Laparoscopic Resection of Retroperitoneal Schwannoma: Report of 3 cases

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ABSTRACT

Background: Schwannoma is a neoplasm that arises from Schwann cells in the peripheral nerve sheath. They are mainly benign tumors, Ohigashi T et al. reported that only 0.7% is located in the retroperitoneum and these are associated with a higher rate of malignancy. The preoperative diagnosis is a challenge due to its low frequency and the low specificity of imaging studies. Treatment consists of its complete surgical resection, avoiding its rupture since it is associated with local recurrences. The laparoscopic approach presents technical limitations due to the usually large size of these tumors, and few cases of laparoscopic excision have been reported in the world literature to date. **Methods**: the results of 3 retroperitoneal schwannomas of different location, size and complexity are presented, all resolved laparoscopically by a highly complex laparoscopic surgery team. **Results**: all surgeries were performed completely laparoscopically, there were no complications associated with the mini-invasive procedure and all the benefits of it were obtained. The anatomopathological and immunohistochemical examination was compatible with schwannomas in all 3 cases. To date, the patients do not present recurrences. **Conclusions**: although the location, size and relationship with other anatomical structures make the laparoscopic surgical approach difficult, with a well-trained team in laparoscopic surgery, these procedures can be performed safely, without increased morbidity and with all the benefits that mini-invasive procedures provide.

KEYWORDS

Laroscopy, Retroperitoneal tumor, Schwannoma

Resección laparoscópica de Schwannoma retroperitoneal: Reporte de 3 casos

RESUMEN

El schwannoma es una neoplasia que se origina de las células de Schwann en la vaina del nervio periférico. Son tumores principalmente benignos, de acuerdo con lo reportado por Ohigashi T, et al. solo un 0.7 % se localizan en el retroperitoneo y estos se asocian con una mayor tasa de malignidad. El diagnostico pre operatorio es un desafío debido a su baja frecuencia y a la poca especificidad de los estudios imagenológicos. El tratamiento consiste en su resección quirúrgica completa evitando su ruptura ya que esta se asocia a recurrencias locales. Suelen ser tumores de gran tamaño y es por esta razón que su abordaje por vía laparoscópica

presenta limitaciones técnicas y existen pocos reportes en la bibliografía médica.

Métodos: Se presentan los resultados de 3 schwannomas retroperitoneales de distinta localización, tamaño y complejidad, todos resueltos por vía laparoscópica por un equipo entrenado cirugía laparoscópica de alta complejidad. **Resultados**: Todas las cirugías se realizaron completamente por vía laparoscópica, no hubo complicaciones asociadas al procedimiento mini invasivo y se obtuvieron todos los beneficios del mismo. El examen anatomopatológico e inmunohistoquímico fue compatible con schwannomas en los 3 casos. A la fecha los pacientes no presentan recurrencias. **Conclusiones**: si bien la localización, el tamaño y la relación con otras estructuras anatómicas hacen dificultoso el abordaje quirúrgico por vía laparoscópica, con un equipo entrenado en cirugía laparoscópica de alta complejidad, se pueden realizar estos procedimientos de forma segura, sin aumento de la morbilidad y con todos los beneficios que brindan los procedimientos mini invasivos.

PALABRAS CLAVES

Laparoscopía, Tumor retroperitoneal, Schwannoma

INTRODUCTION

Retroperitoneal tumors generally grow silent until compression of the surrounding organs produces symptoms. Retroperitoneal tumors have traditionally been excised using a standard open technique, even for those malignant with invasion of large vessels or neighboring organs. However, the report of cases of laparoscopic excision of retroperitoneal neural tumors is very scarce to date. Histopathological examination after surgery is often necessary for the final diagnosis because of the nonspecific imaging characteristics of these tumors make the preoperative diagnosis difficult.
We report three cases with varying technical difficulty on laparoscopic excision of retroperitoneal schwannomas with excellent clinical results.

