for the patients. In addition, TachoSil® reduces the number of blood transfusions required after surgery[1].

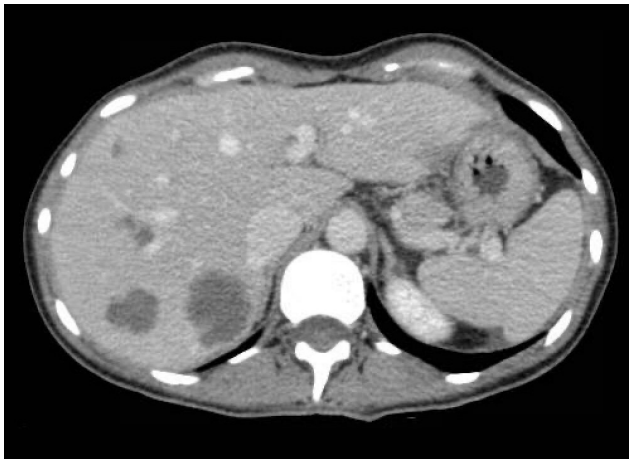

Image 1: Pre-operative CT where hepatic bilobar lesions compatible with metastasis are found.

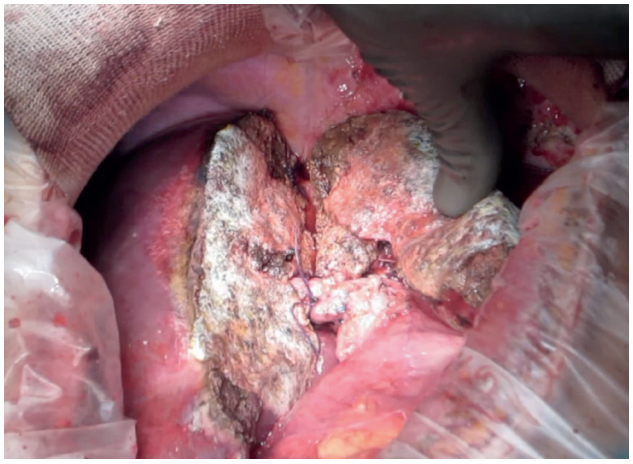

Image 2: Final result after the first ALPPS intervention. Transection borders with TachoSil®.

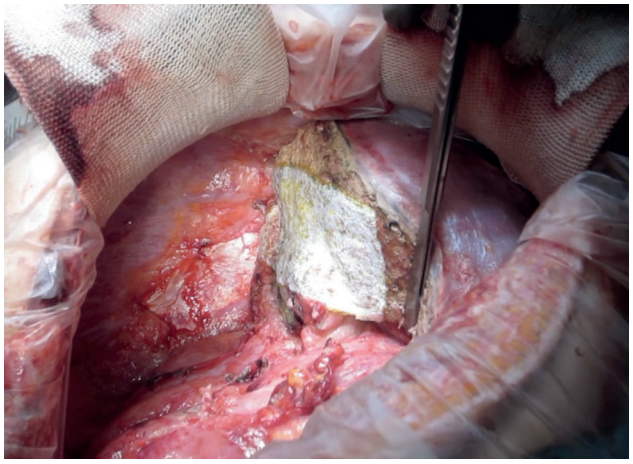

Image 3: Final result after the second ALPPS intervention (right hepatectomy). Transection border with TachoSil®.

Clinical case

We present the clinical case of a patient of 36 years of age, with history of urgent left colectomy due to intestinal obstruction secondary to colon neoplasm (well differentiated mucosectomy type colorectal adenocarcinoma (pT3N0/17). In the diagnosis of said neoplasm there is hepatic bilobar metastasis *(→ Image 1)*. After surgery, the patient receives adjuvant treatment with Folfox-Bevacizumab (7 cycles) with a partial response. The case is presented in committee which decides on hepatic surgery, with possible resection in two interventions given the scare remnant hepatic volume.

In the first intervention of ALPPS (Association Liver Partition and Portal vein ligation for Staged hepatectomy) a resection of segment II, cholecystectomy, ligature and section of right portal pedicle and hepatic transection are performed respecting the middle suprahepatic vein. The right arterial-biliary pedicle and the V-segment draining vein are referenced. TachoSil® is placed over the transection surfaces *(→ Image 2)*. The patient post operatory evolution is satisfactory without any hemorrhaging complication and is discharged the 4th day after surgery.

Afterward, a new control CT is performed, ingressing as programmed 11 days after to carry out the second ALPPS intervention. The right hepatic lobe is atrophic and the left one hypertrophied. In addition, it can be seen that the TachoSil® has completed with 3 functions: hemostatic, sealant and preventing that adherencies form between both borders of the transection. The right regulated hepatectomy is performed with placement of TachoSil® in the transection bed *(→ Image 3)*. The patient repeats a satisfactory postoperative evolution, being discharged the 4th day after intervention.

Conclusion

The morbidity and mortality after a hepatic resection are closely related to the intraoperatory blood loss. This blood loss is due, among others, to the fact that the liver is extensely vascularized. Recent improvements in surgical and anesthesia techniques have made the global results for the patients that undergo hepatic surgery improve substantially in recent years. However, the intra-operatory bleeding control after the hepatic parenchyma resection continues to be a challenge to date. To help with this, diverse hemostatic and sealing products such as TachoSil® have emerged.

TachoSil® has demonstrated that it is safe, effective and cost-efficient in diverse areas of surgery. In a systematic review (L. Colombo et al.) of more than 20 studies and over 2,000 patients, TachoSil® has demonstrated that it reduces postoperative complications in hepatic, cardiac and renal surgery. Likewise, in 8 studies, it demonstrated a reduction in hospital stay of approximately 2—3 days[2].

In hepatic surgery TachoSil® has demonstrated that is safe and superior to other hemostatic agents after the performance of hepatic resections, obtaining satisfactory hemostasis in the first three minutes in 80.7% of the patients[3]. In another Japanese study of Kawasaku et al it also corroborated the safety of the matrix in a randomized, double-blind, non-inferiority study of patients that underwent hepatectomies including live donors[4]. Its effectiveness has also been demonstrated after minor hepatic resections[5] and complicated cholecystectomies[6].

In other areas, such as pancreatic surgery[7], TachoSil® has demonstrated the reduction in the incidence of grade B or superior pancreatic fistulas. These results, nonetheless, must be validated with prospective studies of larger sizes to establish solid recommendations. In emergency surgeries[8], TachoSil® has also demonstrated to be useful (Fontana et al.). Of 308 patients submitted to emergency surgery that received TachoSil® during the surgery there was no registration of any hemorrhage complication that required surgical re-intervention.

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18 Blunt abdominal trauma with duodenal perforation. Classification and surgical management

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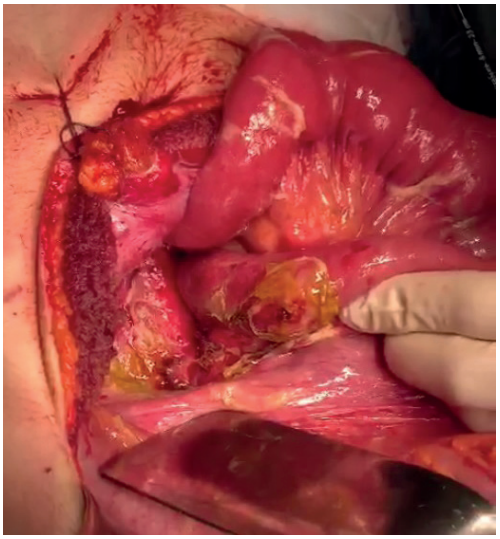

Image 1: Mobilization of the 3rd portion of the duodenum viewing the duodenal perforation.

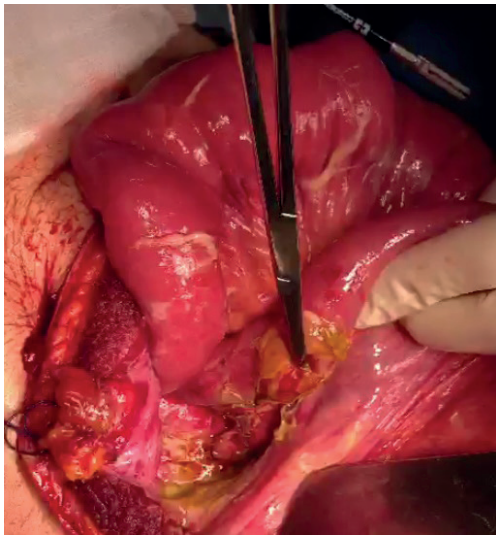

Image 2: Grade II perforation of 5 mm in the 3rd duodenal portion.

Introduction

Duodenal injuries secondary to abdominal trauma constitute an entity difficult to diagnose due to their retroperitoneal location, such that they are most diagnosed belatedly[1]. As a consequence, it is a lesion that has an elevated morbity and mortality and related complications[1].

The diagnostic test that allows a better objectification of the duodenal lesion is computerized tomography (CT) with oral and intravenous contrast. The treatment will very greatly in function of the magnitude of the lesion, including different types of conservative and surgical options[1,2].

Below we present a case of a 22 year-old patient with duodenal trauma due to a traffic accident.

Clinical case

Patient of 22 years of age, without history of interest, appears in emergency transferred by the SEM (Medical Emergency System for its initials in Catalan) after suffering a car accident of a front-end collision, seated behind the copilot with the safety belt fastened.

Upon his arrival to emergencies, he is hemodynamically stable, eupneic, conscious, oriented and without neurological focality. Upon exploration highlights an abdomen painful to palpation in the left hypochondrium, coinciding with a transversal hematoma at the level of the hypochondrium and epigastrium due to the seat belt without symptoms of peritoneal irritation.

Due to the stability of the patient and the type of impact he is transferred to perform a CT. Highlight a hypodense and poor defined area of 4 cm in the VI segment subcapsular hepatic compatible with grade II hepatic laceration, mural thickening of jejunal loops in left hypochondrium and mesenteric trabeculation, compatible with mesenteric laceration. Minimum hemoperitoneum without signs of active bleeding.

Patient is transferred to the Intensive Care Unit (ICU) where at 24 hours after arrival presents a clinical decline compatible with septic shock and signs of peritoneal irritation.

The abdominal CT is repeated that describes destructuring of the root of the mesentery with involvement of the pancreatic uncinate process, of the second, third and fourth portion of the duodenum, as well as the segment next to the jejune with probable contusive and ischemic etiology in the context of the mechanism of injury. In addition, abundant intra-abdominal free fluid and pneumoperitoneum were observed, probably related to high perforation.

Given the results of the CT and decline of the patient urgent surgical intervention is decided. In a first intervention a laparoscopy is performed where intestinal peritonitis and free liquid in all four quadrants is seen. After initial exploration, biliary content and air outflow at retroperitoneal level is evidenced, identifying a perforation of the third portion of the duodenum after the Treitz mobilization. It is decided to convert to open surgery.

A wide Kocher maneuver is performed and a complete mobilization of the 3rd and 4th duodenal portions *(→ Image 1)*, confirm a grade II perforation of 5 mm *(→ Image 2)*. The borders are debrided and a loose stich suture with absorbing multi-filament thread is performed and is reinforced with a sealant matrix (TachoSil®).

The patient has a favorable evolution being discharged on the thirteenth postoperative day with no apparent complications.

Discussion

Duodenal traumas represent 4.3% of abdominal trauma, being most frequent in males aged 16 to 30 years old. They are an entity with high morbimortalidad and complications due to their belated diagnosis. This belated diagnosis is due to the retroperitoneal location that additionally tends to be associated with affected adjacent structures[1,2].

The injury mechanism may be of the contusive or penetrating trauma type. In the contusion, the lesion is produced due to crushing or compression, which is the injury mechanism suffered by our patient. Penetrating trauma, more frequent, is produced generally after a stab or gunshot wound.

The diagnosis should be suspected by the clinical state of the patient, the abdominal exploration, highlighting in our case the seatbelt mark and the injury mechanism. The diagnostic test to perform is a CT with oral and intravenous contrast, if the hemodynamic state of the patient permits it.

In reference to treatment, the initial handling will be based on damage control that include the identification of possible hemorrhaging. Following, a control of intestinal contamination should be performed exploring the totality of the same. For the mobilization of the duodenum the Kocher maneuver is required and opening of the Treitz angle.

Duodenal perforation is classified according to the 5 degrees of the scale of the American Association for the Surgery of Trauma-Organ Injury Scale Committee (AAST-OIS) *(→ Table 1)*[1,2,4]. The 2nd degree, that includes the presence of hematoma or laceration that involves more than one portion and represent a disruption of at least 50% of the duodenal circumference, is the case of our patient.

GRADE	INJURY	DESCRIPTION
I	Hematoma Laceration	Involving a portion of the duodenum. Partial laceration, no perforation.
II	Hematoma Laceration	Involving more than one portion of the duodenum. Disruption of <50 % of the circumference.
III	Laceration	Disruption of <50 % – 75 % of the circumference of D2. Or disruption of <50 % – 100 % of the circumference of D1, D3, D4.
IV	Laceration	Disruption of > 75 % of the circumference of D2. Involving the Vater ampulla or the distal common bile duct.
V	Vascular laceration	Massive disruption of the duodenopancreatic complex. Devascularization of the duodenum.

Table 1. Duodenal organ injury scale classification[5]

The surgical options tend to vary in function of the degree of the injury. In low degrees duodenal raffias can be performed with or without adjacent protection, such as decompressive duodenostomy or applying mucous patches or sealant as in the patient of the described case.

In the case of higher degree lesions a segmentary resection and end-to end duodenal anastomosis may be required, or duodenal-jejunostomy, duodenal diverticulization, pyloric exclusion and in extreme cases, duodenopancreatectomy.

The posterior complications are principally fistulas, which appear in up to 50% of the cases with a mortality described of between 40 and 71%[1].

Conclusion

Duodenal lesions represent a small percentage of all of the abdominal traumas and it is important to have an elevated index of suspicion to avoid a belated diagnosis. Their repair, that will depend on the degree of the trauma, tends to require complex surgical procedures and anastomosis with a high risk of dehiscence.

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Metachronous retroperitoneal recurrence from sigmoid cancer. Case study

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Introduction

Retroperitoneal metastases from colorectal malignancies are rare, especially if they are solitary lesions that permit a resection with healing as an objective. The incidence of these relapses are between 5 to 12%, and depending on the size, degree of locoregional involvement and if there are distant metastases, the patient may benefit from a radical R0 surgery or cytoreductive surgery associated with hyperthermic intraperitoneal chemotherapy.
We present the case of a 70 year old patient that underwent an open sigmoidectomy for stage IIIC adenocarcinoma that appeared in the follow-up of a retroperitoneal lesion suggesting a tumor relapse.

Clinical case

A male patient of 70 years of age with arterial hypertension and an ex smoker, intervened for an infiltrating pT3N2 adenocarcinoma (stage IIIC), who underwent an open sigmoidectomy in 2016, who after the surgery received adjuvant chemotherapy, and also has a history of a partial left nephrectomy for clear cell carcinoma in 2021. He comes to our center for evaluation of a retroperitoneal mass in probable relation to a retroperitoneal relapse of the sigma tumor found during oncological follow-up. The patient is asymptomatic at the time of the consult and the physical exploration revealed no pathological findings. The complementary test reveal the presence of a pathological retroperitoneal adenopathy at the level of the emergence of the inferior mesenteric artery, and a tumoral implant at the level of the suture of the inferior mesenteric artery is suspected. In the renal cell there is no evidence of signs of local relapse. The study is completed with a colonoscopy that does not reveal evidence of mucous infiltration in the anastomosis, and a PET-CAT reveals the presence of a conglomerated adenopathy anterior to the descending aorta, in relation to the inferior mesenteric artery, compatible with a viable tumor.

Patient is programmed for surgery and a medial laparotomy is performed, finding a retroperitoneal mass located in the pre-aortic region extending to the left retroperitoneum, that reaches the bifurcation of the iliac artery. An wide excisional biopsy is performed and the sample is sent for intraoperatory analysis, that informs the tissue is compatible with malignancy. The biopsy bed was quite friable and difficult to control hemostatically, so a TachoSil® patch was used, achieving adequate hemostasis.

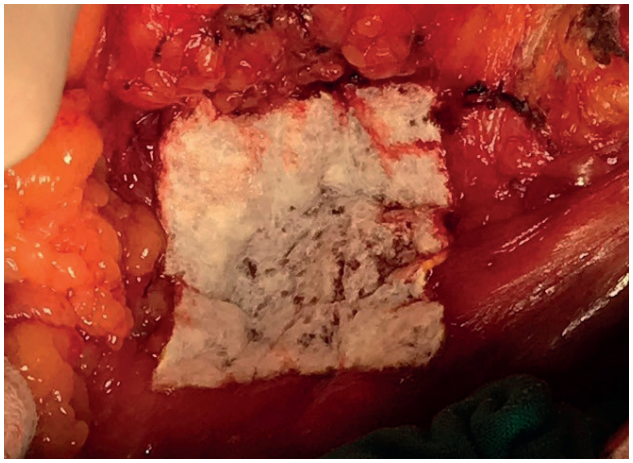

Image 1: TachoSil® patch placed on the bed at discretion.

