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Laparoscopic adrenalectomy for large pheochromocytoma: a challenging case report

Adrenalectomia laparoscópica de um grande feocromocitoma: relato de um caso desafiador

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ABSTRACT: Pheochromocytoma is a rare neuroendocrinal tumor, cause of severe hypertension and excretion of catecholamines. The gold standard treatment is laparoscopic adrenalectomy, however when the tumor is more than 6 cm laparoscopy access is controversy. The patient was a 41-year-old man with severe hypertension and important weight loss. CT showed a adrenal mass with contrast enhancement and central necrosis with 10x8cm. Laboratory exams demonstrated serum calcium of 12.5mg/dL, high urinary catecholamines at the expense of noradrenaline (13 936 ug/24h) and serum noradrenaline of 7451 pg/ml. The authors performed an adrenalectomy of a large tumor by laparoscopic approach without major complications. Histopathology showed pheochromocytoma with 11x8 cm and 285 gr without capsular involvement. This case report may bring information about adrenal tumors management and shows that large pheochromocytomas are challenging cases, but if well programmed can be done by minimally invasive access with safety.

Keywords: Pheochromocytoma; Laparoscopy; Neuroendocrine tumors; Adrenalectomy.

RESUMO: O feocromocitoma é um tumor neuroendócrino raro, causa de hipertensão grave e excreção de catecolaminas. O tratamento padrão ouro é a adrenalectomia laparoscópica, no entanto, quando o tumor apresenta mais de 6 cm de tamanho, o acesso laparoscópico é controverso. O paciente do relato, é um homem de 41 anos com hipertensão grave e perda de peso importante. A tomografia computadorizada mostrou uma massa adrenal com captação de contraste e necrose central medindo 10x8cm. Os exames laboratoriais demonstraram cálcio sérico de 12,5 mg/dL, catecolaminas urinárias elevadas às custas da noradrenalina (13 936 ug/24h) e noradrenalina sérica de 7451 pg/ml. Os autores realizaram uma adrenalectomia neste paciente por abordagem laparoscópica sem maiores complicações. A histopatologia evidenciou um feocromocitoma com 11x8 cm e 285 gr sem envolvimento capsular. Este relato de caso traz informações sobre o manejo de tumores adrenais e mostra que apesar de grandes feocromocitomas serem casos difíceis, se houver um bom preparo cirúrgico, é possível realizar o procedimento por acesso minimamente invasivo com segurança.

Descritores: Feocromocitoma; Laparoscopia; Tumores neuroendócrinos; Adrenalectomia.

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INTRODUCTION AND BACKGROUND

Pheochromocytomas are uncommon adrenal tumors that require caution in their surgical treatment and specific preoperative care. Currently, laparoscopy has been established as the gold standart for removal of adrenal masses. However, several studies mentioned that tumors larger than 6 cm, should not be treated by laparoscopic approach, due to higher rates of surgical and clinical complications and possibility of malignancy. We describe a case of laparoscopic adrenalectomy of an 11 cm pheochromocytoma without intercurrences. The aim of this report is to show that with proper preparation and trained surgical staff, this type of surgery is reliable and safe.

PRESENTATION OF CASE

A 41 years old man presents to urology service with 11 months history of hypertensive crises, tachycardia, nausea and vomiting, occipital headache and sweating. In addition, he reports unspecific abdominal discomfort in left hypochondrium, constipation and weight loss of 30 kg in the last 12 months. Prior clinical history of coronary syndrome investigation, the patient was submitted to coronary catheterism, that was normal, and he was using losartan 50mg. At clinical examination: arterial pressure 220/180mmHg, heart rate 120bpm and eupneic. At abdominal examination, no pain or palpable mass.

Abdominal CT with intravenous contrast revealed a rounded tumoral lesion, measuring 10,8x8cm, in left adrenal gland topography, with contrast enhancement and prominent arteries at the periphery of the lesion (Diagnostic Hypothesis: Adrenal carcinoma or pheochromocytoma) (Figure 1).