MATERIALS AND METHODS

All patients operated for laparoscopic retroperitoneal schwannoma between May 2019 and March 2020 were evaluated.
Variables related to the patient, the tumor and the surgery were analyzed, and are summarized in Tables 1 and 2. The variables corresponding to the pathological anatomy are summarized in Table 3.

CASE 1

A 45-year-old man with no medical history consult for wounding abdominal pain at the epigastric level, an ultrasound was performed that reported, at the level of the uncinate process of the pancreas, a homogeneous hypoechoic solid lesion of 4 x 3 cm without other pathological findings. In an MRI, formation of a nodular configuration, is observed in the pancreatic-duodenal area, with an adequate cleavage plane with the pancreas, sizes of 46 x 34 x 41 mm, presents a progressively heterogeneous contrast enhancement. It does not restrict in diffusion sequence. Consider extra pancreatic NETs.
An echo-endoscopy was performed and demonstrates a hypoechoic, heterogeneous lesion with well-defined boundaries of 42 x 36 mm over aorto-mesenteric compass and intercavo-aortic space, with Doppler signal. Diagnostic impression; extra intestinal GIST (Fig. 1A - D). Fine needle aspiration biopsy reported stromal cells with fibrillar cytoplasm and elongated nuclei. Immunostains showed negativity for smooth muscle actin and CD 117.
The surgical conduct is decided by laparoscopic approach with the American technique and four ports. When performing the Vautrin Kocher maneuver, a 5 cm hard elastic lesion was observed in close relation to the aorta, superior mesenteric artery, inferior vena cava, left renal vein and right renal artery, behind the uncinate process of the pancreas and the inferior mesenteric and porta vein, but without invasion of any of these structures. Through dissection maneuvers,

it was possible to separate it from all surrounding tissues. The procedure lasted 90 min and the patient was discharged on the first postoperative day without complications (Fig. 3).

