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One stage laparoscopic left adrenalectomy and sleeve gastrectomy by direct supragastric approach☆

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ABSTRACT

INTRODUCTION: The advances in laparoscopic surgical technique and the greater experience of surgical teams have enabled the combination of different surgical techniques in a single procedure. This paper presents a case of a sleeve gastrectomy and a left adrenalectomy by laparoscopy for a morbidly obese patient with Cushing's syndrome.
PRESENTATION OF CASE: A 52 year-old male patient with a BMI of 53 kg/m^2 was diagnosed as having Cushing's syndrome caused by a left adrenal tumor. Sleeve gastrectomy was performed according to the usual technique. The adrenalectomy was performed at the same time by a left supragastric approach. The evolution was favorable, with 52% of excess weight loss observed after six months. Plasma and urinary cortisol at the 3- and 6-month follow-ups were under normal range and the patient required glucocorticoid therapy, confirming the cure of Cushing's syndrome.
DISCUSSION: Teams with experience of advanced laparoscopic surgery can successfully combine complex procedures in one surgical period. The approach we used for the adrenalectomy proved itself to be feasible after the sleeve gastrectomy.
CONCLUSION: Both procedures can be safely done in experience teams. Sleeve gastrectomy facilitates the direct supragastric approach.

1. Introduction

Morbid obesity is a growing problem in the third world.[1] Despite its growing incidence, only a small percentage of patients have a medical problem such as Cushing's syndrome, which could in fact be its cause.[2,3]

Both bariatric surgery[4] and adrenalectomy[5] have a clear indication for a laparoscopic approach. The association of both procedures at a single stage may be debatable due to the increased risk of performing both complex procedures and to the surgical risk of a morbidly obese patient with such a endocrinological comorbidity.[6,7]

Here we present the case of a 52 year-old man diagnosed with Cushing's syndrome during the preoperative screening for bariatric surgery. A sleeve gastrectomy and left adrenalectomy were performed using a laparoscopic approach at the same time.

2. Presentation of case

A 52 year-old man was referred to our Department for the assessment of morbid obesity. He had a 10 year history of hypertension which had worsened in the last few months and was being treated with 3 antihypertensive agents. He had a recent history of type 2 diabetes that was controlled with diet, hyperlipidemia under pharmacological treatment and sleep apnea treated with continuous positive airway pressure support. In our Center patients with obesity are studied to exclude endocrine causes of obesity and laboratory tests to screen for hypothyroidism and Cushing' syndrome are routinely performed.

He referred a 20 kg weight increase in 2 years with no history of alcohol drinking or intake of exogenous glucocorticoid drugs. Moreover, the patient complained of fatigue and proximal muscle weakness. His physical examination showed a weight of 153 kg with body mass index of 53.8 kg/m^2 at the first visit in the outpatients' clinic. Morning orthostatic blood pressure was 150/90 despite medical therapy. A central distribution of fat with a waist circumference of 150 cm and cervical and dorsocervical fat pad (buffalo hump) were observed. No purple striae or easy bruising were present.

Suspected hypercortisolism was confirmed by a failure to suppress the level of cortisol after 1 mg dexamethasone (DST). The

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Table 1
Biochemical screening.

Cushing' disease biochemical screening				
Data	Determination	Value	Unit	Normal range
Preoperative workup	Base values			
	24 h urinary free cortisol	3010	mcg/d	20–90
	Plasmatic cortisol	395	nmol/L	138–690
	ACTH	6	nmol/L	9–52
	Low dose DST			
	24 h urinary free cortisol	196	mcg/d	20–90
	Plasmatic cortisol	475	nmol/L	138–690
	ACTH	<6	nmol/L	9–52
	High dose DST			
	Plasmatic cortisol	475	nmol/L	138–690
	ACTH	<6	nmol/L	9–52
6 months after surgery	Base values			
	Plasmatic cortisol	47	nmol/L	138–690
	ACTH	3.6	nmol/L	9–52

DST: dexametasone.
ACTH: adrenocortical hormone.

measurement of ACTH levels showed suppressed ACTH indicating an ACTH independent disease. An overnight low dose followed by a high dose DST suppression test was performed. Serum and urinary cortisol were not suppressed in response to either the low dose or the high-dose confirming an ACTH independent disease. The initial and subsequent laboratory examinations are resumed in Table 1.

Adrenal computed tomography was performed and a well-defined left adrenal mass measuring 3 cm and suggestive of adenoma was observed (Fig. 1).

For the surgery, the patient was positioned in the lithotomy position and tilted-up 40° under general anesthesia. The main surgeon was positioned between the legs of the patient. Five 12 mm ports were placed. A 30° oblique laparoscope was used. Ports were placed in the same way we use for the sleeve gastrectomy (Fig. 2). Once the pneumoperitoneum was achieved, the lesser sac was opened and the sleeve gastrectomy was performed, guided by a 36F tube.