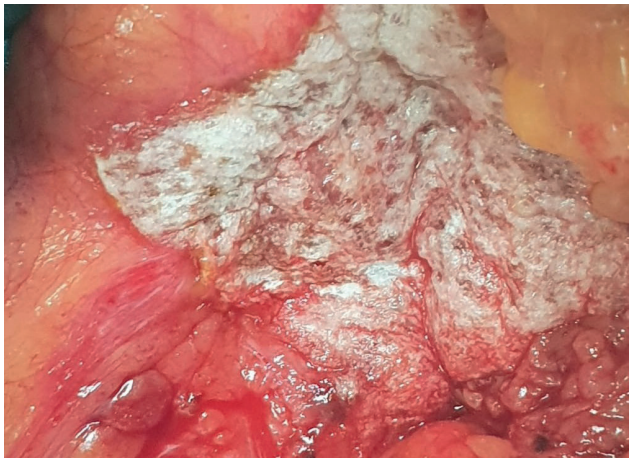

Image 2: Integration of the patch 10 minutes after application.

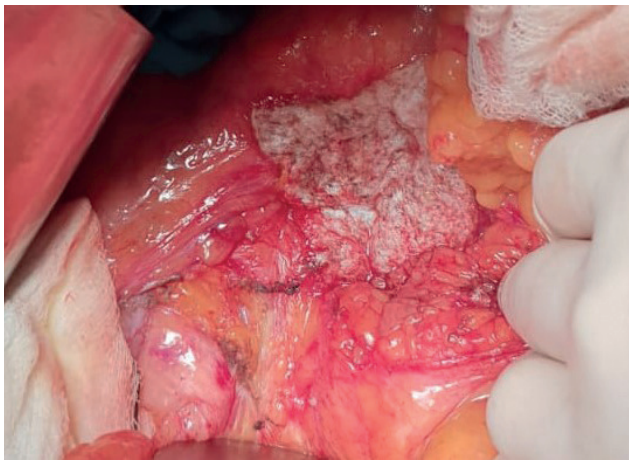

Image 3: The state of the TachoSil® patch after hemostatic control at the end of the intervention.

During the postoperative period the patient suffers form evisceration that requires urgent laparotomy at 24 hours. The zone of the biopsy is explored revealing adequate hemostasis of the TachoSil® patch *(→Images 1 to 3)*. The cavity is closed again and a supraaponeurotic mesh is put in place. The patient evolves satisfactorily and is discharged to continue oncological treatment.

The definitive biopsy of the lesion is received informing that a fragment of the tissue is amply infiltrated by little differentiated carcinoma, with immunophenotype more suggestive of gastrointestinal tract origin.

Discussion

The healing resection of colorectal cancer continues to be the initial therapeutic alternative of choice. However, the presence of metastasis (synchronous as well as metachronous) during the follow-up may vary the direction to take with the patient. The common sites of metastasis are the liver, lungs and lymphatic ganglion, with retroperitoneal metastasis being rare. When there is retroperitoneal involvement, it is commonly associated to distant involvement of other places, since it is an unresectable illness[1,2,3].

The handling of retroperitoneal recurrences is controversial, since there exists little evidence that reports this finding in the cases, with a reported incidence of ganglion/retroperitoneal involvement of 1%. Initially the isolated locoregional relapses are a local illness for which surgery should be considered, while the retroperitoneal involvement is considered a systemic illness and therefor the option for treatment is chemotherapy[1,4,5]. However, studies have achieved demonstrating that a multimodal approach of complete surgical resection associated to oncological treatment may bring benefits in the survival of the patients with ganglion retroperitoneal involvement. In our case, the retroperitoneal involvement was a small size and permitted a complete resection, and the patient could begin oncological treatment upon discharge.

The benefits of chemotherapy after resections of retroperitoneal relapses are also discussed, and the number of studies on the subject is limited, given that it is infrequent that the patients have solitary retroperitoneal involvement[6].

The use of local hemostatic patches for the handling of bleeding in the surgical bed is well documented. TachoSil® is one of them, being a collagen matrix with a surface covered by fibrinogen and thrombin, which upon entering into contact with physiological fluids dissolves and spreads over the surface where the patch is placed. The collapse, not destruction, of the collagen cells conglutinate the TachoSil® patch firmly with the tissue surface to permit the factor VIII endogen, activating the endogeneous coagulation cascade. The use of these patches has demonstrated advantages to stop intraoperatory bleeding, and is also useful to prevent lymphorrhagia or the appearance of lymphocele. Gasparri et al. demonstrated in a meta analysis of 26 studies that included 720 patients in total that used fibrin sealing patches diminished the total volume of lymph drained during post operatory, the duration of the drainage, incidence of lymphocele and symptomatic lymphocele, and the need for postoperative percutaneous drainage of collections, but no difference in the presence of wound infection[7,8].

Conclusion

The recurrence of retroperitoneal ganglion in colorectal cancer is a form of progression of the illness that rarely appears in an isolated way, being common to find distant metastasis or locoregional relapse simultaneously. Although what the conduct should be with these patients has not been well established, in selected cases with solitary involvement that are candidates for wide and complete resection of the lesion, and that also permit continuation with chemotherapy, it is a viable option that may improve survival.

However more controlled randomized studies that support this multidisciplinary approach are necessary.

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20

Multidisciplinary management of thyroid cancer with tracheal invasion

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Introduction

Locally advanced thyroid cancer is defined as an illness that extends beyond the thyroid glands or the capsule of the metastatic ganglion, invading adjacent structures[1]. In contemporary times, in which the majority of the thyroid neoplasms are diagnosed in more early studies and often accidently, the incidence of advanced illness is very low. This fact is important for those who are dedicated to endocrine surgery, in general unaccustomed to extense resections that imply the involvement of structures adjacent to the gland, and therefore, to the reconstructions necessary to provide an adequate functionality and quality of life for their patients[2].

It is estimated that the global incidence of locally invasive thyroid illness is between 1% and 10%[1], although it is true that the literature in this sense is quite varied and the percentage can increase or decrease considerably according to the definition of the term itself in function of the types of center (being greater in centers of reference), or whether the non-differentiated or poorly differentiated cancers are included in these estimates[3]. The different series coincide, however, in which are the most commonly invaded structures in cases of advanced illness: the recurrent laryngeal nerve (RLN) is, without a doubt, the structure that is most frequently involved at the central compartment level (38—61%).

Tracheal invasion is estimated in similar percentages (37—60%), while larynx (0—34%) and esophagus (9—31%) are less frequent. It should be taken into account that in this type of case it common several structures to be involved concomitantly[3].

We present a clinical case of a locally advanced thyroid illness attended in our center that required a multidisciplinary approach that included a complete resection with reconstructive surgery.

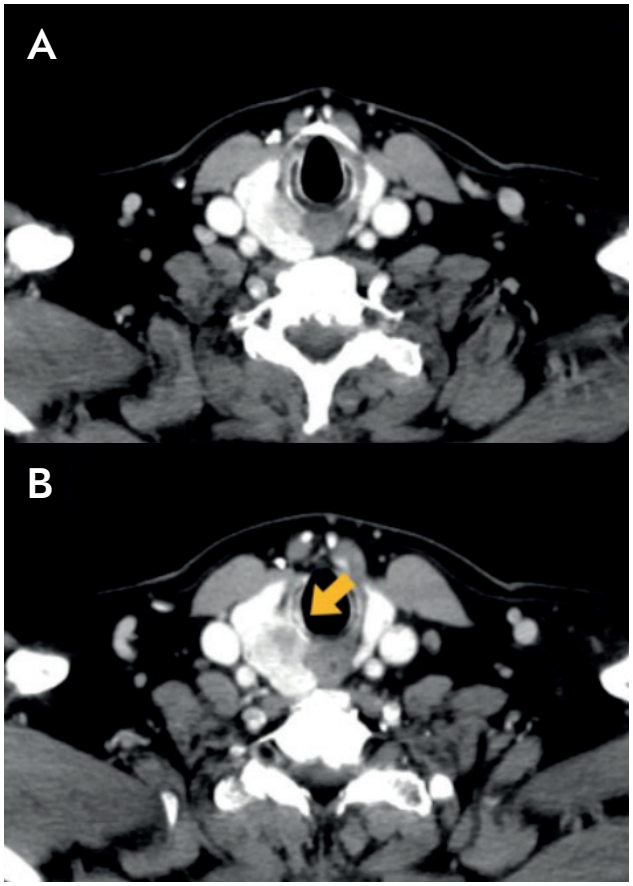

Image 1: In the cut **1A:** of the CT cricoid are identified in contact with the neoplasm of the right lobe. In the cut **1B:** of the CT the suspicious cricoid invasion at the right level is observed (marked with an arrow), that appears more evident when compared to the contralateral side.

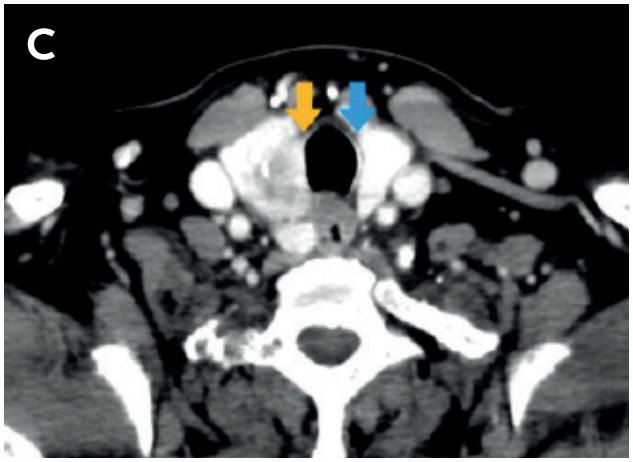

Image 2: In the cut **2C**, of the CT we observe the tracheal invasion (marked with a yellow arrow), that becomes more evident when compared to the contralateral side (blue arrow).

Clinical case

It is a female patient of 60 years of age with history of grade III obesity, without personal or family history of thyroid pathology. Referred to Otorhinolaryngology (ORL) due to dysphonia of one month of evolution with progressive phonasthenia associated with hemoptysis, sensation of a strange body in the pharynx and loss of approximately 3 kg in the last month. No odynodysphagia or dyspnea. The clinical exploration with nasofibroscopy shows a unilateral paralysis of the right vocal chord (RVC) in the paramedian position.

A cervical-thoracic computerized tomography (CT) is requested where a multinodular goiter is detected with a dominate nodule in the right thyroid lobe of 22 x 22 x 30 mm with suspicion of laryngeal infiltration of the cricoid cartilage and the first tracheal ring, with craniocaudal extension of 15 mm *(→ Images 1 and 2)*. In addition bilateral micronodules are detected, the largest of 3 an 4 mm in the inferior left lobe.

Due to the suspicion of thyroid carcinoma the patient is referred to the Endocrinology Service, where a cervical ultrasound is performed corroborating the findings of the CT describing a solid right thyroid nodule, markedly hypoechogenic, with lobulated borders and with macrocalcifications, with scarce peripheral vascularization with loss of tracheal planes, TIRADS-5. A fine needle aspiration puncture (FNAP) is performed whose anatomopathological result was suspicious of malignancy (Bethesda V), without being able to specify the histological subtype.

To complete the study a fibro bronchoscopy was requested that shows compression over the posterior tracheal wall in its upper third without evidence of suspicious endotracheal lesions and with bronchoalveolar aspirate cytology negative for malignant cells. The cervical magnetic resonance (MR) confirms the tracheal involvement discarding the esophagus. A core needle biopsy (CNB) is performed whose study doesn't permit the determination of the histological subtype of the lesion. Analytically, a serum Thyroglobulin (TG) level of 834 ng/mL, with negative anti-TG antibodies, negative carcinoembryonic antigen (CEA) and Calcitonin, normal thyroid function with thyroid-stimulating hormone (TSH) 0.91 uUI/mL and a Parathyroid Hormone (PTH) of 101.5 pg/mL with Calcium and 25 hydroxy-cholecalciferol in normal range.

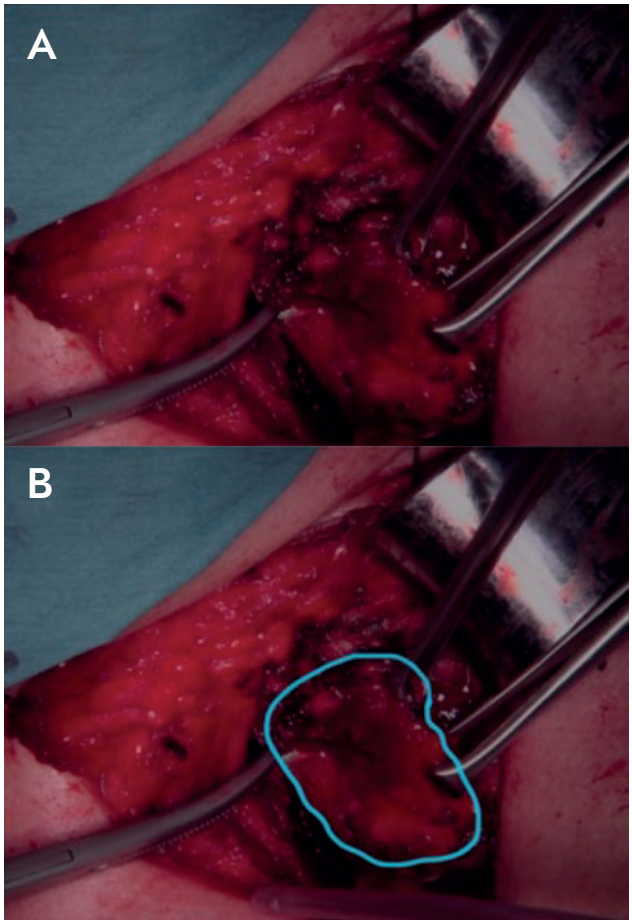

Image 3: Intraoperatory image after the transtumor section, where the tumor pill infiltrates the trachea can be seen (marked with a blue contour in the **B** shot).

The case is discussed in the Oncology Committee for Endocrine Tumors, that recommends a surgical approach to the neoplams and proposes a radical but potentially curative surgery. The patient is informed of the possible complications and functional consequences according to the case: possible lesion of the healthy left RLN and a high risk of total or partial laryngectomy and reconstructive surgery, as well as the need to perform a tracheostomy during the intervention, which may be temporary or permanent. The patient understands and accepts the risks of the intervention resolving her doubts with the members of the surgical team and signs the surgery consent form.

The intervention takes places as follows:

First phase

Total thyroidectomy assuring the preservation of the left RLN with intraoperatory neuromonitoring (INM), with the consequence of possible preservation of the larynx. After release of the affected right lobe, right antero-lateral invasion of the first tracheal rings and the right RLN was observed. Trans tumoral section is performed on the anterolateral border of the trachea *(→ Image 3)* to optimize the assessment of the degree of infiltration of the adjacent structures, sacrificing the affected RLN. Neoplasm infiltration of the cricoid cartilage was not observed.

Second phase

Bilateral lymphadenectomy of the central cervical compartment preserving the left inferior parathyroid gland. Electrophysiological indemnity of the left RLN is proven through INM.

Third phase

Resection of the 2/3 of the right tracheal circumference of the 4 first tracheal rings from the medial line to the posterior region of the tracheal mucosa, with release of the anterior face of the cervical esophagus and sparing the area of the entrance of the right RLN to conserve the ipsilateral larynx movement *(→ Images 4 and 5)*. The resection margins are checked in an intraoperatory study of the surgical piece of the tracheal resection, broadening the anterior and postero-lateral margins and again confirming the new margins as negative.

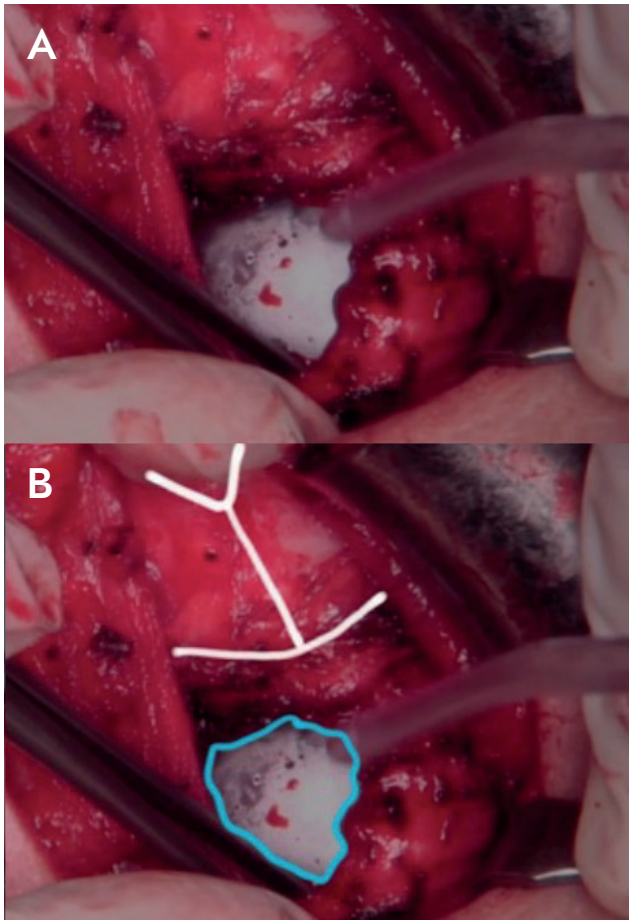

Image 4: Intraoperatory image where the tracheal defect is observed after the performance of the partial tracheal resection. **A:** through the opening (marked with a blue contour in the shot **B:** the balloon of the endotracheal tube can be observed. The relationship of the defect with the larynx can also be appreciated (the thyroid cartilage have been marked in white).

