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A case report.

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Laparoscopic left nephro-adrenalectomy for renal vein leiomyosarcoma using (ICG) fluorescence and 3D-CT reconstruction: A case report.

INTRODUCTION: *Leiomyosarcoma is a rare malignant mesenchymal cancer of smooth muscle and about 50-60 % of cases are from inferior vena cava. Recently, preoperative reconstruction of three-dimensional (3D) images from computed tomography (CT) and intraoperative indocyanine green (ICG) are being developed. We present a case of laparoscopic left nephro-adrenalectomy using ICG fluorescence associated with 3D-CT reconstruction:n.*
CASE REPORT: *A 72-years-old female patient presented pain in left side from two months. Contrast computed tomography and magnetic resonance imaging showed a solid mass between left-adrenal gland and upper renal pole. After multidisciplinary evaluation, a laparoscopic left nephno-adrenalectomy was performed.*
DISCUSSION: *The surgery was without intra and postoperative complications. The patient was discharged in the 3rd postoperative day without complications and with oral steroid replacement therapy. Histology confirmed leiomysarcoma of renal vein.*
CONCLUSION: *In this case, use intraoperative ICG fluorescence associated with preoperative 3D-CT was a valuable support for surgery.*

KEY WORDS: Endocrine surgery, Indocyanine green fluorescence, Laparoscopic Nephro-Adrenalectomy, Leiomyosarcoma, Three-dimensional computed tomography reconstruction, Video surgery

Introduction

Leiomyosarcoma (LMS) of the renal vein is a rare tumor with a difficult diagnosis. LMS is a rare malignant mesenchymal tumor of smooth muscle and about 50-60 % of cases develop from inferior vena cava [1]. In literature there are approximately 35 cases of renal vein leiomyosarcoma. Pre-operatory diagnosis is very difficult because of non-specific symptoms and similar radiological images of renal and adrenal tumors [2]. Indocyanine green (IGC), already used in different surgical fields as ophthalmology, neurosurgery, thoracic surgery, colorectal surgery, hepatobiliary surgery, and endocrine surgery [3-6]. In adrenal surgery, it represents a helpful tool for evaluation of vascular structures and parenchymal tissue planes in real time [7,8]. Recently, surgeons improve preoperative reconstruction of 3D images from computed tomography (CT) or magnetic resonance (MR) with good results on surgery [9]. Several studies show the benefits of association between ICG and 3D reconstruction [10]. So, we use this approach in adrenal surgery [8].
This is a case of a patient with diagnosis of primary leiomyosarcoma of the left renal vein. Our approach is

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a laparoscopic left nephro-adrenalectomy using intraoperative ICG fluorescence and preoperative 3D-CT reconstruction.

Case Report

A 72-year-old female patient with pain in left side for two months. The patient had obesity, dyslipidemia, drug-controlled arterial hypertension (irbesartan 150 mg daily). Among the previous interventions: appendectomy in childhood, hysterectomy for uterine fibroid about 10 years ago and laparoscopic cholecystectomy 2 years ago. CT-scan showed a well-lobed mass (26x38 mm) in the left adrenal gland. With MRI-scan we observed a 30x20 mm solid mass on the left side between the adrenal gland and upper renal pole (Fig. 1). After six months, patient repeated RMI-scan and it showed an increase of mass (42x30 mm). PET with fluorodeoxyglucose showed increase uptake of the mass in the left adrenal lodge (SUV: 4.8) suggesting it was a tumor of the adrenal gland and accumulation in the right colon (SUV: 6.7). Pancoloscopy was negative. So, the indication for laparoscopic left adrenalectomy was confirmed by metabolic syndrome, fast increase in the volume and the size >4 cm. The day before surgery we performed a 3D-CT reconstruction of the mass with a 3D Software (Synapse 3D®, Fujifilm, Tokyo, Japan) (Fig. 2). In the surgery patient was on left lateral decubitus; the first step was the mobilization of the splenic flexure and exposure of the spleno-pancreatic axis, highlighting the main landmarks. So left renal vein and confluence of the adrenal vein were identified.

At 30 and 75 seconds after ICG administration, we observed a bulky, hyperfluorescent mass completely separated from the adrenal gland (Fig. 3). Additionally, splenic artery, left adrenal vein and left renal vein were clearly visible (Fig. 3). After the section of the left adrenal vein, we tried to separate the mass from the left renal vein. Because of mass was attached to the left renal vein, we isolated the renal hilum with vessel loop to create a cleavage plane.

A second ICG administration confirmed the separation of the adrenal gland from the mass (Fig. 4). Unfortunately, we had to perform a nephro-adrenalectomy, with en-bloc resection of the whole mass. The kidney, the mass and adrenal gland were extracted en-bloc with endobag.