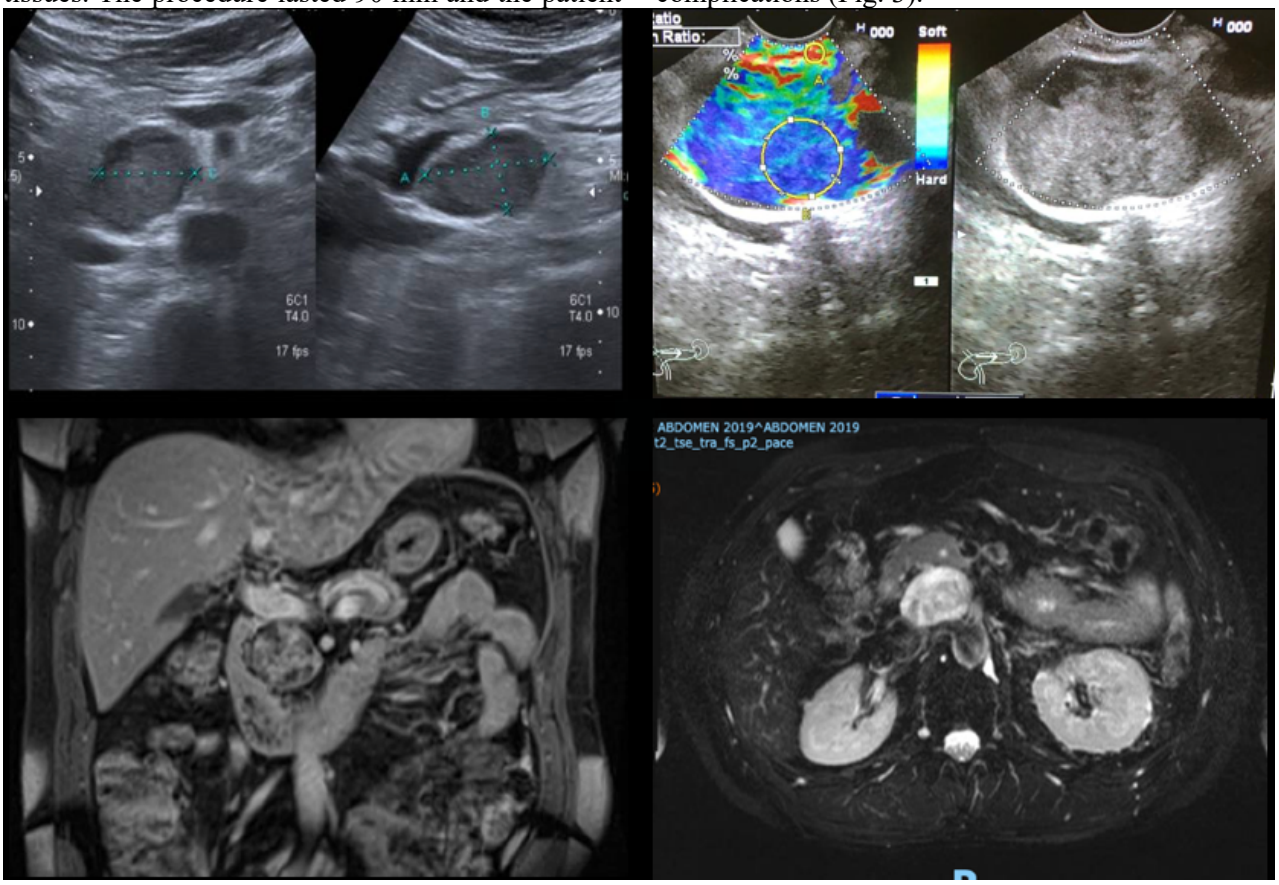
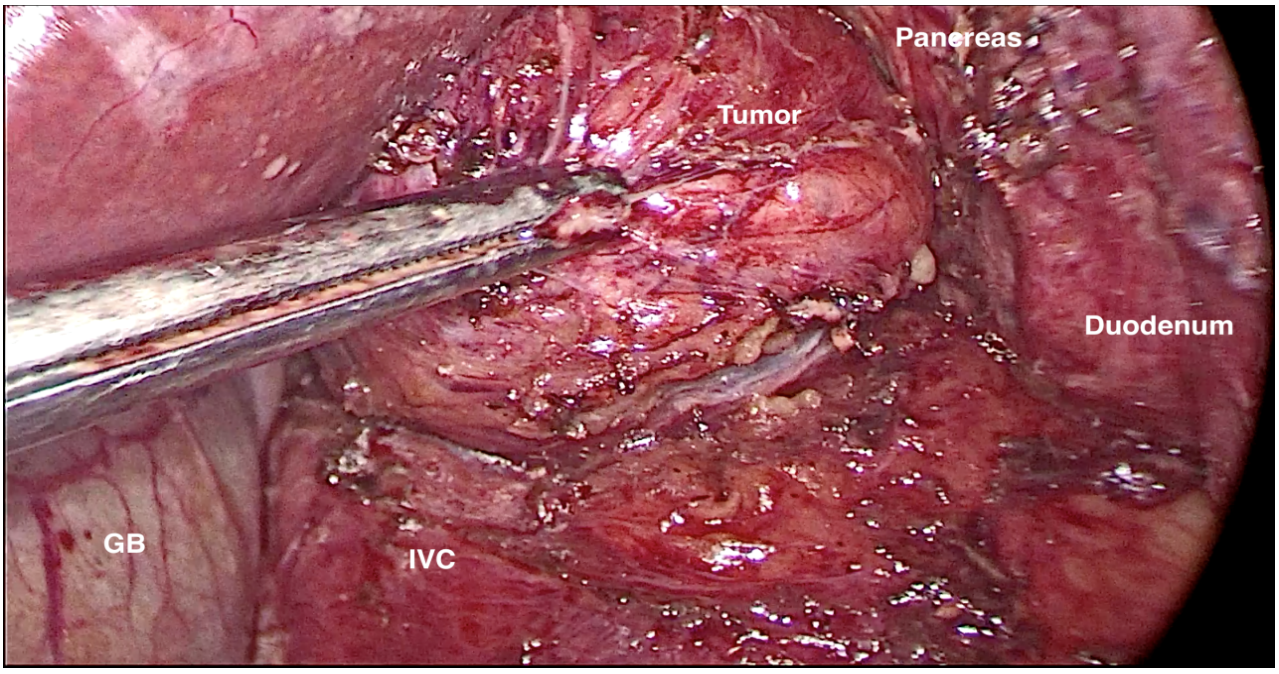


