

Two tumours of the right adrenal gland treated videoscopically by the posterior retroperitoneal approach

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Abstract

Pheochromocytomas are a rare cause of arterial hypertension, necessitating surgical resection. Coexistence of a pheochromocytoma with an ipsilateral adenoma in the right adrenal gland has sporadically been reported. No reports on their videoscopic resection by the posterior retroperitoneal approach are available. We describe a case of a 49-year old female patient with a pheochromocytoma of the right adrenal gland, 43 mm in diameter, diagnosed in the course of assessment for arterial hypertension. During the imaging studies, a second tumour (34 mm in diameter) was found in the ipsilateral gland. The patient underwent right videoscopic adrenalectomy by the posterior retroperitoneal approach. After applying a clip to the central adrenal vein, the gland was removed together with two tumours. The postoperative period was uncomplicated. On the second postoperative day the drain was removed and the patient was discharged. In pathological examination pheochromocytoma with no malignant features along with adrenocortical adenoma was diagnosed. The presented case demonstrates a very rare coincidence of two ipsilateral adrenal tumours and the possibility of their safe videoscopic removal using the posterior retroperitoneal approach. Our finding of double tumour in the adrenal gland emphasizes the importance of detailed preoperative imaging and evaluation of hormonal status in every patient.

Key words: adrenal adenoma, pheochromocytoma, retroperitoneoscopic adrenalectomy.

Introduction

Pheochromocytomas contribute to as little as 0.2% of arterial hypertension; however, due to the potential threat of sudden release of catecholamines to the bloodstream, they are described as a biological time-bomb. Thus, there is a need for screening in all patients with signs and symptoms suggesting a possibility of hormonally active pheochromocytoma, such as: headache, excessive sweating or palpitations [1]. An additional problem lies in differentiating benign from malignant adrenal tumours. Both presented reasons warrant surgical excision of all diagnosed pheochromocytomas [2].

The possibility of bifocal or multifocal pheochromocytomas is widely known in the literature [3]. Coincidence of pheochromocytoma with contralateral adrenal adenoma has rarely been reported [4-6]. Presence of both tumours within one gland has been described only in a few patients [7, 8] and so far there have been no reports on their simultaneous radical excision by a videoscopic posterior retroperitoneal approach.

Case report

A 49-year old female patient complained of arterial hypertension, palpitations and occasional

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collapses. Laboratory tests (Table I) showed elevated values of metanephrines and normetanephrines in daily urine, with no other hormonal or electrolytic abnormalities. On ultrasound scan, in the field of the right adrenal gland, a hypoechogenic tumour 29 × 34 mm was found, as well as a second heterogenic lesion 40 × 43 mm. Imaging studies were completed with computed tomography (Figure 1). It showed a focal lesion 40 × 41 × 37 mm with density of 12-15 Hounsfield units, with heterogeneous contrast enhancement, modelling the inferior vena cava. Additionally a hypodense 34 × 30 × 34 tumour lying posteriorly and cephalad in close proximity of the first one was visualised.

The patient was prepared during two weeks using an α -blocker (doxazosin) and underwent an elective operation. Videoscopic adrenalectomy by the posterior retroperitoneal approach (PRA) was performed (Figure 2). After clipping of the central vein, the right adrenal gland with both tumours was resected totally (Figures 3, 4). The postoperative period was uneventful. On the second postoperative day the drain was removed and the patient was discharged. The skin sutures were removed on the 7th postoperative day (Figure 5). Final pathological examination revealed pheochromocytoma without features of malignant lesion (Figure 6) and cortical adenoma (Figure 7).

Discussion

The presented case illustrates an extremely rare coincidence of two tumours of the ipsilateral adrenal gland. Only a few cases of pheochromocytoma and cortical adenoma in the same gland have been reported in the literature. Cotesta *et al.* [7] presented two cases of unilateral presence of both pathological types of adrenal tumours and their resection by an open approach. Hwang *et al.* [8] describes a patient with a small right cortical adenoma, not diagnosed preoperatively, lying next to a large pheochromocytoma, treated classically. Twice a left-sided adrenal tumour with two pathological components – partially that of pheochromocytoma and partially adenoma – has been reported [9, 10]. In one of those cases videoscopic adrenalectomy by PRA was performed [10].