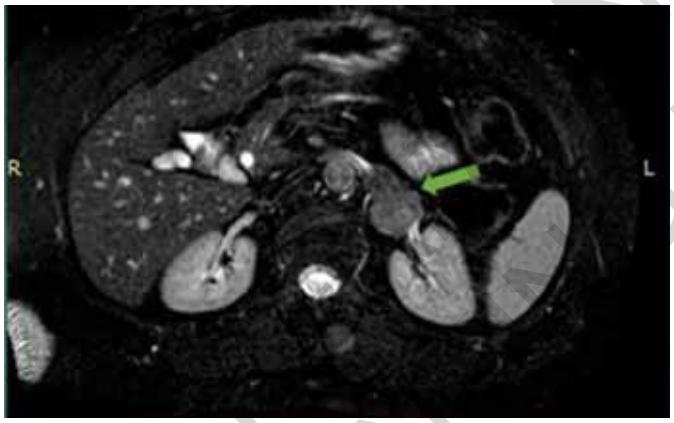

Fig. 1: MRI showed a solid mass on the left side between the adrenal gland and upper renal pole.

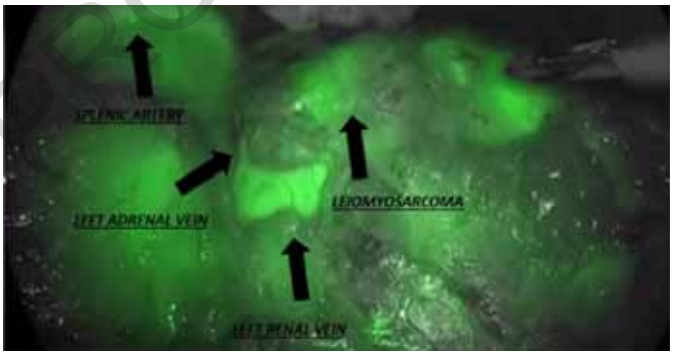

Fig. 3: ICG showed a bulky, hyperfluorescent mass completely separated from the adrenal gland. Additionally, splenic artery, left adrenal vein and left renal vein were clearly visible.

Fig. 2: 3D CT reconstruction of the mass.

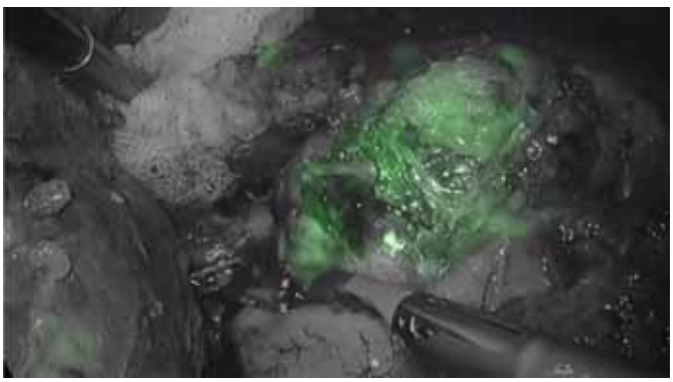

Fig. 4: Second administration of ICG which confirmed the separation of the adrenal gland from the mass.

Discussion

The surgery was free from intra and postoperative complications. The operation time was 130 min. On the 1st postoperative day, 200 mg of hydrocortisone was administered in 24 hours, on the 2nd postoperative day 100 mg of hydrocortisone in 24 hours. The patient was discharged on the 3rd postoperative day with oral steroid replacement therapy. Serum laboratory tests, performed 1 week after discharge, were normal. The suspicion was confirmed by histology because the mass was a leiomyosarcoma of left renal vein. The wall of the renal vein was infiltrated by anaplastic cells and focal tumor necrosis. The proliferative activity, evaluated with ki67/MIB1, was equal to about 10%. The immunohistochemical study showed widespread and strong positivity for ML actin, desmin, caldesmone, calponin and negativity for S100 and CD34.

Conclusion

In this case, ICG intraoperative administration with preoperative 3D-CT was safe and improved the surgical performance.
This approach allowed to better understand the localization and anatomy of the lesion, the vascularization and the parenchymal cleavage plane.

Riassunto

Il leomiosarcoma della vena renale è un raro tumore mesenchimale a partenza delle cellule muscolari lisce. La diagnosi non è semplice e, come nel nostro caso, le indagini preliminari possono indirizzare l'ipotesi diagnostica verso una neoplasia surrenalica o renale. La chirurgia laparoscopica rappresenta il gold standard del trattamento. Negli ultimi anni, sia la ricostruzione 3D preoperatoria da immagini radiologiche che l'utilizzo intraoperatorio del verde di indocianina stanno diventando degli strumenti molto utili per il chirurgo. Il loro campo di applicazione sta crescendo in modo esponenziale, infatti, ci sono sempre più lavori in letteratura in merito.
Per quanto concerne questo tipo di chirurgia, invece, ci sono ancora pochi studi. La visualizzazione di immagini anatomiche tridimensionali preoperatorie consente di stabilire i rapporti, la vascolarizzazione e il piano di clivaggio della neoformazione da trattare. L'utilizzo intraoperatorio del ICG consente, in tempo reale, di identificare le strutture vascolari coinvolte. Nel nostro caso, la combinazione di queste due metodiche ha portato dei vantaggi in termini di localizzazione della lesione, pianificazione dell'intervento, visualizzazione dei piani e delle strutture vascolari. Pertanto, crediamo che questo approccio possa rappresentare uno scenario innovativo e utile per il chirurgo.

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