FIG. 2; A) ABDOMINAL ULTRASOUND; ROUND HYPOECHOIC LESION IN UNCINATE PROCESS. B) ECHO-ENDOSCOPY; HETEROGENEOUS HYPOECHOIC LESION WITH POSITIVE DOPPLER. C-D) MRI; HETEROGENEOUS NODULAR FORMATION, WITH AN ADEQUATE CLEAVAGE PLANE WITH THE PANCREAS, PRESENTS A PROGRESSIVELY HETEROGENEOUS CONTRAST ENHANCEMENT.

The pathological anatomy was a mesenchymal tumor of 5 x 3.5 cm made up of cells with ovoid nuclei and acidophilic cytoplasm forming fascicles with hyper and hypovascularized areas (Verocay bodies), mitotic figures are not observed. Immunohistochemistry reported positivity for protein S-100 and negativity for smooth muscle actin, CD 34, and CD 117. Ki 67 was 2%.

In an MRI of the abdomen 6 months after surgery, there is no evidence of tumor recurrence.



CASE 2

A 43 year-old female with clinical history of treated breast cancer. In her follow up a hypodense image of 19 mm, adjacent to the uncinated process of the pancreas was found. The patient is asymptomatic and with an ECOG 0. MRI is requested where the presence of a nodular formation in projection of the uncinate process with defined limits is observed, hypointensity with respect to the pancreatic parenchyma and without contrast enhancement, it contacts the mesenteric vessels and the large size of 26 mm (Fig. 4). Echo-endoscopy was performed, which reported a round, hypoechoic, heterogeneous solid lesion with defined edges sizing 20 x 24 mm in an uncinate process. It contacts the superior mesenteric vein and artery, without deforming them and without altering the interface of its walls. The fine needle aspiration biopsy report a morphological and immunohistochemistry profile compatible with neural tumor, S 100 positive, AML, CD 117 and synaptophysin negative. It was decided to perform the laparoscopic surgical procedure with American technique and placement of 5 trocares. Pancreatoduodenectomy is completed with pylorus conservation and for reconstruction duct-to-mucosa anastomosis is performed for the pancreas, then hepatico-jejunum anastomosis and duodeno-jejunum anastomosis in omega (Fig. 4). The procedure was of 450 minutes, the patient coursed 2 days in the intensive care unit, began with liquid diet and was discharged on the 6th day feeding per os.

The pathology reports a 2.3 x 2 cm tumor in a surgical specimen with free margins and intimate contact with the pancreatic gland characterized by spindle cells with nuclear palisade and eosinophilic cytoplasm. Immunohistochemistry reported positivity for protein S-100 and negativity for DOG -1, CD117, Desmin and HMB-45, with Ki67 12% compatible with Schwannoma.