Fourth phase

Larynx-trachea reconstruction using primary sutures with PDS 2/0 between the 5th tracheal ring in the resected area and the free cricoid border. Hemostasis with application of a medicated fibrinogen and human thrombin matrix (TachoSil®) over the tracheal suture, the exposed arterial trunk and in both superior poles of the thyroid bed. The intervention is finalized performing a tracheostomy between the 7 and 8th tracheal rings and placement of a flexible cannula (Traqueoflex®) with a no. 8 inflated balloon. A Redon type drainage is placed in the surgical bed and proceed to closure by planes.

The immediate post operatory evolution in the Reanimation Unit transcurs with bilateral pneumothorax due to probable barotrauma, requiring the placement of pleural drains that are removed without incident at 24 hrs. after confirming the correct pulmonary expansion with a thorax X-ray discarding complications at the cervical thoracic level. After the resolution of the acute respiratory insufficiency, the patient is moved to the general ward, where her evolution is favorable. The cervical drain is removed on the 4th post operatory day. Enteral nutrition is maintained by a nasogastric tube until the reintroduction of an oral diet at 14 days of the intervention, after performing the dysphagia test by the ORL. The principal post operatory complication of post operatory hypoparathyroidism is highlighted, with Calcium corrected to 8.23 mg/dL and undetectable PTH at 3 hours following the intervention. Upon discharge, 21 days after ingressing, it is proven that Calcium is corrected to 8.5 mg/dL with a PTH of 10.1 pg/mL.

The anatomopathological study of the surgical piece shows a papillary carcinoma of the thyroid of the classic type in the right lobe that measures 25 mm and infiltrates the first 3 tracheal rings in an extension of 18 mm, with lymphatic invasion, without vascular nor perineural invasion. There is a papillary ipsilateral microcarcinoma of 2 mm. The left lobe presents multinodular hyperplasm of the thyroid without evidence of malignancy. In the lymphadenectomy of the compartment VI 4 to 6 lymphatic ganglion were identified infiltrated by papillary thyroid carcinoma, with rupture of the ganglion capsule. All of the amplified margins are negative. The mutation V600E/D of the BRAF gene is detected.

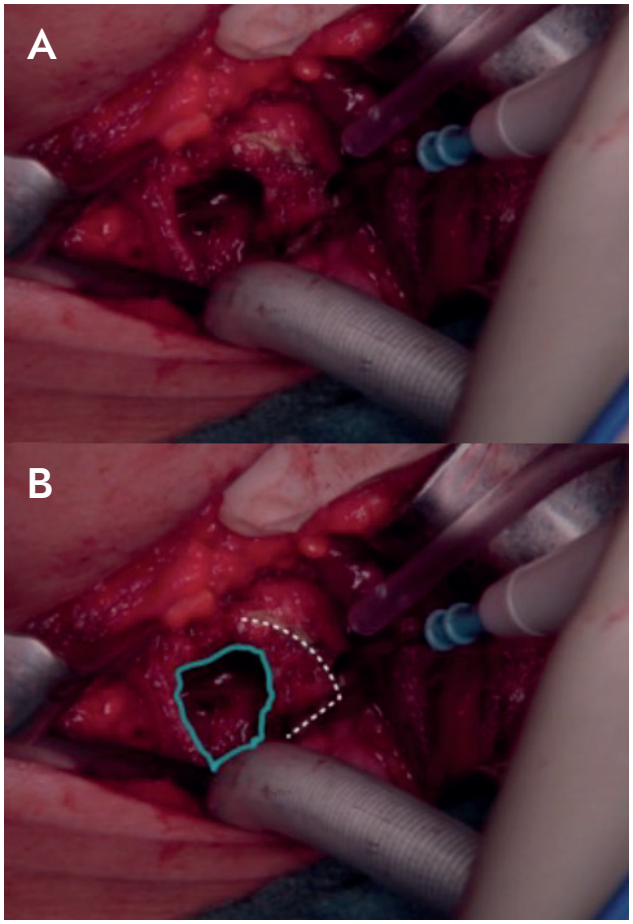

Image 5: Intraoperatory image where the tracheal defect once the tracheostomy has been performed and the endotracheal tube has been removed. The marking for the extension of the anterior border can be observed (identified as a discontinuous white line).

The final stage is pT4a pN1 cM1 (probable pulmonary metastasis), stage IV of the classification TNM 2018 of the AJCC with high risk of recurrence.

At 42 days after the intervention the permeability of the airway is proven, showing persistance of the paralysis of the RVC with good mobility of the left vocal chord, and it is decided to remove the cannula. After evaluating the case in the Oncology Committee ablative treatment with iodine 131 and posterior evaluation using Total Body Tracing (TBR) and Positron Emission Tomography (PET) was decided.

Discussion

Locally invasive thyroid carcinoma is an infrequent pathology, whose presentation is varied and frequently asymptomatic[1]. A palpable cervical mass (present in 98—100% of the cases), the appearance of dysphonia (18—22%) or dysphagia (25%), the hemoptysis (11—25%) or dyspnea (5—33%) in patients with thyroid pathology should make us suspect a possible invasive neoplasm, and in these situations we must perform the pertinent studies that permit us to define their scope[4].

The initial intervention is the optimum moment to obtain free margins and avoid complications, so we must focus our efforts in planning it exhaustively. To do so it may be necessary to perform less frequent diagnostic studies of thyroid pathology, such as MR, fibro bronchoscopy or digestive ultrasound endoscopy. A multidisciplinary approach is determinant for the pre-operative study and surgical planning, especially when radical interventions are planned that may require resections and complete reconstructions[5].

One of the principal objectives of the surgical team should be to preserve at least one of the RLN whenever at least one functional VC exists. The same occurs with the parathyroid glands, trying to guarantee the preservation of as many as possible without compromising the oncological scope of the surgery, especially with respect to central compartment lymphadenectomy.

When the larynx and/or trachea are involved, different scenarios must be considered: from the simple superficial shave of macroscopic disease to much more complex surgeries, such as hemi laryngectomy or total laryngectomy[6].

In this respect, the preservation or not of one or both RLN may be a determining factor at the time of deciding the type of resection and tracheal and/or larynx reconstruction to be performed. It is also worth keeping in mind, including in limited segmentary resections, that it tends to necessary or recommendable to perform a transitory tracheostomy.

Regarding the post operatory complications of interventions of this kind, hemorrhages and respiratory complications stand out for the special clinical relevance. In this sense the hemostasis must be rigorous when finalizing the intervention, and can be reinforced with the use of secondary hemostatic agents chosen according to the case. Likewise the aerostasis can benefit form the use of some of these agents, whenever they also have the indication as a sealant. In extensive dissection that can reach the superior mediastinum or the pulmonary apexes, it is important to evaluate the integrity of the pleura and bear in mind post operatory pneumothorax as a possible complication.

The collaboration between specialties is a key aspect in the oncological and functional success, as well as the correct information in conjunction with the patients, reaching a consensus on the objectives and limitations of the intervention, establishing the priorities and informing about the functional and survival expectations according to the results.

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21

Indications and technique of laparoscopic partial splenectomy

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Introduction

The laparoscopic total splenectomy is the technique of choice for the majority of benign and malignant spleen pathologies.

Indications of a partial splenectomy are infrequent, and nonetheless their preservation prevents the complications related with asplenia, it is a technically more difficult procedure, especially in relation to the transection of the parenchyma and the subsequent control of hemorrhage.

We present the case of a patient, who has undergone a laparoscopic partial splenectomy for diagnostic study of suspicion of a hematologic disease, reviewing the indications and the technique of the laparoscopic partial splenectomy.

Clinical case

Male of 71 years of age diagnosed with type 2 Diabetes Mellitus under treatment with oral antidiabetics and for glaucoma.

Has an episode of fever due to Ebstain Barr Virus in April 2021; associated with plateletopenia and dissociated cholestasis. Is assessed by Hematology for suspicion of lymphoproliferative syndrome, where an abdominal computed tomography (CT) if performed revealing mild splenomegaly and multiple inguinal, axillary, mediastinal, and cervical lymphadenopathies *(→ Image 1)*.

Due to the suspicion of lymphoproliferative syndrome without the possibility of a biopsy, a diagnostic splenectomy is requested. In the abdominal CT the inferior polar nutritional pedicle of the spleen is identified, so a laparoscopic partial splenectomy of the inferior pole is programed.

Surgical technique

The patient is placed in the right lateral decubitus position and under general anesthesia and pneumoperitonea with Veress needle 4 trocars are placed, as can be seen in *(→ Image 2)*.

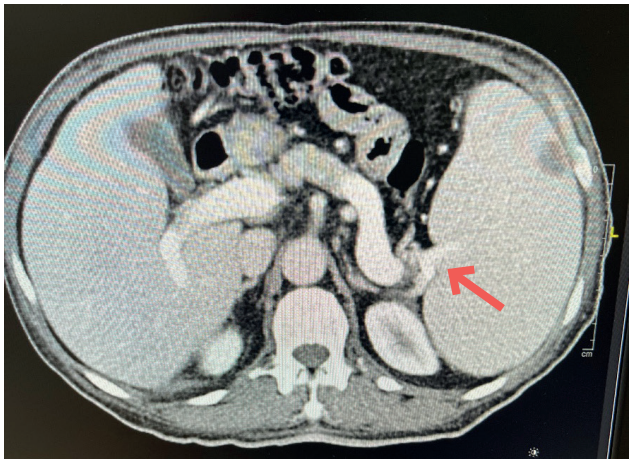

Image 1: Splenic vascularization.

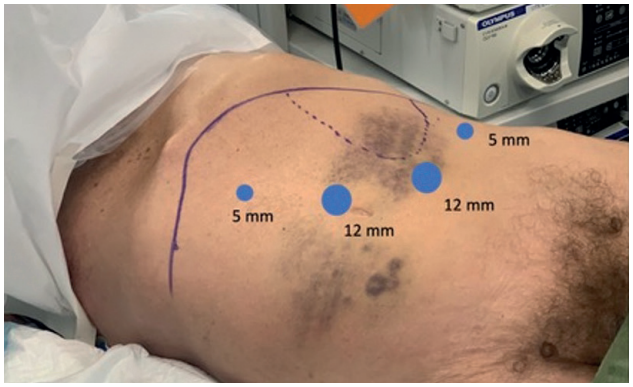

Image 2: Placement of trocars.

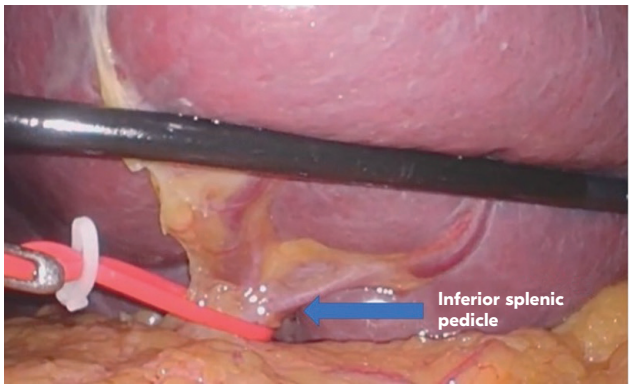

Image 3: View of the inferior polar pedicle.

Prior partial mobilization of the splenic angle of the colon, the inferior splenic pedicle is identified *(→Image 3)*, just as evidenced in the CT, and is clamped by the application of a laparoscopic bulldog *(→Image 4)*. Said clamping marks the area of the ischemia and the resection of the inferior spleen pole *(→Image 5)*.

With a system to seal vessels the opening of the capsule in the marked area is performed, and afterwards through the system for sealing by radiofrequency the transection of the splenic parenchyma is performed *(→Image 6)*. Once the transection is completed, the bulldog is removed and the correct hemostasis is tested, applying in addition 2 TachoSil® patches *(→Image 7)*. Final extraction of the piece extending the incision of the umbilical trocar.

The intraoperative blood loss was 100 cc and the post operative transcurred without incidents, being discharged after 24 hours.

The histological study discarded the lymphoproliferative syndrome, finally being diagnosed with a myelodysplastic syndrome with mutation of the Janus kinase 2 (JAK2) in treatment with Ruxolitinib.

Discussion

The spleen is a lymphatic organ that fulfills a blood purification function due to the elimination of red blood cells, granulocytes and old or malformed platelets besides the filtration of encapsulated bacteria (H. influenzae, N. meningitidis, S. pneumoniae)[1,2,6].

Today the total laparoscopic splenectomy is performed for the diagnosis and treatment of the majority of hematologic illnesses. The most important complications related to a total splenectomy are the element of risk of infection due to encapsulated bacteria, atherosclerotic events, thrombosis, pulmonary hypertension[1-10] and although less common (4.4%) but with high mortality (50—80%) is OPSI (Overwhelming Post-Splenectomy Infection) that consists of acute sepsis due to an asplenia in the first or second year after the intervention, generally caused by encapsulated germs; principally S. pneumoniae[2,5,6,8]

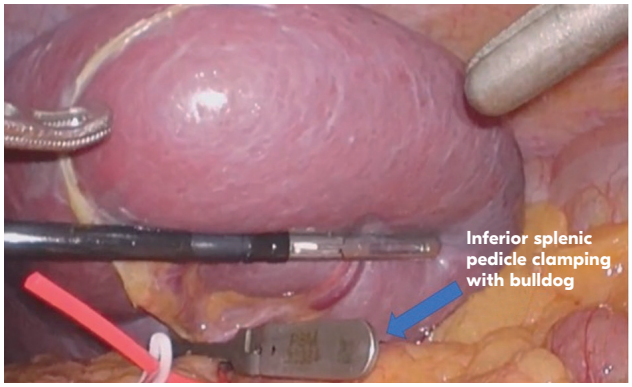

Image 4: Inferior polar arterial clamping with bulldog.

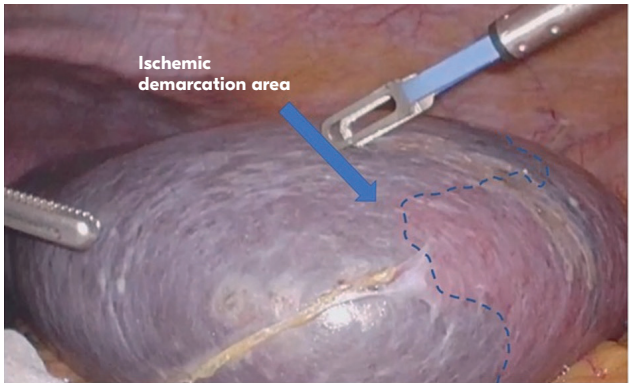

Image 5: Ischemic demarcation area.

Image 6: Transection with radiofrequency system.

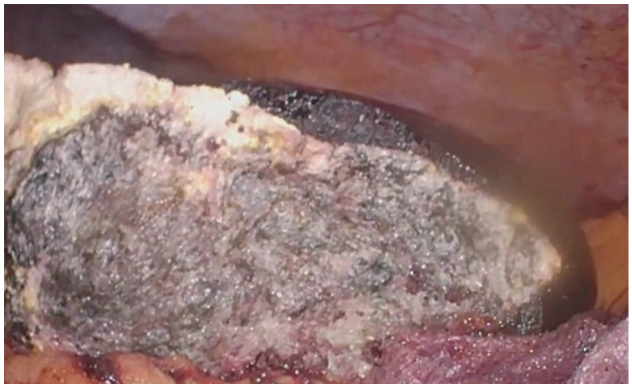

Image 7: Application of TachoSil® in the splenic transection.

The partial splenectomy permits reducing the development of the previas complications, but its performance continues to be a subject of debate, on one hand for the indications and on the other because it presents a major technical difficulty due to difficult control of the hemostasis. The first case of partial splenectomy by traditional laparotomy was described in 1980 by Morgenstern & Sapiro[5] and later the first case of partial splenectomy using the laparoscopic approach in 1995 by Uranüs et al.[1,2].