Videoscopic technique is generally considered a gold standard in treatment of benign adrenal tumours [11]. It has many advantages over open

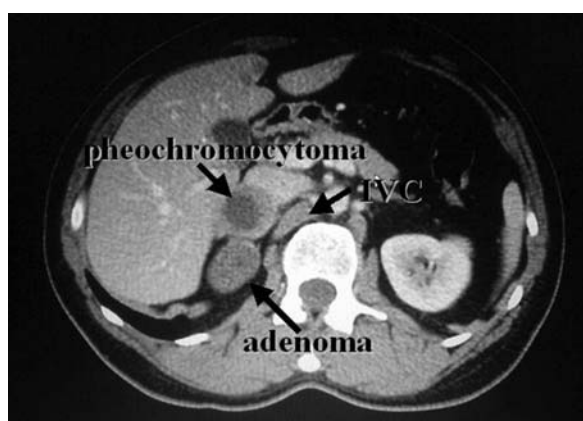
surgery, such as: shorter hospitalization time, decreased postoperative morbidity, better cosmetics and quicker convalescence. Several methods of videoscopic approach are used: lateral transperitoneal adrenalectomy (LTA), anterior transperitoneal, lateral retroperitoneal and PRA [12]. Lateral transperitoneal adrenalectomy is the most commonly used [13]. Its main advantages are: large operative field and easy orientation based on landmarks known from open surgery [12]. The main difficulties in the transperitoneal approach are: obesity and adhesions after previous laparotomies [14].

In the presented case right videoscopic adrenalectomy by PRA was performed using three trocars.

Table I. Results of selected laboratory tests

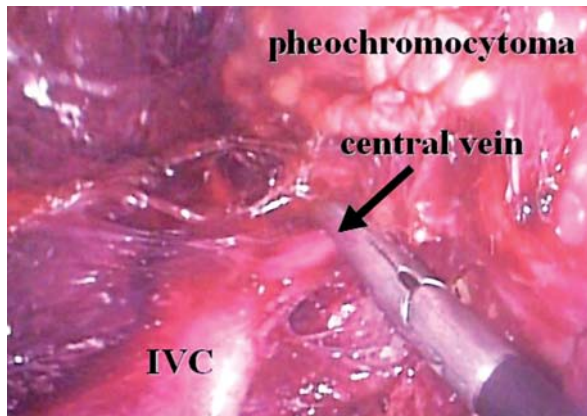
Parameter	Result	
Metanephrines in daily urine	2180	$\mu\text{g}/24\text{ h}$
Normetanephrines in daily urine	4620	$\mu\text{g}/24\text{ h}$
Circadian rhythm of cortisol	Conserved	
ACTH	6.22	pmol/l
DHEA-S	0.68	mg/ml
Potassium in serum	4.05	mEq/l
Sodium in serum	139	mEq/l
Potassium in daily urine	2.0	$\text{g}/24\text{ h}$
Sodium in daily urine	3.3	$\text{g}/24\text{ h}$

ACTH – adrenocorticotropin, DHEA-S – dehydroepiandrosterone sulphate



IVC – inferior vena cava

Figure 1. Preoperative computed tomography showing both lesions visible in the field of the right adrenal gland (pathology was confirmed postoperatively)



IVC – inferior vena cava

Figure 2. Intraoperative view showing the moment of dissection of the right adrenal central vein

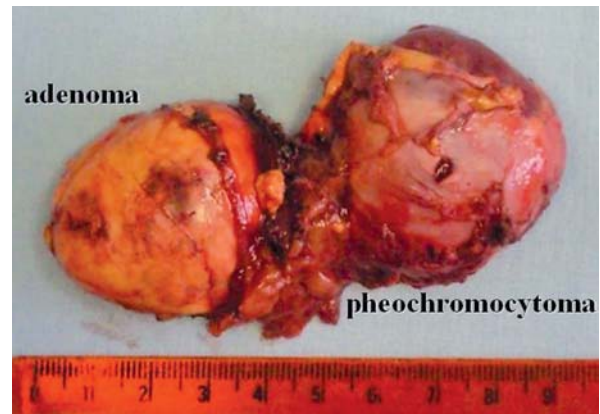


Figure 3. Operative specimen showing both lesions of the right adrenal gland (pathology was confirmed postoperatively)

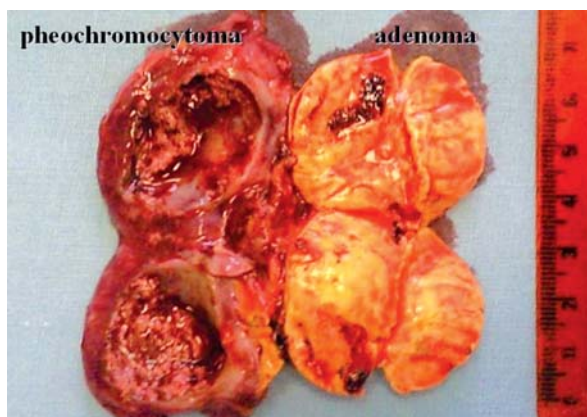


Figure 4. Cross-section of operative specimen showing both lesions of the right adrenal gland (pathology was confirmed postoperatively)

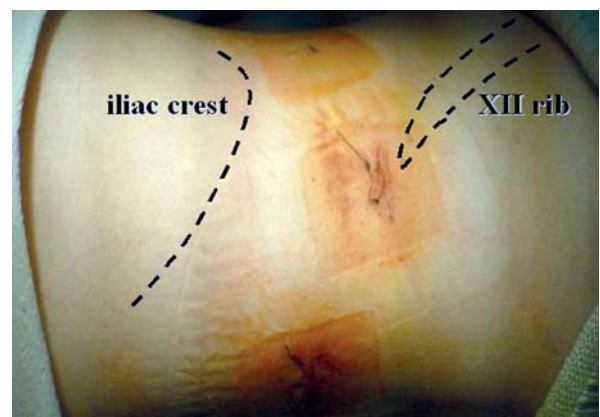


Figure 5. View of healed wounds 7 days after the operation (sutures visible). Dashed lines show the outlines of the iliac crest and the 12th rib