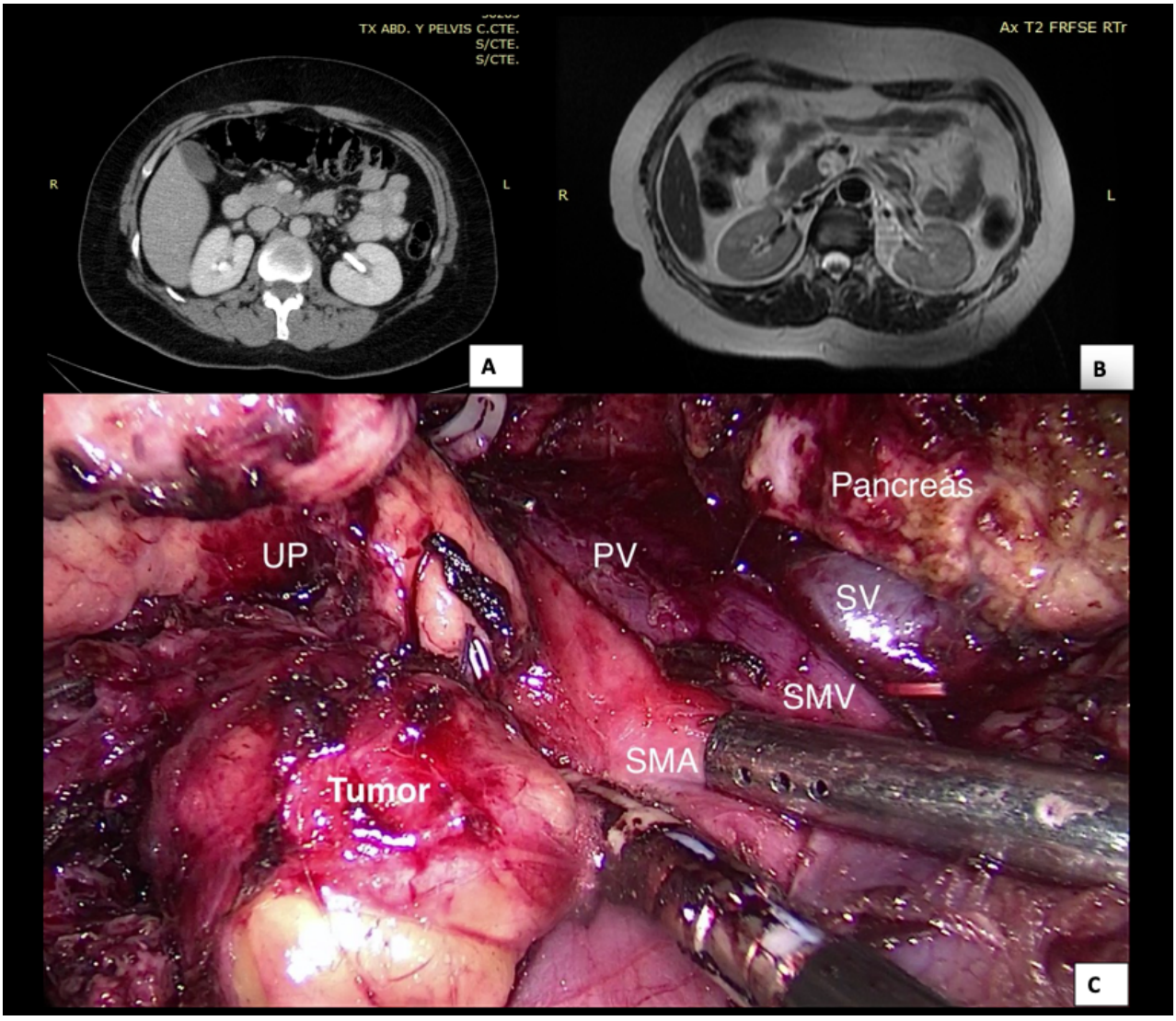


FIG. 4; A) TOMOGRAPHY SHOWING A HYPODENSE NODULAR LESION WITH DEFINED EDGES IN A PANCREATIC UNCUS, B) MRI T2 IMAGE OF HYPERINTENSE CHARACTERISTICS WITH HYPOINTENSE AREAS INSIDE IS VISUALIZED, C) TUMOR IN CONTACT WITH THE MESENTERIC VESSELS.

CASE 3

A 60-year-old female with no relevant clinical or surgical history presenting pain in the hypogastrium and sacral region for one month associated with evacuation disorders. An MRI of the abdomen and pelvis is performed where heterogeneous nodular formation is visualized in the pelvis at the retroperitoneal level in the vicinity of the left ureter, with an adequate cleavage plane, measuring 36 x 28 x 26 mm (Fig. 5).
Laparoscopic exploration was performed, the left Told's fascia was decollated, iliac vessels, left ureter were identified, and there was evidence of a hard-elastic nodular lesion with defined edges, which was then dissected and completely resected. The procedure lasted 60 minutes and the patient was discharged at the following day. The pathological anatomy result reported slightly irregular 2 x 2 cm nodular formation, neoplastic proliferation of spindle cells with elongated euchromatic nuclei. Immunohistochemistry reveals positivity for S-100 protein and negativity for Desmin, Keratin (AE1 - AE2), Smooth Muscle Actin, CD34, CD117 and DOG1, compatible with Schwannoma.