The most frequent indication is the benign cyst, although it has been used in multiple splenic lesions benign and malignant *(→ Table 1)*.

In the case we present here, the indication is established only to define a suspicious diagnosis that in principle does not require a total splenectomy, since mild splenomegaly doesn't determine any associated pathology, such as thrombocytopenia or left portal hypertension. In effect, the resected sample was sufficient to discard lymphoproliferative syndrome. A total splenectomy would have obtained the same diagnosis, but exposed the patient to the known risks of asplenia.

With respect to the increase in the difficulty of the surgical technique compared to a total, for the performance of a safe partial splenectomy two principal factors must be taken into consideration: the first is the need to preserve at least 25% of the spleen to permit correct functioning[1-6]. The second factor to take into account is the correct identification of the polar nutritional vessels that if clamped, as in our case, permit the performance of a safer anatomic splenic transection reducing the risk of hemorrhage.

Normally the splenic artery is divided into 2 or 3 groups of branches that vascularize the spleen but it has also been seen that this segmentation can reach as many as 7 ramifications[1,4,5] so assessment with a CT prior to the intervention is useful for planning the procedure, where the clamping with the bulldog will be performed on the ramification in the desired pole with posterior limitation of the ischemic area, permitting a correct demarcation for an anatomic resection, the use of radiofrequency systems can further decrease intraoperative bleeding, as well as the application of hemostatic material such as TachoSil®, that can seal even more the splenic parenchyma.

ADULTS[2-6]	CHILDREN[9]
Splenomegaly of unclear cause	Simple/epidermic cysts
Simple cysts	Hemangiomas
Benign tumors (Hamartoma, Hemangioma, Lymphangioma, Fibroma)	Hematologic illnesses (Hereditary spherocytosis, hemoglobinase E)
Lymphoma	
Splenic infarctions	
Pancreatic intrasplenic cysts	
Splenic abscess	
Solitary metastasis	

Table 1: Indications

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22

Lymph node metastases of thyroid cancer after surgery for laryngeal neoplasia

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Introduction

Thyroid cancer constitutes 1% of all malignant neoplasms. However, it is the most frequent endocrine neoplasm (90% of all of the endocrine neoplasm) and whose incidence is increasing due to greater number of imaging tests being performed[1]. It is also the principal cause of death of all of the endocrine tumors. It is most frequent in women between 30 and 50 years old. The incidence is between 2 and 20 cases for every 100,000 inhabitants, in Spain being 5 cases/100,000 women and 1.9/100,000 men.

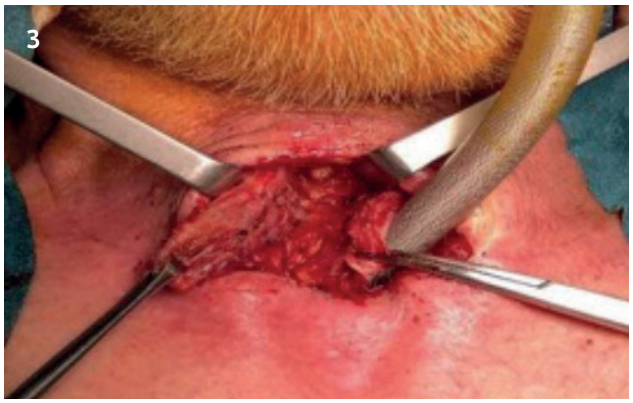
The predispositioning factors are the exposure to ionizing radiation, genetic factors and a diet low in iodine.

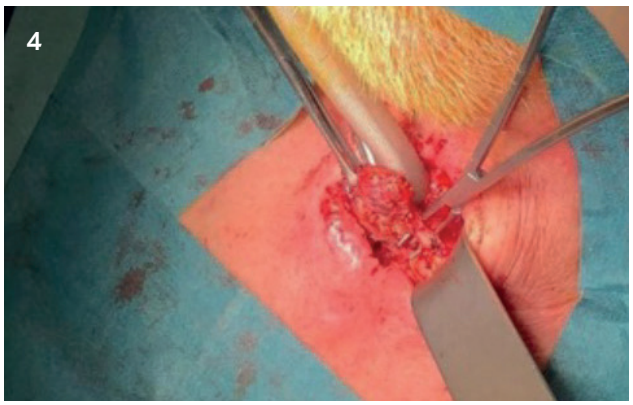
Thyroid cancer is classified as differentiated and undifferentiated. Differentiated thyroid cancer includes thyroid papillary carcinoma, follicular carcinoma and carcinoma of the Hürtle cells, the comprise between 90% and 95% of the total. Among the undifferentiated cancers can be found medullar carcinoma and anaplastic carcinoma.

The study is performed using cervical ultrasound, which can visualize nodules equal or bigger than 3 mm, associated with fine needle aspiration biopsy (FNA). In some cases the study can be complemented with core needle biopsy (CNB), cervical RM, bone gammography and cervical-thoracic-abdominal computed tomography (CT) in the case of suspicion of a metastatic illness. Curative treatment in thyroid cancer is surgical.

We present the clinical case of a patient diagnosed with ganglion metastasis of papillary carcinoma of the thyroid in the cervical lateral compartment after larynx surgery.

Images 1 and 2: Intubation through the tracheostomy. Positioning of the patient with both extremities in adduction and cervical hyperextension.





Images 3 and 4: Dissection and excision of both thyroid lobes.

Clinical case

Male patient of 60 years of age ex smoker with pathological history of arterial hypertension and diabetes mellitus type II. Intervened for appendectomy and athroscopy.

After being diagnosed with a squamous cancer of the glottis in October 2019 a direct laryngoscopy and partial cordectomy with laser CO^2 were performed with tumor staging pT1aN0M0. Subsequently received cervical radiotherapy treatment due to persistence of the lesion.

In October 2020 a new leukoplasia lesion was discovered on the right vocal cord with biopsy of severe epithelial dysplasia. The head and neck tumor committee decide to perform salvage surgery due to clinical recurrence. Intervened in Decembre 2020, carrying out a total laryngectomy with bilateral functional emptying and permanent tracheostomy.

The result of the anatomy pathology showed a moderately differentiated squamous keratinizing and ulcerated carcinoma of 2.5 cm in diameter, located in the anterior corner of both vocal chords and with infiltration of the external cortex of the thyroid cartilage. Bilateral lymphadenectomy negative for squamous cancer (ypT4ypN0). However, informed of infiltration of the thyroid by papillary carcinoma in 2 of 10 ganglion of the left IV level, in addition to two subcortical foci of thyroid follicles of 0.5 mm and 0.8 mm.

The study was completed with a cervical ultrasound, whose performance was difficult due to the postsurgical changes and the presence of the tracheostomy. In the latter, a thyroid gland was observed with a localized morphology and echo structure of normal parenchyma except for a reduction in its volume. The presence of a hypoechoic micronodule of 2 mm in the left thyroid lobe and another of 4 mm on the right thyroid lobe, no adenopathies suspected of malignancy were found. The analytical analysis of TSH and T4 were within normal ranges.

In the oncology tumor committee it was decided that the patient was tributary to total thyroidectomy with central compartment lymphadenectomy.

The patient was intervened in February 2021 using a Kocher incision in spindle at the peritracheostomal level to preserve a fine border of skin after the intubation for the tracheostomy and placed in cervical hyperextension *(→ Images 1 and 2)*.

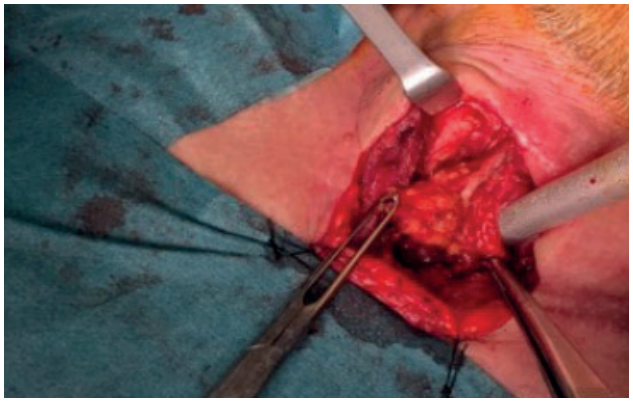


Image 5: Lymphadenectomy of the central compartment.

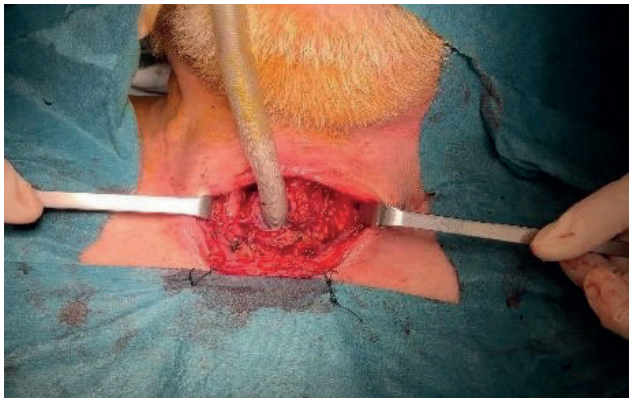


Image 6: Revision of the hemostasis prior to the application of the medicated matrix.

An important fibrosis was detected due to the radiotherapy and the previous surgery. A total thyroidectomy was performed with separate dissection of both thyroid lobes *(→ Images 3 and 4)*. During the lymphadenectomy of the central compartment distal section of both recurrent laryngeal nerves was performed *(→ Image 5)*. After the exhaustive review of the hemostasis *(→ Image 6)*, a medicated matrix (TachoSil®) composed of fibrinogen and human thrombin was applied, covering the entire bloody surface of the resection. The intervention was completed with the performance of tracheoplasty, inserting an aspiration drain and closing by planes from the incision up to the skin.

The patient was discharged on the 6th postoperative day. Complications worth mentioning include low debit lymphatic fistula upon removal of the drainage the third post operatory day and a transitory hypoparathyroidism with normalization of the parathyrin and blood calcium at three months from the intervention.

The anatomy pathology informed the presence of a follicular micronodule in the right thyroid lobe and a hyperplasic follicular nodule of 4 mm in the left thyroid lobe. No evidence of malignancy was found in the thyroids. In the piece of the lymphadenectomy of the level VI 13 neoplastic ganglion without infiltration were found, and one parathyroid gland.

The patient received adjuvant treatment with radiotherapy for glottis carcinoma and finalized in May 2021, and one month later was administered treatment with 100 mCi of radioiodine (I131) after stimulation with recombinant TSH. In the total body scan there is no evidence of thyroid remains and at the analytic level the levels of thyroglobulin are undetectable.

Discussion

In the literature very little evidence can be found about the presence of thyroid tissue in cervical adenopathies in patients diagnosed with head and neck tumors. In one of the series published it was estimated the in the 1.5% of the patients treated with lateral cervical lymph node dissection, both lymph node metastases of papillary thyroid carcinoma and benign inclusions of thyroid tissue were found[2].

The presence of ectopic thyroids at the lateral cervical level is very rare, being between 1—13% of the total ectopic[3]. Their incidence may be sub-estimated since in the majority of the cases they are found incidentally. The incidence of carcinoma in ectopic thyroids is less than 1% of the cases.

In approximately 50% of the patients with thyroid carcinoma lymph node metastasis exists upon diagnosis[4]. However, the presence of pathological adenopathies in the lateral compartment with occult primary is exceptional. This has suggested the development of primary papillary thyroid carcinomas due to malignant transformation of benign intranodal inclusions[5,6].

In our case a primary tumor in the thyroid gland or metastasis in the lymph nodes of the central compartment have not been found, only positive adenopathies in the left lateral compartment.

One of the reasons could be the cervical adjuvant treatment with radiotherapy that the patient has received for the glottis neoplasm. It could also be a microcarcinoma situated in the superior pole of the left thyroid lobe that has given place to the appearance of lymph node metastasis in the lateral compartment (skip metastasis) without involvement of the central compartment, and that after the radiation has disappeared. Another option is that it is an intranodal papillary carcinoma developed after the benign inclusions turned malignant.

There is no doubt that it is about patients with a complex pathology that should be assessed and treated in centers of reference of endocrine oncology surgery. For its correct management, the collaboration between different specialties is indispensable as well as the discussion in multidisciplinary committees.

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23

Usefulness of the sealant matrix with fibrinogen and human thrombin (TachoSil®) in the treatment of esophagogastric fistula after McKeown type esophagectomy

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Introduction

Esophagastric leaks are the serious and potentially mortal complication in oncologic esophagectomies. The reported rate of leaks after the esophagastric resection due to cancer vary from 5 to 30% in the literature[1].

The therapeutic strategy to follow in these cases depends on the clinical condition of the patient and they type of leak; which may be treated conservatively with broad spectrum intravenous antibiotics, parenteral or enteral nutritional support, percutaneous drainage with stents or placement of a vacuum assisted endoscopic closure (E-VAC) or requiring urgent re-intervention in the worst of the cases[1,2].

On the other hand, in an attempt to reduce the incidence of anastomotic esophagogastric leaks, tissue adhesives with fibrin have been introduced to reinforce this anastomosis as a preventative measure. The theory is that these can increase the strength of the esophagastric anastomosis and promote the anastomotic healing minimizing the risk of leaks[3].

However, there is limited evidence in the literature and the majority is related to experimental studies with animals or very heterogenous retrospective cases with patients diagnosed with esophagastric atresia or caustic lesions to esophagus cancer disease[3].

In the majority of the publications, the patches covered with fibrin and thrombin such as TachoSil® have been used in the prevention of anastomotic leaks and in a few cases as treatment of an established fistula. Nonetheless, we present two cases of patients with esophagogastric fistulas after MeKeown type esophagectomies in which, after the failed conservative management, a surgical re-intervention associating TachoSil® in the reinforcement of the anastomotic defect resolved the leakage problem successfully.

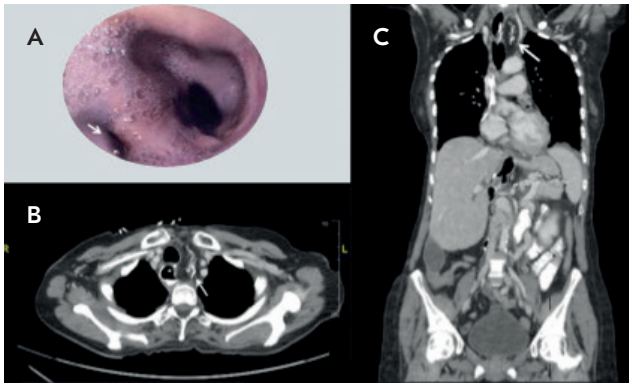

Image 1A: Gastroscopy. The arrow marks the fistulous opening of 8 mm over the esophago-gastroplasty anastomosis. **1B:** Transversal cut and **1C:** Coronal of CAT with oral contrast. The arrows indicate the extravasation of oral contrast.

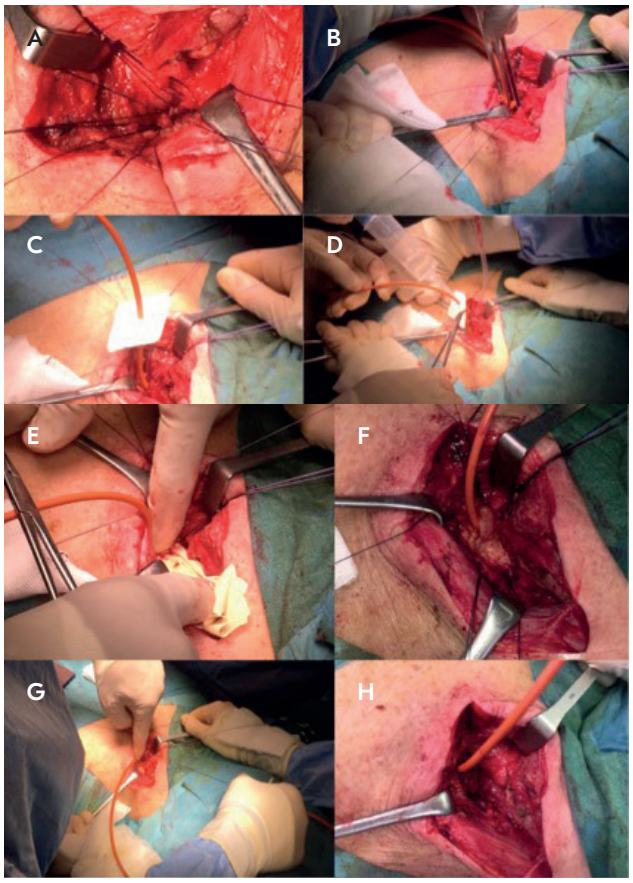

Image 2: Surgical technique: **A:** Loose sutures with Polysorb 2—0 without tying in the extremes of the defect at approximately 7—8 mm at the level of the anastomosis. **B:** Introduction of a Kehr tube through the defect. **C:** Application of TachoSil® through the Kehr tube. **D:** Moistening the TachoSil® matrix. **E:** Pressure over the TachoSil® matrix with a dry glove. **F:** View before tying. **G:** Application of the TachoSil® matrix over the defect by tying the previously made loose Polysorb sutures. **H:** Final view before closing the wound.