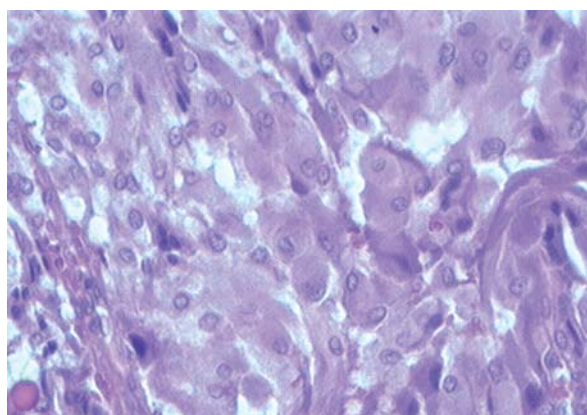


Figure 6. Microscopic view of pheochromocytoma. Haematoxylin and eosin staining. Original magnification 200×

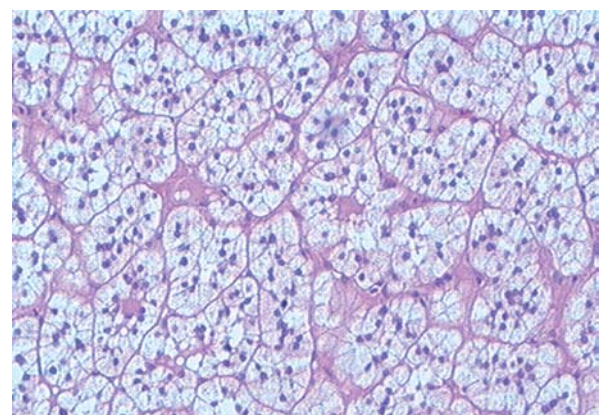


Figure 7. Microscopic view of adrenal cortical adenoma. Haematoxylin and eosin staining. Original magnification 200×

This method has been popularized by Walz [15] and is presently used in a growing number of reference centres [13, 16-18]. A prospective randomized trial, conducted by Rubinstein *et al.* [14], showed that videoscopic retroperitoneal technique is comparable to transperitoneal one in aspects such as: operative time, estimated blood loss, analgesic requirements, hospital stay and the complication rate. The main limitation of both methods is the tumour size [19].

The main advantages of PRA are: direct access without need for mobilisation of abdominal organs, avoiding intra-abdominal adhesions and feasibility even in obese patients [18]. In a comparative study, Lombardi *et al.* [13] observed that patients returned to work faster after videoscopic adrenalectomy by PRA as compared to LTA. Rubinstein *et al.* [14] described postoperative hernias in 2 out of 25 patients operated on using LTA, which was not observed in a group of 32 patients in whom PRA was performed.

As with every technique, PRA also has some minor drawbacks. Lombardi *et al.* [13] observed that values of arterial partial pressure of both carbon dioxide and oxygen were greater at the end of PRA as compared to LTA. Although it might bother the anaesthesiologist, increased carbon dioxide at completion of PRA does not have any negative impact on the postoperative period [13]. Another disadvantage of PRA is the need to become familiar with a new operative field, not known from open surgery [12]. However, once this is achieved, PRA turns out to be an easy and safe procedure. This was proven by Walz *et al.* [15], who performed 560 procedures of PRA with no mortality. Standardization of the technique and gained experience allowed Walz and his team to shorten the operative time to 40 ±15 min using 3 trocars and no postoperative drainage in most cases. In this setting even when bilateral adrenalectomy is needed, PRA has been advocated, especially in patients after previous laparotomies [13].

Application of modern instruments allows further minimization of morbidity and improvement of cosmesis by performing the PRA from single access [20], although the possibilities of wide use of this method are still limited. Also the recently introduced technique of natural orifice transluminal endoscopic surgery (NOTES) has been attempted during adrenalectomy in porcine and cadaver models [21, 22]. The first preclinical results demonstrate the feasibility and apparent safety of the procedure.

Whether this will be confirmed in patients requires clinical studies.

The extent of resection may range from tumour enucleation to total adrenalectomy [23, 24]. As partial adrenalectomy becomes increasingly popular, our finding of two ipsilateral tumours emphasizes the importance of detailed preoperative imaging and evaluation of hormonal status.

In this paper, we report for the first time right adrenal pheochromocytoma and ipsilateral cortical adenoma, treated videoscopically by PRA. The presented case demonstrated a need for detailed preoperative diagnostics of all adrenal focal lesions. The performed operation proves that resection of bifocal right adrenal tumour by PRA is feasible and safe.

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