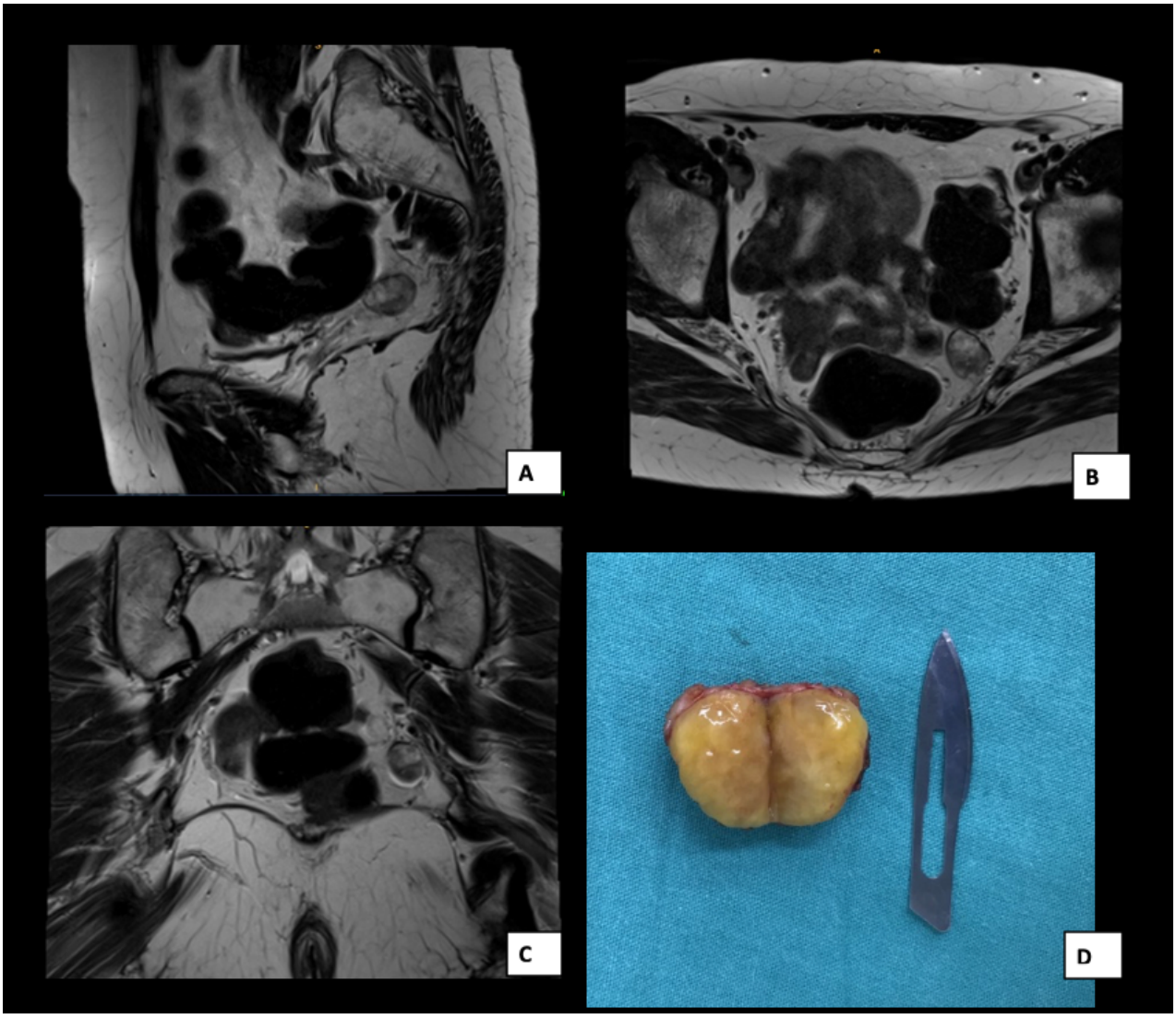


FIG. 5; A) MRI SAGITTAL CUT OF PELVIS, HETEROGENEOUS NODULAR FORMATION AT THE RETROPERITONEAL LEVEL MEASURING 36 X 28 X 26 MM. B-C) AXIAL AND CORONAL CUTS. D) RESECTED TUMOR.