Clinical case 1

Female of 53 years of age with history of smoking (1 pack/day), hepatitis C treated and cured with sofosbuvir and nephrectomy for a Wilms tumor in infancy with posterior adjuvant with Vincristine and Actinomycin D.

Due to symptoms of progressive dysphagia and constitutional syndrome in July 2020 is diagnosed with metatastic squamous carcinoma of the inferior third of the esophagus T3N0. CROSS scheme neoadjuvant chemotherapy-radiotherapy (weekly administration of Carboplatin (AUC 2 mg/ml/mn) and Paclitaxel (50 mg/m^2) is carried out during 5 weeks concurrently with Radiotherapy) finalizing in November 2020 and with a posterior PET-TAC that shows a complete metabolic response in January 2021.

In February 2021 a McKeown type esophagectomy in prone position with medial thorascopic approach was performed. Upon admission, the patient is suffering from the complication of a leak in the esophagastric gastroplasty anastomosis detected on the 14th post-operative day using gastroscopy (fistular orifice of 8 mm over the esophageal-gastroplasty anastomosis) *(→ Image 1)* and an oral contrast CAT (extravascular with a small amount of oral contrast in the posterior wall of the anastomosis near the plasty, at the level of D2—D3 without evidence of other leaks) *(→ Image 1)*.

In this situation with the patient hemodynamically stable and no signs of acute septicemia, conservative management was chosen maintaining the cervical drainage, broad spectrum antibiotherapy and posterior placement of a nasojejunal feeding tube. After a month in the hospital, the patient was discharged maintaining the nasojejunal feeding tube.

During the follow-up in external offices and with evidence of the persistence of the fistula over the esophagus-gastroplasty anastomosis in the successive image and endoscopy studies, it was decided to re-intervene the patient at 3 months of the initial surgery.

In May 2021 an exploratory cervicectomy was performed finding a defect of approximately 7—8 mm at the level of the anastomosis. For its repair, in the first stage various loose sutures with Polysorb 2—0 were made without tying in the extremes of the defect. In the next stage, a Kehr tube was introduced through the defect.

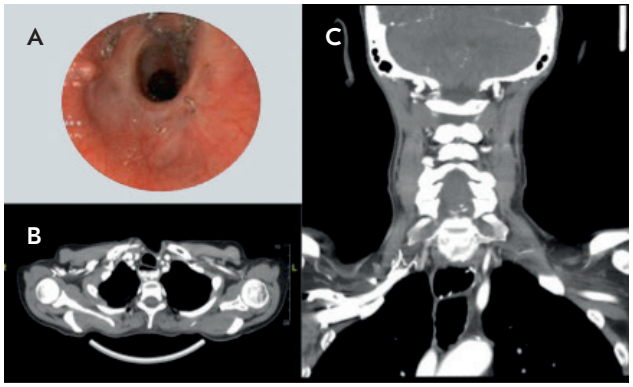

Image 3A: Gastroscopy. The esophago-gastroplasty anastomosis is identified at approximately 18 cm of the dental arch with suture material remains, with a scar-like appearance with retracted areas but without evidence of fistulous orifices. **B:** Transversal cut and **C:** Coronal of CAT with oral contrast without images of extravasation of the same.

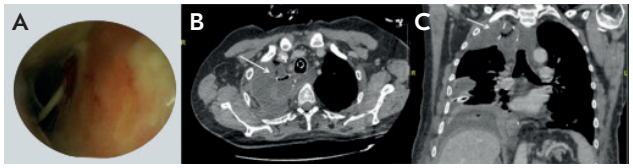

Image 4A: Gastroscopy that shows at 25 cm a cavity of more than 5 cm in depth. **B:** Transversal cut and **C:** Coronal of CAT urgently informing of thickening and general loss of definition of the wall of the gastroplasty attributable to ischemia.

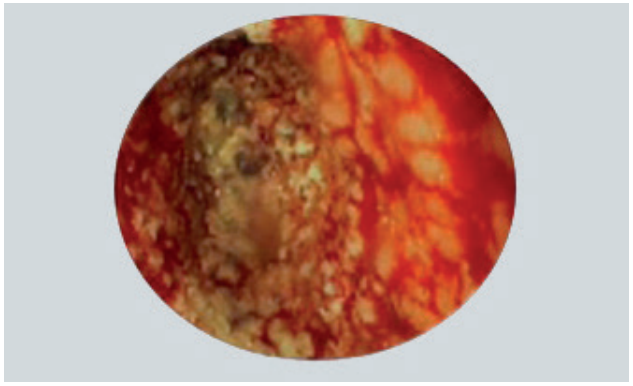

Image 5: Gastroscopy after performance of 14 EsoSponge changes. The cavity can be seen as smaller in size and has granulated tissue.

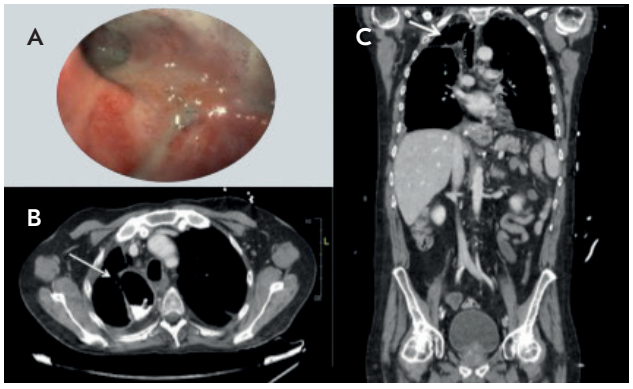

Image 6A: Gastroscopy. The persistence of the dehiscence is shown covering 1/3 of the circumference and with a larger cavity. **B:** Transversal cut and **C:** Coronal of CAT with oral contrast. The arrows mark the discontinuation of the suture of the esophagastric anastomosis.

Following and to guarantee a closure without tension, a matrix of TachoSil® was applied through the Kehr tube, with it remaining around the same tube and staying adhered over the defect by tying the aforementioned loose Polysorb sutures. Finally, a Penrose type drain is inserted by counter-incision *(→ Image 2)*.

During the stay the patient received total parenteral nutrition. At 3 weeks, a gastroscopy and a CAT with oral contrast were performed that demonstrated the resolution of the fistula and the Kehr tube was removed. The gastroscopy identified the gastroplasty anastomosis at approximately 18 cm of the dental arch with suture material remains, with a scar-like appearance with retracted areas but without evidence of fistulous orifices. The anastomosis was passable with the conventional gastroscopy accessing the gastroplasty that had a normal appearance. The CAT with oral contrast showed post surgical signs with visible sutures and a distended esophagus by oral contrast, without images of extravasation *(→ Image 3)*.

Finally, after having confirmed the resolution of the anastomotic fistula, oral tolerance to liquids began satisfactorily with the patient being discharged without presenting any post-operatory complications (Clavien-Dindo: 0).

The anatomy pathologic study informed poorly differentiated squamous carcinoma in the distal esophagus with invasion of the periesophagic tissue (ypT3) with free surgical margins, without invasion of vasculolymphatic, perineural or the extra-mural venous vessels. Twenty-six lymphatic nodules without evidence of tumor invasion were isolated (0/26) (ypN0). The secondary changes due to neoadjuvant therapy according to the modified Ryan classification showed residual cancer with fibrosis – partial response (G2) and according to the Mandard classification TRG3 with the fibrosis predominating over the tumor.

Currently the patient has correct oral tolerance to liquids and solids, carry out an active life (ECOG 0) and without evidence of relapse of the illness in successive controls using imaging tests.

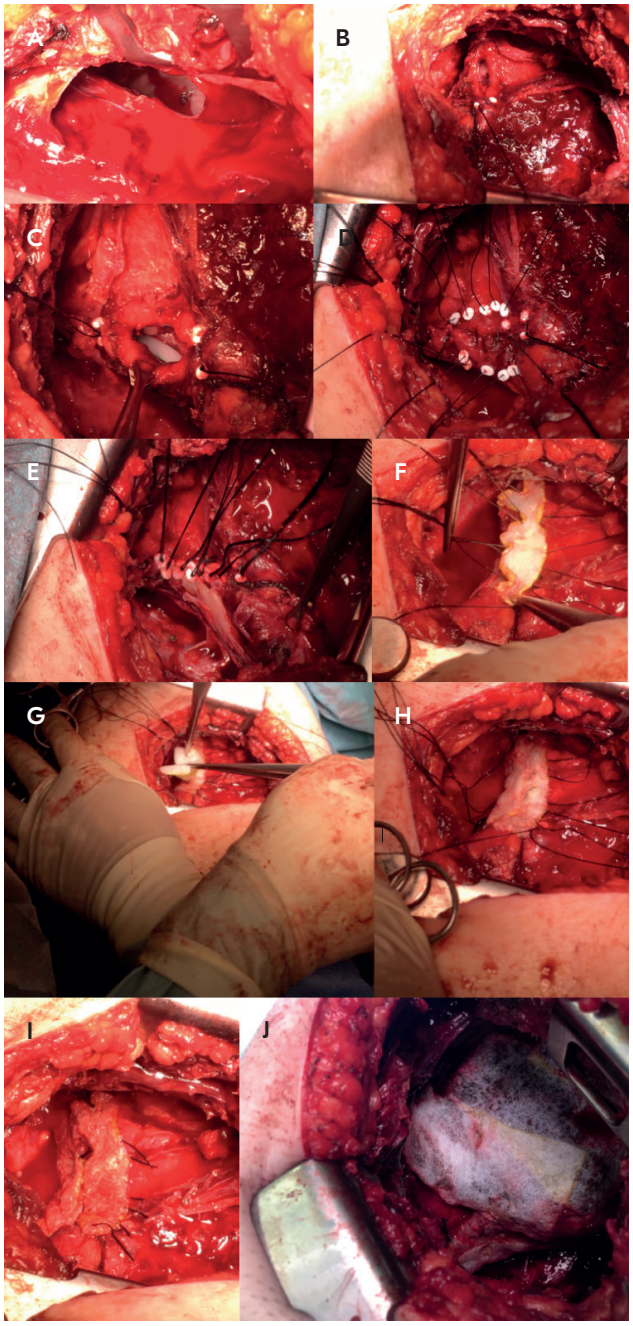

Image 7: Surgical technique: **A:** Release of the lung and parietal pleura. **B, C, D:** Correct exposure of the gastric plasty with a defect of about 5 cm longitudinally corresponding to the staple line of the gastric plasty and visualizing the nasogastric tube in the background. Various loose stitches of silk 2—0 without tying are observed at the extremes of the defect with placement of Pledgets through it. **E:** Stitches tied obtaining a simple closure without tension. **F, G, H:** Placement of a full TachoSil® matrix but cut in half and both halves were placed over the defect through tying the ends of the silk stiches that were previously tied. **I, J:** Placement of a full TachoSil® matrix that was cut in half and both new halves were used as a final reinforcement of the defect.

Clinical case 2

Male of 57 years old with smoking habit of 25 packs/year as the only background of interest. Due to an episode of upper gastrointestinal bleeding externalized in the form of hematemesis and melenas in February 2021 an urgent gastroscopy was performed which showed a lesion suggesting neoplasm in the distal esophagus of which biopsies were taken with results of adenocarcinoma over Barrett's esophagus.

The extension study was completed with a final diagnosis of adenocarcinoma of the distal esophagus T2N1, so the patient received CROSS scheme neoadjuvant chemotherapy-radiotherapy finalizing in June of 2021 and with a posterior PET-CAT demonstrating a partial metabolic response at the end of this same month.

In February 2021 a McKeown type esophagectomy in prone position with medial thorascopic approach was performed. At 10 days after the surgery, the patient presents a progressive worsening with hemodynamic instability performing a gastroscopy that describes a 25 cm cavity of more than 5 cm in depth; and an urgent CAT informing thickening and generalized loss of definition of the gastric plasty wall attributable to ischemia with right anterosuperior pleural collection with no plane of separation with the superior anastomosis, suggesting a fistula between the plasty and the pleural cavity *(→ Image 4);* which required an urgent surgical re-intervention.

During surgery, the previous cervicectomy was opened and the esophagus and the anastomosis were located by blunt dissection. There was evidence of outflow of purulent content corresponding to an anterior collection visualized in CT. It is observed that the gastric plasty in its proximal end presented a correct perfusion. The mechanical suture is palpitated on its contour although without direct visualization due to the local conditions. An abundant lavage with physiological solution is performed and a new Penrose drain is inserted.

In addition a subcostal bilateral laparotomy was performed confirming a correct perfusion of the intraabdominal gastric plasty, as well as the intestinal loops. An alimentation jejunostomy is performed using a Witzel type technique.

After which, the patient present a slow but progressive recuperation. At 15 days a new gastroscopic control was performed that described the esophago-gastroplasty anastomosis at 20 cm of the dental arch, and at 25 cm, localized a large cavity of more than 5 cm in depth, leading to the placement of an endoluminal vacuum (EsoSponge) therapy system.

After 14 changes of the EsoSponge, the cavity persists although in a reduced size (3 cm in the las gastroscopy control) *(→ Image 5)*, so it was decided to discontinue the vacuum therapy. In the following days the patient needed to be re-admitted to intensive care due to respiratory deterioration, dyspnea and progressive needs to increase the FiO2 being diagnosed with intrahospital pneumonia.

After stabilizing the patient it was decided to perform a new gastroscopy that showed the persistence of the dehiscence covering 1/3 of the circumference and with the a larger cavity (approximately 6 cm in depth x 15 mm). In addition, a new CAT was completed that informed of the discontinuation of the suture of the esophagogastric anastomosis in relation with the known dehiscence of the suture, with discrete reduction in the size of the pleural collection in the right anterior aerial apical. *(→ Image 6)*.

So, due to the lack of resolution of the fistula using conservative management and with the patient stabilized, a surgical re-intervention was determined at 3 months of the initial surgery.

Under selective right intubation, a right thoracotomy was carried out. The lung and parietal pleura were bluntly released. The gastric plasty was correctly exposed showing a defect of approximately 5 cm in length corresponding the line of staples of the gastric plasty and viewing the nasogastric tube behind it. For its repair, various loose stitches with silk 2 — 0 were made without tying at the extremes of the defect with placement of Pledgets through it. Afterward the stitches could be tied obtaining a simple closure without tension. Following, a full TachoSil® matrix was applied, that was cut in half and both halves were placed over the defect through retying the ends of the silk stiches that were previously tied. Also a full TachoSil® matrix was applied, that was cut in half and both new halves were used as a final reinforcement of the defect. Finally, a thoracic drain was inserted *(→ Image 7)*.

After the surgical intervention the patient had a satisfactory evolution although due to the recent nature of the surgery, we don't have endoscopic or radiological studies that confirm the absence of the leak. Nonetheless, given the progressive clinical and analytical improvement of the patient and due to the absence of debit in the pleural drain, everything would indicate that our treatment has been successful.

The anatomy pathological study informed moderately differentiated adenocarcinoma in union gastroesophageal invasive submucous (ypT1b) with free surgical margins without vascular lymphatic or perineural invasion. Twenty lymphatic nodules were isolated, one of them with tumor infiltration (1/20) (ypN1). The secondary changes to the neoadjuvant therapy according to the modified Ryan classification showed an almost complete response (G1) and according to the Mandard classification, TRG2 (loose cells in fibrosis and mucin).

Discussion

The esophageal reconstruction using gastroplasty with thoracic or cervical anastomosis has a greater incidence of dehiscence than other types of gastrointestinal tract anastomosis due to complexity of the surgical procedure itself, the considerable risk of ischemia associated with gastroplasties and the elevated proportion of patients with relevant comorbidities and malnutrition[1]. All of these factors could explain the high morbimortality in this type of surgery. According to the latest series published, the incidence of esophago-gastroplasty anastomotic dehiscence varies between 5 — 30%[1]. This complication, in addition to influencing in the morbimortality of the patient, directly affects the recovery and quality of life and is associated with poor oncological results[1,2]. In consequence, both its prevention as well as its optimum handling is of vital importance.

Prevention of esophagogastric fistula

The most widely validated preventative measures consist of guaranteeing an adequate pre-operative nutrition, the pre-habilitation, that is part of the protocols for enhanced recovery after the surgery (ERAS), the anesthesia measures focusing on an adequate ventilation of the lungs with this being selective, the restrictive management of liquids and correct

analgesics. At the surgical level, heterogenous results are shown with respect to the type of anastomosis (intrathoracic versus cervical), the confection of the gastroplasty, the anastomotic technique and other surgical measures such as the pedicled omental flaps, the preparation of the gastroplasty or the monitoring of the intraoperatory profusion of the gastroplasty with flowmeter, doppler, spectroscope with infrared or fluorescence with indocyanine green[4].