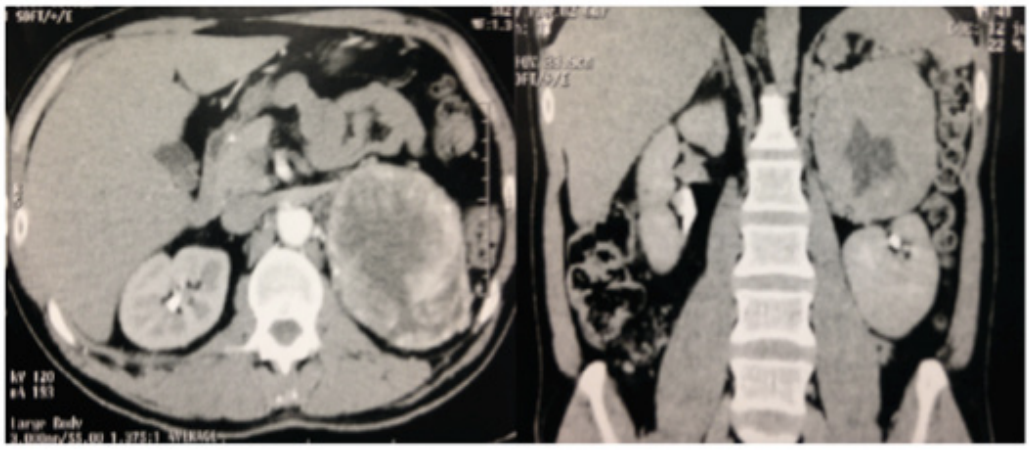

Figure 1- 1A - CT transverse section showing left adrenal mass with contrast enhancement and central area of necrosis; 1B - CT coronal section showing left adrenal tumor

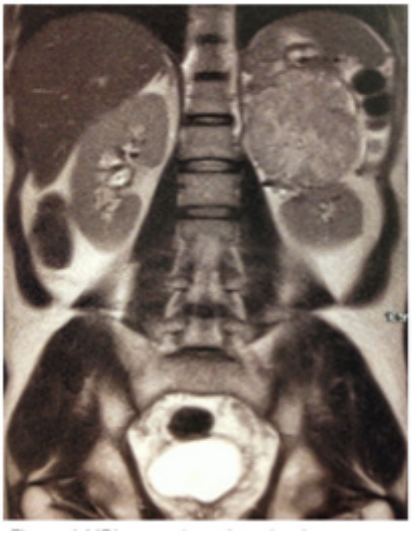

Figure 2 - MRI coronal section showing an adrenal tumor with heterogeneous characteristics and necrotic area measuring 9.9x8.7x9.1 cm

A magnetic resonance imaging was done and demonstrated a tumor with heterogeneous characteristics and necrotic area in the center, measuring 9.9 x 8.7 x 9.1 cm, consisting in an adrenal primary neoplasia (Figure 2). Laboratory tests shows serum calcium of 12.5mg/dL, high levels of urinary catecholamines, noradrenaline (13936 ug/24h), serum noradrenaline of 7451 pg/ml and normal urinary cortisol. A MIBG scintigraphy demonstrated left adrenal mass and absence of metastasis.

The preoperative management was with alpha adrenergic blockade with Prazozin 2 mg daily and blood pressure control with sodium nitroprusside. After alpha adrenergic blockade, beta-blocker drugs was started.

Patient was submitted to left videolaparoscopic adrenalectomy, with the patient in right lateral decubitus position. Initial approach consisted of dissection and vascular control. The left adrenal vein had normal drainage for the renal vein but presented a very large caliber (similar to the renal vein). When the adrenal vein was ligated with hem-o-lock, the patient presented severe hypotension

requiring extreme care by the anesthetic team and vasopressor drug. The rest of the surgery evolves without other complications (Figure 3).

The first 2 postoperative days, the patient stayed in intensive care unit for careful pressure control. He had a good evolution and he was discharged from hospital on 4 day of postoperative. The patient presented a clinical improvement and free of hypertensive crisis. After 2 years of the follow up, he continues normotensive and asymptomatic.

The histopathological diagnosis was pheochromocytoma, without capsular involvement, weighing 285g and measuring 11.0x8.5x7.5 cm (Figure 4).

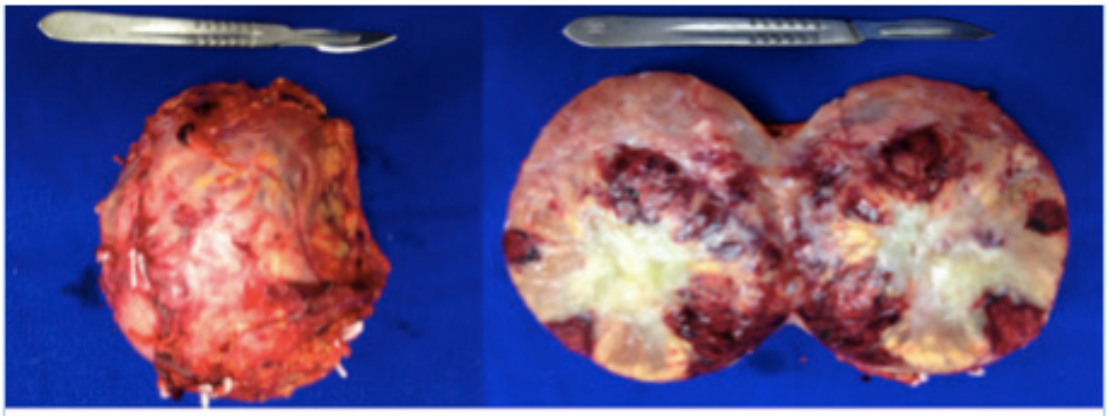

Figure 3. 3A - Left adrenal mass meausuring 11 cm in long axis and weighing 285gr; 3B - Mass open longitudinally