For the adrenalectomy, an anterior supragastric approach was used. Fig. 3 shows the exposure of the surgical field before the adrenalectomy. With this supragastric approach described by Basso et al. in 1999,[8] the key point consists in identifying the diaphragmatic–adrenal channel which runs on the left crus and crosses the middle adrenal artery and joins the adrenal vein. The left diaphragmatic vein was dissected and followed caudally until the left adrenal gland vein was found (Fig. 4). Once the vein was clipped and cut, the rest of the gland was carefully dissected in an

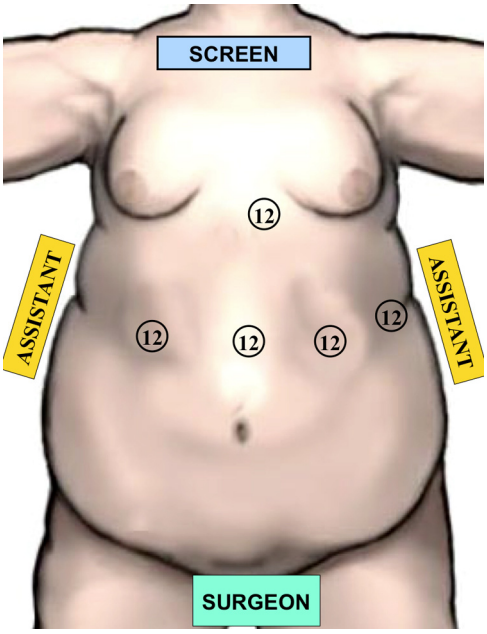

Fig. 2. Trocar position for the procedure.

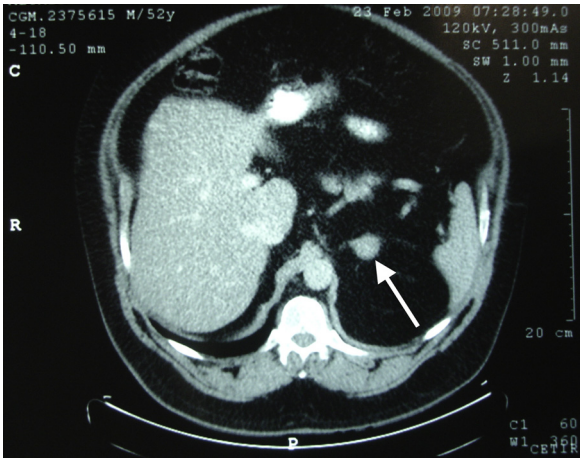

Fig. 1. CT-scans show the abnormal left adrenal gland.

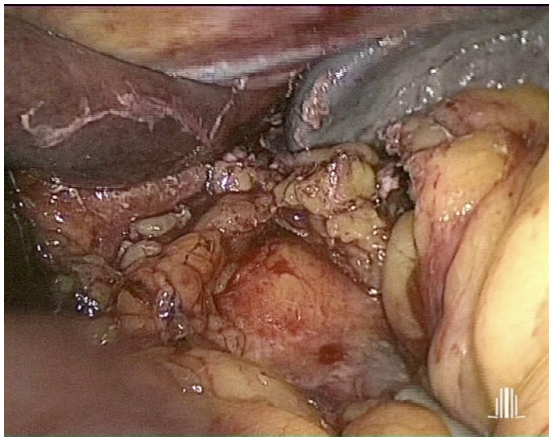

Fig. 3. Surgical field after the sleeve gastrectomy and prior to the adrenalectomy.

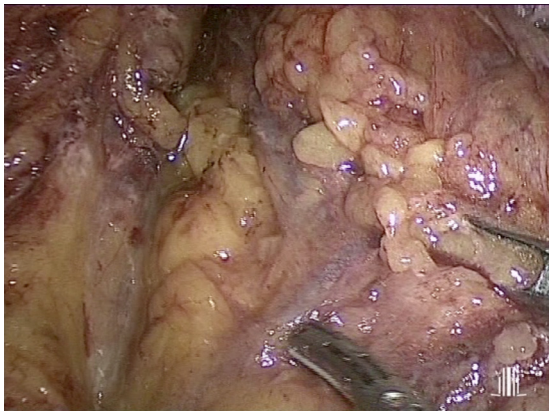

Fig. 4. Dissection of the diaphragmatic–adrenal channel.

anti-clockwise direction with blunt dissection. Finally, the gland was removed and taken out inside a plastic bag.

The patient spent 24 h in the post-surgical ICU, and was then discharged to the surgical ward. Diet was initiated on the second postoperative day. There was no complication during the admission. The pathologist reported a corticoadrenal pigmented adenoma.