As well as the tissue adhesives that have been used in gastrointestinal surgery both in the prevention as well as in the treatment of anastomotic leaks[3]. The tissue adhesives contribute to the scarring of the wound by permitting the polymerization and facilitating an approximation of the tissues in the anastomosis[3].
In gastrointestinal surgery, two categories of tissue adhesives are used according to their chemical composition: the fibrin sealants and the cyanoacrylates. Generally, the fibrin sealants consist of a thrombin and fibrinogen composite from humans or animals combined (e.g. TachoSil®). The cyanoacrylates are not bio-absorbable and are used for skin lacerations providing a stronger adherence compared to fibrin sealants[3].

With respect to the prevention of the anastomotic leak, many studies that involve the use of tissue adhesives in the sealing of gastrointestinal anastomies have been carried out. However, few studies have evaluated the use of tissue adhesive in esophageal anastomosis.

In the literature, the experimental studies with animals that evaluate tissue adhesives for the sealing of the esophageal anastomosis as a preventative measure have as a primary objective of interest the measurement of the pressure that causes a rupture, the synthesis of the collagen and the appearance of anastomotic leakage. Verhage et al. investigated the use of collagen coated patches (TachoSil®) in the esophagogastric anastomosis in rats. To do so they dissected the intrabdominal distal esophagus. The animals were randomly distributed in two groups and they were sacrificed on the days 0, 3, 5 and 7. The pressure of the rupture increased significantly due to the sealing during the first postoperative days (days 0 and 3) in the TachoSil®[5] group.

At the close of the 20th century, McCarthy et al. performed esophagogastric anastomosis in dogs. The esophagus was resected 8 cm above the gastroesophageal union. In the experimental group the fibrin sealant (Tisseel®) was used to reinforce the anastomosis. In the autopsy, a leakage test was carried out. A leakage rate of 36.4% was observed in the experimental group compared to 92.2% in the control group ($p < 0.01$)[3]. Another study carried out by Thorson et al. in esophageal anastomosis in dogs documented similar results. The incidence of dehiscence was reduced by 30% as a result of the additional sealing with fibrin[3]. In another interesting study by the Spanish group García-Pérez performed in 50 rats, these were divided into 2 groups: TachoSil® group ($n = 25$) and control group ($n = 25$). After the abdominal esophagus section a monoplane esophagastric anastomosis was performed, reinforced with a 1 cm strip of TachoSil® wrapping the anastomosis in the first group. A functional study was carried out using manometry, as well as a histopathological and immunohistochemical study for angiogenic, fibrogenic and proliferative factors. The mortality in the series reached 8% in the group in which the collagen strip was applied, compared to 36% of the control group with significant differences. When performing the esophageal manometry, the pressure of dehiscence was greater in the reinforced anastomoses. In the microscopic study, in the group where TachoSil® was applied, a profuse inflammatory reaction with abundant polymorphonuclear cells and macrophages surrounded by a connective matrix with fibroblasts and blood vessels was observed. The expression of VEGF and FGF1 and FGF2 was considerably greater in the anastomosis with collagen the strip, cytokines implicated in the phenomenon of tissue regeneration[6]. In any case, the results indicate that the application of TachoSil® facilitates the tissue reparation phenomenon, so it may be of great utility as a reinforcement of the esophagogastric anastomosis for the prevention of dehiscence.

In the clinical investigation with humans, recently Plat et al. (2019) have published the use of an autologous fibrin sealant (Vivostat®) in 15 patients that underwent esophageal surgery with gastroplasty reconstruction. Two anastomotic leaks of grade I (13.7%) were documented and treated in a conservative manner and one grade III leak (6.7%) that require an Ivor-Lewis re-intervention with thoracic anastomosis[7]. These results are consonant with another study published previously by Haverkamp, et al. (2015) in which the technical viability of the ap-

plication of collagen patches covered in fibrin and thrombin (TachoSil®) was evaluated in the esophageal cervical anastomosis. It concluded that the application was technically feasible and that anastomotic leaks were produced in 2 of 15 cases[8].

Another study of cases and controls carried out by Saldana-Cortez et al. investigated the use of a sealant (Quixil®) in children after a caustic lesion of the esophagus. The esophagus was replaced by an interposition of colon. In the group under investigation (n = 14) fibrin sealants were applied on the neck in the esophagocolic anastomosis and 28.5% developed leaks compared to 50% in the control group (n = 24). However, due to the lack of potential, this result was not significant (p = 0.17)[3]. Upadhyaya et al performed an unique randomized controlled study of surgical treatment for congenital esophageal atresia in newborns that underwent standard right thoracotomy.

A monolayer primary esophageal anastomosis was performed in both groups and in the experimental group a reinforcement of the esophageal anastomosis with a sealant (Tisseel®) (n = 22 surgery only, n = 23 surgery + sealant). For the diagnosis of anastomosis leak the detection of saliva in chest tubes and radiographs with barium swallow. The incidence of dehiscence was 43.0% in the control group compared to 9.1% in the Tisseel group (p = 0.017)[3]. Finally, one of the most recent studies in the prevention of esophageal anastomosis leakage using sealants with fibrin was that realized by Yan Huang et al. (2021)[9]. In spite of being a retrospective study in a single-center with patients intervened between January 2018 and December 2019, it included 227 patients with esophagus cancer or esophogastric union that underwent the McKeown esophagectomy, of which 86 patients were included in the fibrin sealant group and 141 patients in the control group.

In the group with the fibrin sealant, the rate of postoperative cervical anastomotic leakage was less (4.7% [4 of 82]) compared to the control group (19.9% [28 of 141]) (p <0.01). The multivariant logistic regression showed that the intraoperatory application of the fibrin sealant was a protection factor independent of the anastomotic leak (OR 0.169, IC 95% 0.055 — 0.515, p = 0.002)

Treatment of esophagogastric fistula

The treatment in the case of fistula or dehiscence of the esophago-gastroplasty depends on the clinical condition of the patient and the type of leak; that may be secondary to dehiscence of at least 10% of the circumference of the anastomosis, a dehiscence of between 10% — 50% of the circumference or a tissue necrosis with more than 50% of the circumference affected[2]. The last type of leak generally results in septic shock and requires an immediate re-intervention. If the patient units all of the adequate clinical conditions and remains stable, commonly other types of leak; cam be treated conservatively with broad spectrum intravenous antibiotics, parenteral or enteral nutritional support, percutaneous drainage. implantation of stents or placement of a vacuum assisted endoscopic closure (E-VAC)[2].

With respect to the use of **sealants** in the **treatment of an established fistula,** to date, only one **experimental study has been published in animals.** Yurtu et al investigated the use of Glubran® to occlude esophagocutaneous fistulas in one model with rabbits. In both groups a transversal esophageal incision of 1 cm in length was made in the control group (n = 6) which was treated by primary surgical repair. The rupture pressure and the collagen synthesis were measured after eight weeks. The occlusion with Glubran® (n = 6) appeared to be mechanically more effective during the first postoperative days. However, compared to the control, a reduction of the rupture pressure and the collagen synthesis was observed[3].

As for clinical studies in humans, Avalos et al used a sealant (Quixil®) to treat patients that suffered esophagocutaneous fistulas after esophageal resection. The management of sealants (n = 3) was compared to conservative management with fasting, suppression of the gastric secretions, subcutaneous octreotide and nutritional support (n = 7).

The trajectory of complex fistulas was excluded, the fistulas with high volume output and the patients with associated abscesses. The trajectory of the fistula and the production medium of the fistulas were the same in both groups. In all of the patients complete closure was obtained by sealants. The time to obtain closure was significantly reduced (P<0.05) compared to the time for spontaneous closure in the control group[3].

Eight series of cases with a total of 90 patients have been published. Tissue adhesives were used to treat dehiscence or different types of fistulas (that is, esophagocutaneous, tracheoesophageal and broncho esophageal). Sealants were applied (Tissucol® Duo, Tisseel®), cyanoacrylates (Glubran®, Histoacryl®) or a combination of fibrin and Vicryl mesh (Ethicon®). The follow-up time to assure a successful closure varied between on and 264 months. The majority of the articles documented positive results and the complete closure was achieved in 74 patients, which resulted in a success rate of 82%. However, none of the articles defined the selection of the patients[3].

In this study, we successfully used TachoSil® matrixes in the treatment of two cases of esophageal gastroplasty leaks. The principal active ingredients of TachoSil® are human fibrinogen (5.5 mg per cm^2) and human thrombin (2.0 IU per cm^2). The remaining components are equine collagen, human albumin, riboflavin (E101) sodium chlorate, sodium citrate (E331) and L-arginine hydrochloride[10]. This product uses natural hemostatic mechanisms. The fibrinogen and the thrombin form a dry layer over a collagen matrix that dissolves when it enters into contact with body fluids and penetrates the surface of the wound. This is followed by the production of a reaction between the fibrinogen and the thrombin, that initiates the last phase of physiological coagulation. The fibrinogen is converted into fibrin monomers, that spontaneously polymerize forming a coagulation. The coagulation adheres strictly to the surface of the wound and causes the adherence of the collagen matrix. This leads to a strong hemostatic and tensing effect. For this reason, the matrix can be used to seal an intestinal anastomosis. In the following stage, the fibrin, that is united by the factor XII endogen, forms a strong and mechanically stable network. Due to its robustness and strong adhesion, this structure sustains and seals the anastomosis[10].

The sealing properties of TachoSil® have been confirmed in clinical studies in thoracic surgery, where it is used to reduce the postoperative risk of air leakage, as well as in neuro surgery, where TachoSil® has demonstrated its efficacy for preventing the leakage of cerebrospinal fluid[10]. In hepatic surgery, in spite of its confirmed function as a hemostatic, TachoSil® also reduces the leakage of bilis[10]. In pancreatic surgery, TachoSil® can be applied with safety to the remnant pancreas after its peripheral resection as a surgical intervention, however, there is no data that confirms that its use diminishes the rate of post-operatory pancreatic fistulas, mortality, re-intervention rate, blood loss an hospital stay[10].

The efficacy of TachoSil® in gastrointestinal surgery has been documented in animal models, both for the lower gastrointestinal tract as well as for the upper.[10]. These promising results have lead many surgeons to use this product in their clinical practice[10].

After the revision of the literature and in concordance with the two clinical cases presented, it seems that the collagen matrix covered with fibrinogen and thrombin (TachoSil®) can perform an important role both in the prevention of anastomotic leaks as well as in their treatment.

Nonetheless, in esophagogastric surgery the evidence is scarce and prospective randomized studies are required to confirm our hypothesis.

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24 Hemostasis in emergency oncological surgery

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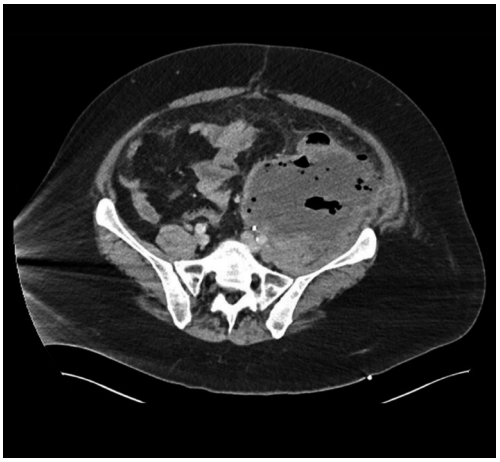

Image 1: Abdominal CT: retroperitoneal lesion (axial view).

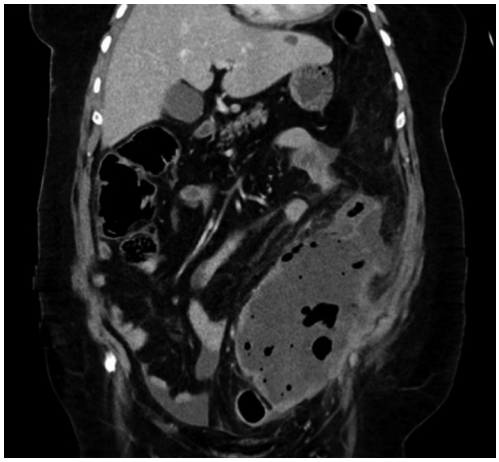

Image 2: Abdominal CT: retroperitoneal lesion (coronal view).

Introduction

Retroperitoneal sarcomas are rare tumors as they only represent 0.15—0.20% of the solid tumors. The location of the retroperitoneal sarcomas is the second most frequent (15—20%)[1]. Their heterogeneousness and rareness leads to difficulties at the time of generating experience and designing therapeutic plans.

Tumor angiogenesis consists in a series of complex consecutive steps that lead in the last place to the formation of neo vessels that supply blood and nutrients to the tumor mass. It is about an essential process both for the growth of the tumor itself as well as for the development of distant metastasis. The neoplastic cells are capable of secreting substances with angiogenic activity. When these growth factors unite with their specific receptors present in the endothelial cells, it favors the proliferation, migration and invasion of the endothelial, with the consequent formation of blood capillaries[2].

Although the tumor cells induce the formation of the blood vessels it is a process that is similar to normal angiogenesis, the ultrastructure of the tumor vessels is abnormal, the neo vasculature is dilated and sinuous and the walls of tumor vessels are thin[2].

Faced with this abhorrent and anomalous vascularization, the tumors are extremely fragile and the hemostasis represents a challenge in their surgery.

Clinical case

Female of 56 years of age, with history of hysterectomy and double adnexectomy in 2014 due to endometriotic cancer.

Due to left lumbar pain an ambulatory CT in a private center on 04/13/2021 informs of a hyperdense mass measuring 15 x 12 x 13 cm left retroperitoneal anterior to the left psoas iliac that extends from the lower left kidney region to the left mesosigma generating a painful mass effect that causes a displacement of the anterior descending colon and of the sigmoid colon and left ureter hydronephrosis.

On 04/16/2021 a double J catheter is inserted and on 04/19/2021 a biopsy of the retroperitoneal mass is performed.

On 04/30/2021 the patient comes to emergencies at our center due to a high fever of 38°C and abdominal pain of 6 days of evolution, with greater intensity in the last 3 days.

Upon arrival the patient is hemodynamically unstable with hypotension (AT 70/40 mmHg) and tachycardia (103x') and painful mass effect in left hemiabdomen for which resuscitation with serotherapy and broad spectrum antibiotherapy is initiated (Meropenem) and complementary tests are requested:

Analytics

Leucocytes 4.51 x 10^9/L, Prothrombin time 1.40 ratio, Creatinine 3.72 mg/dL, Lactic Acid 38.0 mg/dL, Reactive C protein 45.73 mg/dL.

Abdominal CT *(→ Images 1 and 2)*

Voluminous retroperitoneal lesion, mostly hydroaereal and with thickened margins that widely contacts the left psoas muscle and the descending colon. Presence of diffuse free liquid intra- and retroperitoneal. Diffuse pneumoperitoneal with accumulated hydroaereal in mesogastrium suggestive if an abscess at this level without being able to discard a complicated/abscessed underlying retroperitoneal tumor process.

Faced with the patient's instability the radiological findings, showing diffuse purulent peritonitis and a large neoplastic mass of cerebroid appearance in the left iliac fossa that includes the sigmoid colon, iliac vessels, left ureter and a perforation in the sigmoid colon, it is decided to proceed with emergency surgery.

After dissection, a large part of the neoplastic mass is released with a part staying adhered to the iliac vessels, psoas and left ureter. A left hemicolectomy and transverse colostomy are performed on the left hypochondrium. Upon finalizing the surgery the hemostasis is revised and in the presence of friability of persistent neoplastic tissue, a TachoSil® is applied over the same.

Pathological anatomy (left hemicolectomy): infiltration and perforation of the colon wall by a mixed malignant tumor of glandular and solid components compatible with relapse of carcinosarcoma of gynecological origin.

Afterwards, the patient has a prolonged post operatory due to intraabdominal abscess and upper intestinal occlusion for progression of the disease not subject to surgery; being discharged on 07/01/2021. Currently in chemotherapy treatment.

Discussion

The infrequency of retroperitoneal sarcomas implies, on many occasions, a diagnostic delay and therapy that may generate serious situations that require not radical but urgent surgery[1].

Taking as an example the case described, a radical resection of these tumors isn't always possible and even less in urgent surgery with a hemodynamically unstable patient. Under these circumstances it seems prudent to limit the surgical aggression according to the needs of the patient assuring a correct hemostasis and damage control to prevent greater post operatory complications. The hemostasis in these cases, due to the friability of the tumor tissue, can present a challenge to the surgeon. This is why the use of coagulation materials and artificial hemostasis can be considered a tool of great support.

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25

Complex adhesiolysis and hemostasis of the hepatic bed in revisional bariatric surgery with hiatoplasty and cardiopexy with Teres ligament

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Introduction

Gastroesophageal reflux is a complication after the performance of a vertical gastrectomy[1]. There are different techniques within revision surgery for the management of reflux together with hiatal hernia repair in patients who have previously undergone bariatric surgery[2,3]. Nonetheless, revisional bariatric surgery can be complex and is not exempt from complications due to previous adherences[4].