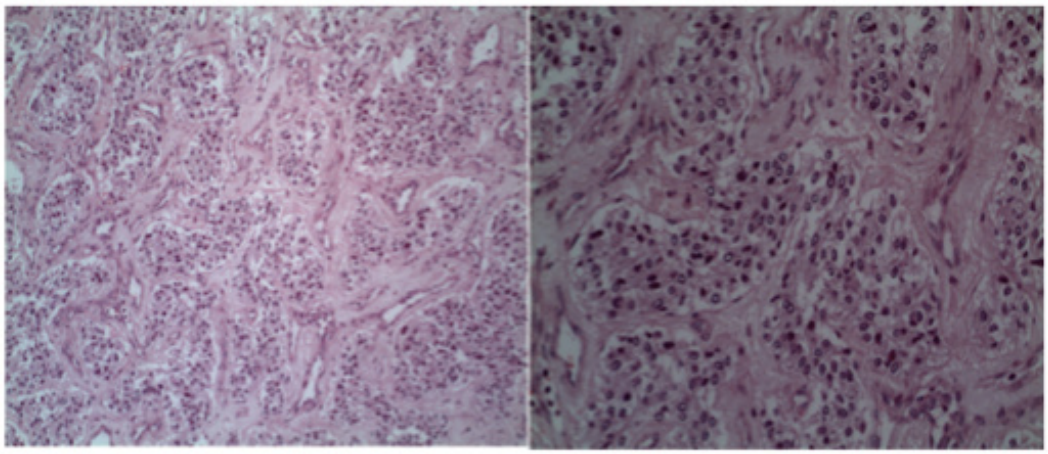

Figure 4. 4A - Increase 100x; 4B - Increase 200x. Hematoxylin and eosin staining. Neoplasic cell nests with abundant cytoplasm and oval nucleus

DISCUSSION AND LITERATURE REVIEW

Laparoscopic approach is the gold standard for adrenalectomy, the safety and efficacy has been established and it has also becomes the standard procedure for pheochromocytomas smaller than 5-6 cm[1,2]. Is associated with less pain, less blood loss, lower morbidity, shorter hospital stay[1].

The use of laparoscopy for pheochromocytomas larger than 6 cm is still controversial, due to clinical complications, higher risk of malignancy and local recurrence[1,2]. Preoperative management, a reduced manipulation of the adrenal gland associated to the progress made in laparoscopic surgery, allowed the minimally invasive indication to larger tumors. Based on several studies, the laparoscopic surgery for pheochromocytoma is more difficult but can be successfully done in tumors larger than 6 cm and it seems to be safe[2,3].

Surgery for pheochromocytoma has specific risks that are not associated with other adrenal tumours. The catecholamine secretion due to the adrenal manipulation can induced cardiomyopathy causing myocardial necrosis and severe hypertension. The amount of catecholamines excreted during laparoscopic surgery is lower than with open surgery[4].

Schweitzer et al.[5], shows that larger tumors were more frequent in patients undergoing conversion to open access during laparoscopic adrenalectomy for pheochromocytoma. This study pointed out that the need for preoperative hospitalization, tumor size >6cm

and intraoperative systolic blood pressure >200mmHg remained significantly associated with conversion.

In a recent paper, 182 patients with pheochromocytoma size ≥ 6 cm were studied, 82 treated with laparoscopic and 100 with open access. The incidence of intra operative hemodynamic instability (25% vs 48.4%), transfusion rate (29.7 vs 46.9%), prolonged hypotension (4.7% vs 23.4%), cardiovascular morbidity (14.1% vs 37.5%) were lower in the laparoscopic group than the open access group. These results show that laparoscopic access is superior for patients with large pheochromocytoma, meanwhile both groups had comparable oncological outcomes[6].

We successfully performed this laparoscopic adrenalectomy without any majors complications. In our research, we found few reported cases of laparoscopic adrenalectomy in tumors of this size.

CONCLUSION

Laparoscopic adrenalectomy of large pheochromocytomas is a major challenge, but it is feasible and safe. Its success depends on correct preoperative management, meticulous surgical planning and surgical staff experience.

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