Since the hypothalamic–pituitary axis and the contralateral adrenal gland was suppressed by the prolonged autonomous cortisol secretion, our patient required glucocorticoid therapy after surgery which was maintained awaiting the recovery of the remaining adrenal.

After surgery, the patient was followed-up in the outpatient clinic with the Surgeon, Endocrinologist and Dieticians. One month after surgery, plasma cortisol was 47 nmol/l (155–678), ACTH 3.6 pmol/l and the hypothalamic–pituitary–adrenal axis had still not recovered, as shown by a blunted response of the short synacthen-stimulated cortisol level (peak level of 140 nmol/l). Four months after surgery, the patient had lost weight as expected for a sleeve gastrectomy (23 kg) and reported normal glycemic controls, his blood pressure was <130/80 mmHg while still using 3 antihypertensive agents. Plasma and urinary cortisol were still under normal range and a blunted response to the short synacten-stimulated cortisol persisted. The corticoid therapy was discontinued after 4 months. One year later, the patient continued doing well with a weight loss of 35 kg; he just needed one antihypertensive agent. The last control was done 2 years after surgery, the patient maintained a BMI of 29 kg/m^2.

3. Discussion

Although there is little epidemiological data on the incidence of Cushing's syndrome, this is an uncommon disease with an estimated annual incidence of 2.3 cases per million population per year.[9] As it is a rare cause of obesity many authors do not recommend including its screening in the routine preoperative evaluation of morbidly obese patients. Fleseriu et al.[2] have described two cases of unidentified Cushing' syndrome in morbidly obese patients that underwent bariatric surgery before their Cushing' syndrome was diagnosed. In these patients bariatric surgery was unsuccessful and had significant postoperative specific complications because of the underlying disease. In agreement with our opinion, the authors highlighted the benefits of performing screening tests and a correct diagnosis before surgery. It is a rare case of obesity, but if it is misdiagnosed its consequences may be severe. To avoid this scenario, our group always recommends a 24-h urinary free cortisol test, a simple and low cost tool for screening.

In this patient, the adequate surgical treatment consists of a left adrenalectomy and a bariatric procedure. The bariatric procedure to be chosen may be widely discussed. Due to the patient's BMI we may have chosen a Duodenal Switch for this patient. Despite this, the presence of Cushing's syndrome makes it a high-risk procedure, so we prefer to do a sleeve gastrectomy. Sleeve gastrectomy in itself also has favorable results in terms of weight loss and comorbidity resolution, with low morbidity and mortality rates in those high-risk patients.[10] Moreover, in this case, the sleeve gastrectomy may facilitate a good surgical field for the left adrenalectomy.

Dr. Basso et al.[8] described the supragastric left adrenalectomy. One of the key points of this approach is a good dissection of the left diaphragmatic vein. After a sleeve gastrectomy is done, with a complete dissection of the left crus and the short gastric vessels we get an excellent visualization of the diaphragmatic–adrenal–renal channel. Soricelli et al.[7] presented a quite similar case to ours. In this paper the authors also remarked on the outstanding exposure of the surgical field for the adrenalectomy after the sleeve gastrectomy. Bardaro and Gagner[6] described another case similar to ours, using a gastric by-pass combined with a left adrenalectomy. In that case, the most difficult aspect was the exposure of the gland by keeping the stomach and the new reservoir retracted, which invalidated two ports during the adrenalectomy.

Both papers show the possibility of combining two major procedures adding neither morbidity nor mortality. We do agree with these authors that the combination of these procedures may be an indication in experienced teams, for better recovery of the patients and avoiding cumulative surgical risk for these high-risk patients.

4. Conclusion

Laparoscopic sleeve gastrectomy and left adrenalectomy can be performed in the same surgical period. Both procedures can be safely associated if there is a multidisciplinary and expert team in laparoscopic surgery with experience in morbidly obese patients.

Conflict of interest

Dr. G. Ruiz de Gordejuela and the other co-authors have no conflict of interest.

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None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Amador G. Ruiz de Gordejuela was one of the assistants of the surgery, he wrote and reviewed the paper.

Jordi Pujol Gebelli was the main surgeon of the procedure. He follows-up the patients. He also reviewed the paper.

Núria Vilarrasa García was the Endocrinologist who made the diagnosis of the adrenal tumor. She is the Endocrinologist that follows-up the patient. She wrote the endocrinology part of the paper.

Lluis Secanella Medayo was the assistant surgeon. He also reviewed the paper and made the bibliographic research for the discussion.

Araceli Estapa Marín was the first Endocrinologist who visited the patient. She initiated the diagnosis of the patient and contributed to the endocrinoly part with Dr. Vilarrasa.

Anna Casajoana Badía collaborated in the writing of the paper and made substantial reviews.

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