The objective of our article (including video) is to present a case of complex reflux management that previously required diverse interventions creating greater difficulty in the final procedure.

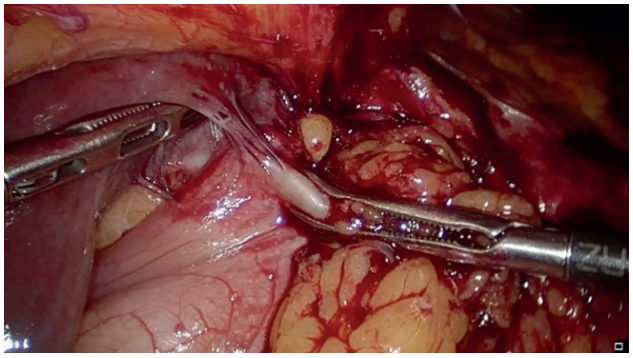

Image 1: Adherences of the liver on the anterior gastric face of the previous gastro-jejunal anastomosis.

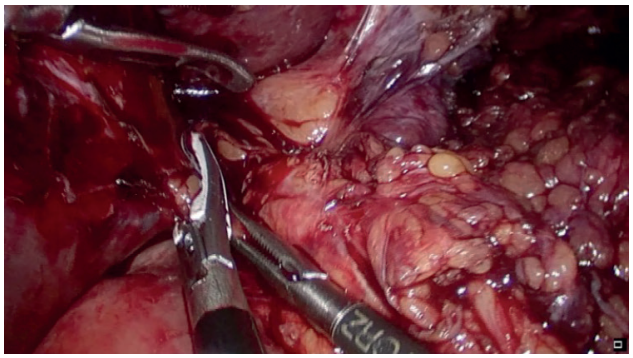

Image 2: Adhesiolysis of the Glisson hepatic capsule over the minor gastric curve to access the right pillar, vena cava and hepatic caudate lobe.

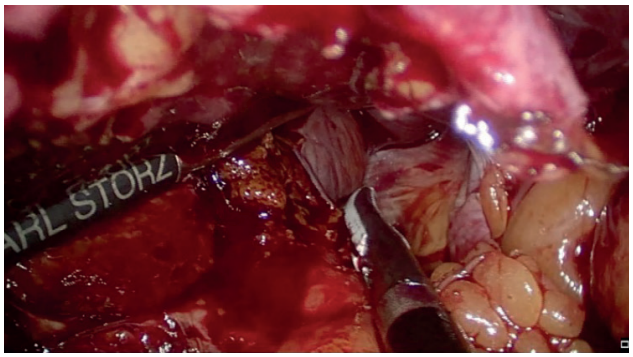

Image 3: Tear of the Glisson hepatic capsule over the minor gastric curve.

Clinical case

We present the case of a 69 year old female, with history of vertical gastrectomy due to BMI of 36 in 2013. Subsequently due to gastroesophageal reflux a hiatoplasty and Hill type gastropexy were performed in 2016. Due to the persistence of reflux a conversion to vertical gastrectomy and gastric bypass in Roux-en-Y was required in 2018. The patient continues to be symptomatic with poor control in spite of Pantoprazole indicated on a daily basis. In the complementary studies including gastro-esophageal transit and a fibrogastroscopy a grade II reflux and hiatal hernia in the reservoir are identified. Faced with these findings and the affect on the patient's quality of life, an new revisional laparoscopic surgery is defined. Intraoperatorily, adherences are released *(→ Image 1)* and the hiatus is dissected to find both pillars and the herniation of the reservoir.

During the adhesiolysis and release of the left hepatic lobe of the gastric pouch, decapsulation of the inferior hepatic Glisson's capsule occurs *(→ Images 2 and 3)*. Likewise, the esophagus is abdominalized and pouch migrated to the thorax. The surgery is completed with a complete review of the hiatus, and closure of the pillars *(→ Image 4)*.

At this time TachoSil® is applied as an adhesive matrix comprised of human fibrinogen and human thrombin over the hepatic bed *(→ Images 5 and 6)*.

With this correct hemostatic control is obtained *(→ Images 7 and 8)*. Once the control of the Glisson's capsule is achieved, it is possible to proceed to the finalization of the intervention associating the hiatoplasty with a Teres pexia. This type of cardiopexy uses the Teres ligament surrounding the gastroesophageal union as an anti-reflux method. The post-operatory transcurred normally and the patient was discharged after two days. In the follow-up at 5 months, the patient has good post-operatory control, without dysphagia nor reflux.

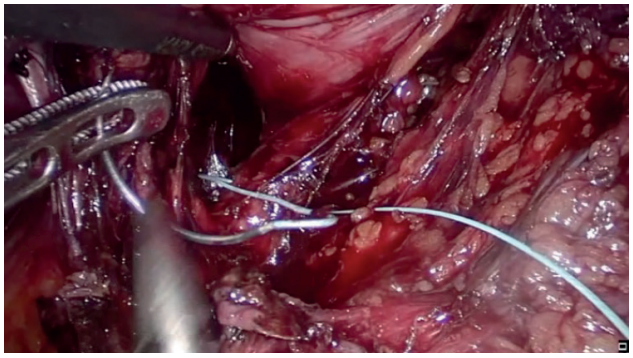

Image 4: Posterior hiatoplasty with closure of pillars with nonabsorbable suture.

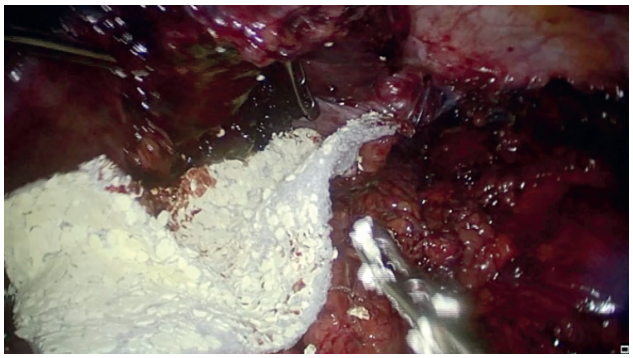

Image 5: Application of TachoSil® over the tear of the Glisson hepatic capsule.

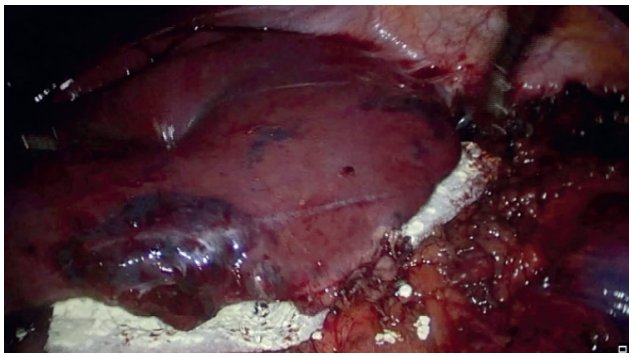

Image 6: Application of TachoSil® over the tear of the Glisson hepatic capsule. The strategy of this case was to allow the liver to initially rest on the TachoSil® patch.

Discussion

Revisional bariatric surgery is becoming more frequent, with gastroesophageal reflux disease (GERD) being one of the causes. However, it is associated with a greater morbidity and mortality risk if compared to the primary surgery[5].

Various techniques exist for the management of GERD in patients who have previously undergone vertical gastrectomy. Repair of the hiatus and the conversion to bypass are two of the principal options, that in this patient had already been performed. A laparoscopic option, that can be used as a salvage technique is the hiatoplasty involving the cardiopexy with the Teres ligament[3].

In this case, due to the history of previous laparoscopic surgeries including the vertical gastrectomy, the hiatoplasty and gastropexy and the gastric bypass in Roux-en-Y, extensive adhesiolysis was required to be able to perform a correct exposure of the gastric pouch and the hiatus to correct the defect. The decapsulation and hemorrhage of the hepatic bed, can be a complication associated with the release of adherencies. In revisional bariatric surgery, there is no case that describes the use of hemostasis in the current literature at this time.

In hepatobiliary laparoscopic surgery, the use of multiple hemostatics have been described, that can help control the hemostasis and biliary leakage. As complications an increased risk of abdominal abscesses or bleeding have been described[6]. Nonetheless, in bariatric surgery, hepatic procedures that include habitual resections don't tend to be associated.

However, previous surgeries, especially those historically performed openly, with the placement of gastric rings (open ringed gastric bypass, open ringed vertical gastroplasty) are especially complex in the adhesiolysis of the liver over the stomach. In this sense, the intra-operatory bleeding can be a challenge to the laparoscopic approach. TachoSil® is a hemostatic product based on a fibrin sealant. This composite of a collagen matrix with one of its faces covered with fibrinogen and thrombin coated in yellow by riboflavin[7]. The use of TachoSil® has demonstrated to be one of the best options in hepatic surgery or for hepatic lesions and is associated with a lower rate of post-operatory complications[8,9].

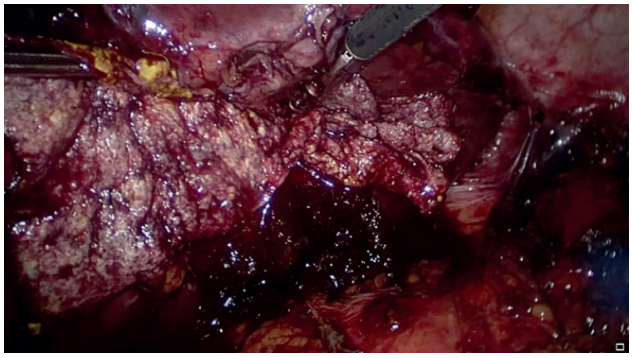

Image 7: Final image of the application of TachoSil® over the tear of the Glisson hepatic capsule.

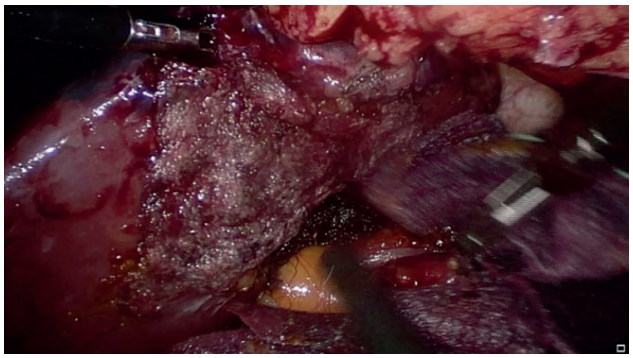

Image 8: Final image of the application of TachoSil® over the tear of the Glisson hepatic capsule. Observe that no apparent bleeding or biliary leakage is found.

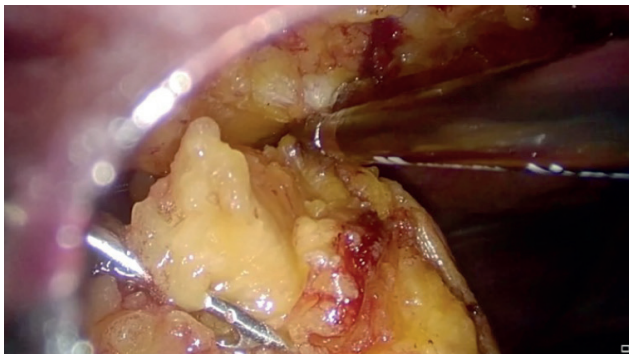

Image 9: Dissection of the Teres ligament up to the entrance of the liver to elongate it and be able to proceed to the Teres pexy.

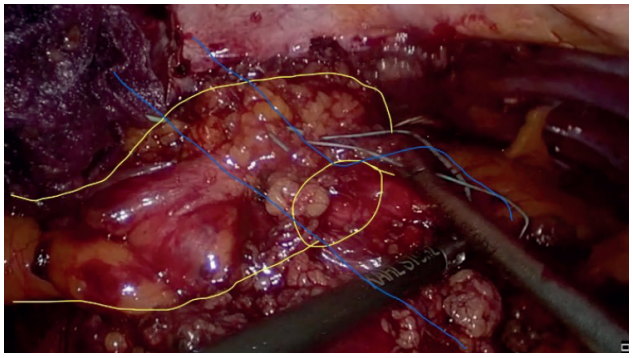

Image 10: Final image with the Teres pexy. The pexy rests over the abdominalized esophagus like a scarf and spring-stop over the inferior esophageal sphincter. Teres ligament in yellow and in blue, esophagus and gastric pouch.

With this case, a revisional bariatric surgery, the use of TachoSil® has also been proposed for cases where hemostasis of the hepatic bed in revisional bariatric surgery is required. Its use if feasible and safe in the laparoscopic approach. Evidence exists in favor of its use in hepatic resection surgery.

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26

Retromuscular TachoSil® for bleeding after incisional hernia repair

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Consorcio Sanitario del Maresme, Barcelona

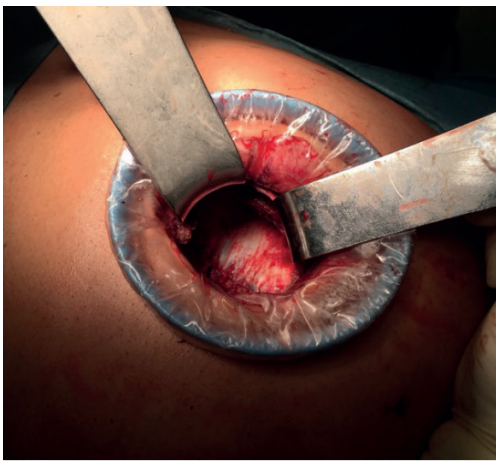

Image 1: Adhesions of the liver on the anterior gastric surface of the previous gastro-jejunal anastomosis.

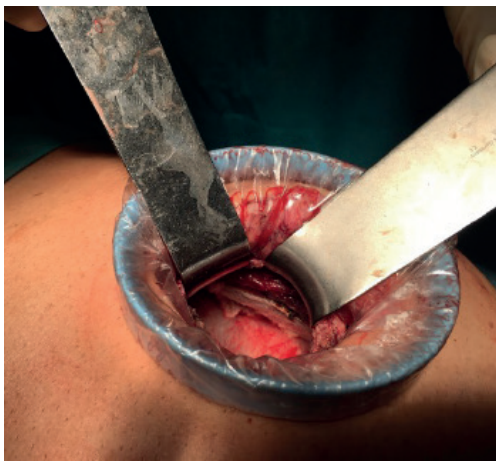

Image 2: TachoSil® patch applied in the retro muscular space.

Introduction

Incisional hernia is one of the most frequent interventions. Currently, the retro muscular repair (Rives-Stoppa technique) is the most accepted treatment for the majority of incisional hernias[1].

Clinical case

Patient of 45 years of age with intervention scheduled on 06/21/2021 for umbilical incisional hernia performing a retro muscular repair. At 12 o'clock position presenting active bleeding evidenced through the surgical drainage for which an urgent surgical re-intervention is indicated. In the surgery venous bleeding proceeding from the perforating vessels of the left rectus muscle, hemostasis was performed and a TachoSil® patch *(→ Image 1)* was applied in the retro muscular space *(→ Image 2)*. After a correct post-operatory the patient was discharged on the third post-operatory day.

Discussion

Hemostatic treatment with TachoSil® has demonstrated to be an effective support reducing hospital stay[2] and bleeding episodes[3]. In our case we decided to associate the application of the same after the hemostasis surgery with the objective of preventing new bleeding episodes and facilitating a early hospital discharge.

Conclusion

The TachoSil® patch can be an effective resource for the control of muscular venous bleeding.

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27 Hemorrhagic shock and use of TachoSil® after emergency appendectomy

López Gordo S, Pulido L, Bombuy Gimenez E

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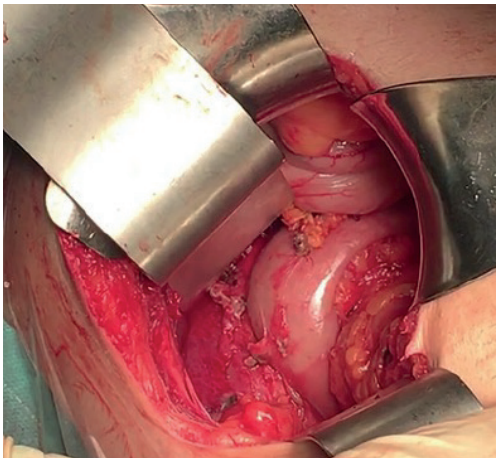

Image 1: Arterial and venous bleeding in the resection bed. Retroperitoneal area with non-expansive hematoma.

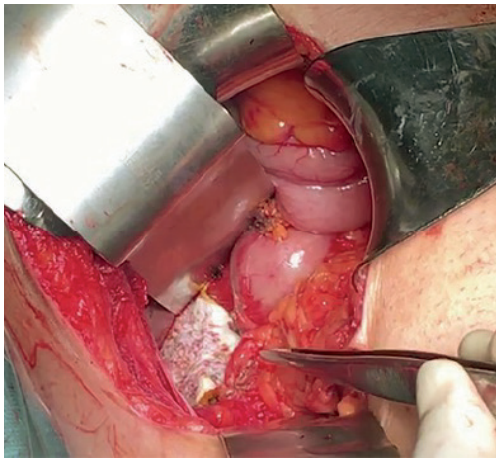

Image 2: TachoSil® placement in the retroperitoneal space.