RESULT

During the analyzed period, we performed laparoscopic excision of three retroperitoneal tumors using the American position. One man and two women aged 45, 43 and 60 years respectively, two of them presented with abdominal pain and one asymptomatic. Two were located in the duodenum-pancreatic region and the third in the left iliac fossa. The preoperative studies used were ultrasound, tomography, and MRI, those of the duodenum-pancreatic region underwent echo-endoscopy, Doppler evaluation and fine needle aspiration biopsy. The results of the same were; Stromal cells with fibrillar cytoplasm and elongated nuclei with negative AML and CD 117 and mesenchymal proliferation with S-100 positive neural phenotype. The mean hospital stay was 3 days, they did not present morbidity and mortality associated with the procedure, and the clinical and imaging follow-up at 6 months was satisfactory. The data analyzed are summarized in Tables 1 to 3.

The pathological result was schwannoma in all three patients.

TABLE 1. PATIENT CHARACTERISTICS AND PRE-OPERATIVE STUDIES.

No.	Sex	Age	Presentation	Location	PAAF
1	M	45	Abdominal pain	Pancreatic-duodenal area	Neural phenotype
2	F	43	Asymptomatic	Uncinate process of the pancreas	Neural phenotype
3	F	60	Sacral pain	Pelvic	No

TABLE 2. OPERATIVE DATA AND CLINICAL OUTCOMES.

No.	Operative time (min)	Blood loss (ml)	Pos-operative stay (days)	Morbidity
1	90	25	1	No
2	450	200	6	No
3	60	0	2	No

TABLA 3. PATHOLOGY RESULTS.

No.	Tumoral size (cm)	Margins	Ki-67 (%)	Histology
1	5 x 3.5	Free	2	Schwannoma
2	2.3 x 2	Free	12	Schwannoma
3	2 x 2	Free	1	Schwannoma

DISCUSSION

Schwannoma is a neurogenic tumor that arises from Schwann cells in the peripheral nerves. It most commonly develops on the head, neck, or extremities. Since patients are often asymptomatic, or have only vague abdominal pain, schwannomas can be identified incidentally when other conditions are investigated, or they can grow long before they cause obvious symptoms. Das Gupta et al.1 reported that schwannoma occurs mainly in the cranio-cervical region (44.8%), extremities (32.6%), and occasionally in the retroperitoneal space (0.7%). First described by Ackerman and Taylor in 1951, the old schwannoma is a rare variant that exists almost entirely in Antoni type B tissue 2. Histopathologically, they can show a biphasic pattern with areas of high cellularity (Antoni type A) and a predominance of myxoid matrix (Antoni type B).

On MRI they appear as hypointense masses on T1-weighted images and hyperintense on T2 3. It generally appears as a solitary, well-encapsulated, firm and rounded mass with a smooth surface. Establishing a preoperative diagnosis is not easy and radiological images are very useful for therapeutic planning, since they provide information on the size, location, and possible invasion of other structures.

According to Nakashima et al., A tumor size greater than 5.5 cm, symptoms, absence of calcifications, irregular margins and cystic degeneration or necrosis can be predictors of malignant retroperitoneal primary tumors 4,5.

Total excision is therapeutic and has a good prognosis; however, a local recurrence rate of 10% -20% is attributed to incomplete resection 6,7.

In conclusion, neural tumors in the retroperitoneal space are usually benign and have a good prognosis, although they are difficult to diagnose preoperatively. Laparoscopic surgical techniques for these tumors are safe and their use is recommended when an accurate and appropriate diagnosis is made, after the exclusion of malignant subtypes.

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