Introduction

Acute appendicitis is one of the most frequent emergency interventions in the world. However, the surgical importance must not be dismissed from the same given the associated possibility of morbidity.

Clinical case

Patient of 54 years of age intervened in June 2021 for urgent acute appendicitis. A difficult appendectomy was performed due to the presence of retrocecal appendicitis and evolved subhepatic gangrene performing a retroperitoneal dissection.

At 24 hours post-intervention patient presents hypotension and bleeding through the surgical drain for which an axial tomography was taken that showed abundant hemoperitoneum. An urgent surgical intervention was decided based on the arterial and venous bleeding in the resection bed, retroperitoneal area *(→Image 1)* with non-expansive hematoma.

After performing the hemostasis application of a TachoSil® patch in the retroperitoneal space *(→Image 2)*. The postoperative evolution was correct leading to hospital discharge.

Discussion

Hemostatic treatment with TachoSil® has demonstrated to be an effective support reducing bleeding episodes[1]. The application of the patch has demonstrated a reduction of re-interventions due to bleeding. For this reason, it can be an effective surgical resource associated to patients with hypovolemic shock due to bleeding, to avoid re-interventions.

Conclusion

The application of TachoSil® for urgent post intervention surgery is a safe and effective resource.

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28

Use of TachoSil® as a hemostatic after excision of a large suprarenal carcinoma

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Hospital Universitario de Cruces, Barakaldo, Vizcaya

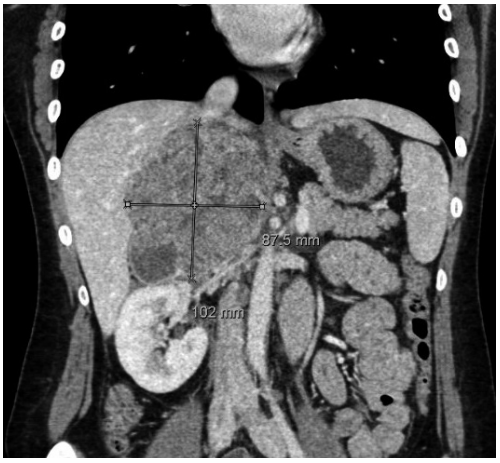

Image 1: Abdominal CT: Suprarenal mass that compromises the right hepatic area and compresses the vena cava.

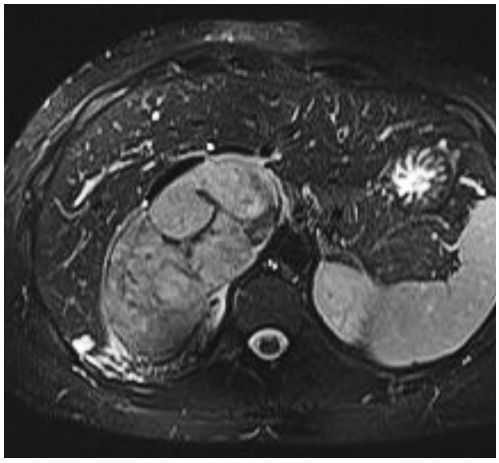

Image 2: Abdominal MRI of a large suprarenal mass that compresses the vena cava in contact with the celiac trunk.

Introduction

Suprarenal carcinoma is an infrequent neoplasm with a poor prognosis[1]. It can originate from both the cortex and the medulla and tends to be large tumors with a tendency of invading the adjacent structures. They are clinically silent tumors until secondary symptoms are manifested due to the effect of the tumor mass, invasion of neighboring structures or due to a variety of hormonal symptoms among which hypercortisolism and virilization are highlighted[2].

Complete resection is the only potentially healing treatment[2,3].
The average survival depends, among other factors, on the size of the tumor and the presence of synchronous metastasis[2].

We present a case of a giant suprarenal carcinoma that jeopardizes the vena cava.

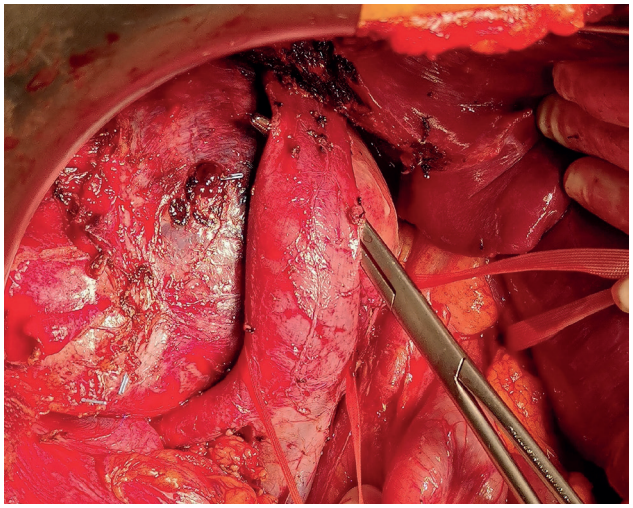

Image 3: Retro perineal tumor that compresses the vena cava and displaces the lower right kidney and middle of the right hepatic area.

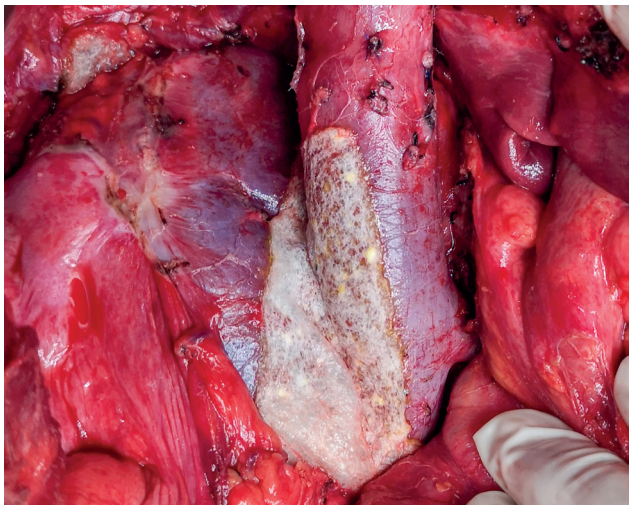

Image 4: TachoSil® over the lateral surface of the vena cava, resection bed and superior region of the renal vein.

Clinical case

Female of 32 years of age without history of interest, that comes to emergencies due to pain on the right side. The patient complains of an increase in facial hair as well as the lack of menstruation in the last three months. An analytic is performed resulting negative for beta human chorionic gonadotropin (BHCG), so gestation is discarded. An ultrasound is performed where a large suprarenal mass is observed and the study is completed.

In the abdominal-pelvic computed tomography (CT) a large solid mass is observed in the right adrenal gland, with necrotic areas, with a size of approximately 10 x 10 x 8 cm, that produces lateral and anterior displacement of the lower vena cava. Also observed are two adenopathies in the retrocaval region next to the renal ilium, without observing adenopathies of pathological size *(→ Image 1)*.

An magnetic resonance imaging (MRI) is performed, that informs of a solid heterogenous lesion over the right suprarenal gland of 12 x 12.5 x 9.5 cm, heterogeneous in T1 and T2, captured after contrast administration and restricted diffusion, findings that suggest malignancy. Describes vascular support by a fine artery originating in the celiac trunk and vascular support by an artery originating in the right renal artery. The tumor exerts a mass effect and has an ample contact surface with the right hepatic lobe and caudate lobe, with the upper pole of the right kidney and the diaphragmatic crura *(→ Image 2)*.

In the blood analysis there is evidence of Testosterone: 4.01 ng/ml (normal value (NV): 0.06 – 0.86), Testosterone free: 107.0 pg/ml (NV: 2.0 – 12.8), Cortisol: 10.7 mcg/dl (NV: 5 – 25).

The urinalysis shows levels of Metanephrines: 14 mcg/24 hours (NV: 0 – 276), free cortisol 59 mcg/24 hours (NV: 10 – 90).

After assessment in the multidisciplinary committee Cushing syndrome and pheochromocytoma are discarded and surgical resection of the mass is indicated due to suspicion of suprarenal carcinoma.

A right subcostal laparotomy is performed to, in the first place, access the vena cava and carry out an infrarenal vascular control of the same. The vena cava is found practically collapsed due to the imprint that the tumor makes on it *(→ Image 3)*.

The mass is released from the right hepatic area and the retrocaval mass is dissected. The tumor's nutritional vessels are sectioned, obtaining a total release of the same together with all of the gerota fat and renal hilar and interaortocaval lymphadenectomy sparing the homolateral kidney. TachoSil® is applied over the lateral face of the vena cava and the upper section of the renal vein as a hemostatic *(→Image 4)*.

The anatomical pathology confirms the pre-operative diagnosis and describes a high grade adrenal carcinoma with capsular invasion, affecting one lymph node of the five resected in the renal hilum and the absence of positive adenopathies in the interaortocaval lymphadenectomy (T2N1M0E stage III).

Currently the patient, six months after the intervention, is receiving treatment with Mitotane without evidence of relapse.

Discussion

Suprarenal carcinoma is an infrequent entity, with an incidence of 1—2 cases per million people/year[1]. It is a very aggressive tumor with diagnosis in advanced stages of the disease. The stage of the diagnosis is the most important factor in the prognosis of patients with adrenal gland carcinoma.

Complete surgical resection is the therapeutic option of choice and the most effective treatment[4], although this is only going to be possible in stages I (Tumors limited to the gland and smaller than 5 cm), II (Tumors limited to the gland and larger than 5 cm), and some cases of disease in stage III (Involvement of adjacent organs, thrombus in renal cava or vein or affected regional adenopathy)[2,3,5]. En block resection is recommended if there is invasion of adjacent organs[6],

The estimated survival is five years for patients with adrenal cortical tumor in stage III, as in the case of our patient, it is 24—50%. Other factors for a poor prognosis are the diagnosis in advanced ages, tumors with mixed secretions (cortisol and androgenous), tumors that secrete estrogens, incomplete resection (R2) or microscopic residual tumor (R1)[7].

Although the open adrenal resection is still considered the treatment of choice, laparoscopic surgery is gaining popularity in the last years.

Differences in the rate of recurrence, time to recurrence of survival rates between the open and laparoscopic approaches have not been described, especially in stages I and II[1]. The most frequent complication after the surgery is hemorrhaging associated to the surgical dissection. The use of materials such as TachoSil® help to control the surgical hemostasis[8].

Adjuvant therapy with Mitotane is recommended in those patients with tumors of high risk of recurrence[6]. The prognosis of these tumors continues to be poor and new treatments need to be developed[5].

In conclusion, suprarenal carcinoma is a complex entity that requires aggressive surgery. In the retroperitoneal surgery use of hemostatic materials such as TachoSil® can be useful.

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TachoSil® — four versions, three sizes*

Illustrated in original size

TachoSil SEALANT MATRIX

*Not all versions are available in all countries

TachoSil Sealant Matrix
(5.5 mg per cm² of human fibrinogen, 2.0 IU per cm² of human thrombin)

Statement: Before prescribing, consult/refer to the full prescribing information. **Presentation:** An off-white sealant matrix. The active side of the matrix is coated with fibrinogen and thrombin, is marked by a yellow colour. Supplied, ready to use, in sterile packaging. **Legal Classification:** Restricted prescription only medicine. **Indications:** In adults and children from 1 month old, for supportive treatment in surgery for improvement of haemostasis, to promote tissue sealing, and for suture support in vascular surgery where standard techniques are insufficient; also, in adults for supportive sealing of the dura mater to prevent postoperative cerebrospinal leakage following neurosurgical procedures. **Dosage & Administration:** For epilesional use only. Use is restricted to experienced surgeons. The quantity to be applied is governed by the size of wound area, and the underlying clinical need for the patient. In clinical studies, the individual dosages have typically ranged from 1-3 units (9.5 cm x 4.8 cm); application of up to 10 units has been reported. For smaller wounds, the smaller size matrices (4.8 cm x 4.8 cm or 3.0 cm x 2.5 cm) or the pre-rolled matrix (based on a matrix of 4.8 cm x 4.8 cm) is recommended. TachoSil should be used under sterile conditions and immediately after opening the inner sterile cover. Prior to application, the wound area should be cleansed, e.g. from blood, disinfectants and other fluids. For Flat TachoSil, the sterile package should be pre-moistened in saline solution and applied immediately. The yellow, active side of the matrix is applied to the bleeding/leaking surface and held against it with a gentle pressure for 3-5 minutes. For pre-rolled TachoSil, after removing from the sterile package, it should be applied immediately through the trocar without pre-moistening. The yellow, active side of the matrix is applied to the bleeding/leaking surface using e.g., a pair of cleansed forceps and held against it with a moist pad under gentle pressure for 3-5 minutes. Pressure is applied with moistened gloves or a moist pad. Avoid TachoSil sticking to surgical instruments, gloves or adjacent tissues covered with blood by cleansing them before application. After pressing TachoSil to the wound, the glove or the pad must be removed carefully. To avoid TachoSil from being pulled loose it may be held in place at one end, e.g. with a pair of forceps. In the case of stronger bleeding, it may be applied without pre-moistening, while also pressing gently to the wound for 3-5 minutes. The active side of TachoSil should be applied so that it extends 1-2 cm beyond the margins of the wound. If more than one matrix is used, they should overlap. TachoSil can be cut to the correct size and shaped if too large. In neurosurgery, TachoSil should be applied on top of the primary dura closure. **Contraindications:** Intravascular use; hypersensitivity to the active substances or to any of the excipients. **Warnings & Precautions:** No specific data available on the use of this product in gastrointestinal anastomoses surgery. Life threatening thromboembolic complications may occur if the preparation is applied intravascularly. Allergic type hypersensitivity reactions are possible, as with any protein product. If hypersensitivity reactions occur, the administration must be discontinued immediately. To prevent the development of tissue adhesions at undesired sites, ensure tissue areas outside the desired application area are adequately cleansed before administration. In the case of shock, the current medical standards for shock treatment should be followed. Standard measures to prevent infections resulting from the use of medicinal products prepared from human blood or plasma include selection of donors, screening of individual donations and plasma pools for specific markers of infection and the inclusion of effective manufacturing steps for the inactivation/removal of viruses. Measures taken are considered effective for enveloped viruses such as HIV, HBV and HCV and for the non-enveloped virus HAV. Measures may be of limited value against non-enveloped viruses such as parvovirus B19. Parvovirus B19 infection may be serious for pregnant women (foetal infection) and for individuals with immunodeficiency or increased erythropoiesis (e.g., haemolytic anaemia). It is recommended to record the name and the batch number of the product administered to the patient. Some cases of product non-adhesion issues have been reported in the form of lack of product adhesion / lack of efficacy. Correct product handling and application is required **Interactions:** No interaction studies have been performed. Similar to comparable products or thrombin solutions, the sealant may be denatured after exposure to solutions containing alcohol, iodine, or heavy metals. Such substances should be removed to the greatest possible extent before applying the sealant. **Fertility, Pregnancy & Lactation:** Safety for use in human pregnancy or breastfeeding has not been established in the clinical studies. Only administer to pregnant and breastfeeding women if clearly needed. **Effects on Ability to Drive and Use Machines:** Not relevant. **Undesirable Effects:** Hypersensitivity or allergic reactions (in isolated cases these reactions may progress to severe anaphylaxis; some cases of product residue causing granuloma), thromboembolic complications may occur if used intravascularly, and adhesions and intestinal obstruction when used in abdominal surgery. Refer to the SmPC for details on full side effect profile and interactions. **Overdose information:** No case of overdose has been reported. **Interactions with Other Medicinal Products:** No interaction studies have been performed. Similar to comparable products or thrombin solutions, the sealant may be denatured after exposure to solutions containing alcohol, iodine or heavy metals (e.g., antiseptic solutions). Such substances should be removed to the greatest possible extent before applying the sealant. **Use in Special Populations:** Limited data are available to support efficacy and safety of TachoSil in the paediatric population. In clinical studies, a total of 36 paediatric patients aged 0-13 years were treated with TachoSil in hepatic surgery. **Pack Sizes:** Package with 1 matrix of 9.5 cm x 4.8 cm, Package with 2 matrices of 4.8 cm x 4.8 cm, Package with 1 matrix of 3.0 cm x 2.5 cm, Package with 5 matrices of 3.0 cm x 2.5 cm, Package with 1 pre-rolled matrix of 4.8 cm x 4.8 cm. Not all pack sizes may be marketed.

Marketing Authorisation Holder: Corza Medical GmbH,
Speditionstraße 21, 40221 Düsseldorf, Germany
The full SmPC can be obtained from Corza Medical GmbH.
Marketing Authorisation Numbers: EU/1/04/277/001-005

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Link to Full SmPC or Prescribing information

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