



## Editorial

# Impact of Minimally Invasive Techniques in Endocrine Surgery

## Impacto de las técnicas mínimamente invasivas en cirugía endocrina

Among the most significant advances in the field of surgery is undoubtedly the development of minimally invasive techniques. In many countries, video-endoscopic surgery is the standard surgical technique for cholecystectomy, hiatal hernia, appendectomy and bariatric surgery, while endocrine surgery has also not escaped such technical advances. This editorial looks at the role of minimally invasive surgery in the treatment of diseases of the endocrine glands.

### Adrenal Glands

The location, size, prevalence of benign disease development as well as relative technical simplicity have made laparoscopic surgery a current first choice option for adrenal gland resection. Several studies have demonstrated the significant superiority of the laparoscopic surgical technique in time, transfusion requirements, re-operations, hospital stay time and operation morbidity.<sup>1-3</sup> While probably the only disadvantage is the increased surgical time, which nevertheless has gradually decreased with increasing experience in this technique.

Taking into account the diversity of diseases affecting the adrenal glands, in the beginning there was a lot of scepticism about whether laparoscopic surgery was as safety as the open approach for the resection of tumours. Its increasingly frequent use has demonstrated a high level of safety, even in patients with pheochromocytoma.<sup>4</sup> It also has a better cost-benefit ratio than the open approach, due to the inherent costs of the procedure being offset by a shorter hospital stay.<sup>5</sup> However, unlike the treatment of benign tumours, the appropriateness of laparoscopy for resecting malignant adrenal tumours is still debatable, and en bloc tumour resection via open surgery is still the preferred form of treatment for cancer.<sup>6</sup>

Essentially, there are two surgical techniques for laparoscopic adrenalectomy. The first is the lateral intraperitoneal approach, described by Gagner et al<sup>7</sup> in 1994. This has significant advantages regarding the field of vision, identification of anatomical relationships and displacement of the blood to lower positions in the abdomen if there is a haemorrhage. The second is the posterior retroperitoneal approach, proposed by Waltz et al,<sup>8</sup> among others, which gives more direct access to the region of the glands. It allows a bilateral approach without repositioning the patient and prevents the risk of intra-abdominal visceral injury and adhesion. Anatomical references are less accurate with this technique, which makes it difficult to teach. Their results are very similar, but the posterior approach might have a certain advantage for the resection of small tumours in patients with a low body mass index and a history of abdominal surgery.<sup>9</sup>

### Pancreas

The usefulness of laparoscopic surgery has been evaluated in a number of procedures regarding the pancreatic gland. Endocrine tumours which are more susceptible to laparoscopic resection are insulinomas, with the 3 techniques commonly used for this treatment (enucleation and distal pancreatectomy with and without splenectomy) can be performed laparoscopically.<sup>10</sup> Laparoscopic surgery has made it necessary to replace palpation with ultrasound, whose usefulness in both locating the tumour as well as evaluating its relationship with the pancreatic duct has been widely demonstrated. The addition of laparoscopic surgery for treating these tumours has been introduced slowly, probably because of its rarity. There are few comparative studies on the laparoscopic and open techniques, with

perhaps the recently published systematic review by Briggs et al<sup>11</sup> being considered as a good indication of its current status. They found laparoscopic distal pancreatectomy to be superior to the open approach regarding hospital stay, bleeding, surgical time, analgesia and operative mortality. The two approaches had similar results in enucleation, and laparoscopic pancreaticoduodenectomy showed no benefit.

## Parathyroid Glands

The availability of high definition ultrasound studies, MIBI scintigraphy tests and rapid PTH tests have resulted in unilateral exploration replacing the classical bilateral exploration for the treatment of primary hyperparathyroidism due to uniglandular disease.<sup>12</sup> Various groups have developed video-endoscopic and video-assisted techniques for the resection of parathyroid adenomas, with cure rates as high as the conventional treatment.<sup>13-15</sup> Video-endoscopic or video-assisted techniques have failed to demonstrate their superiority, but they have contributed significantly to uniglandular disease patients being treated by parathyroidectomy via small incisions, whether located centrally or laterally, using different forms of anaesthesia, such as local, regional, conventional general or via laryngeal mask. Probably, the biggest advance in adjuvants for parathyroid gland surgery is the possibility of confirming a cure in the immediate postoperative period using a rapid PTH assay. This simple laboratory study, in conjunction with the extraordinary imaging resources now available for locating adenomas, reduces the need to explore all glands. This in turn reduces the frequency of postoperative hypocalcaemia, the degree of pain, the size of the scar and recovery time.<sup>16</sup>

## Thyroid Glands

The same minimally invasive techniques used for the resection of parathyroid glands have been tried for thyroid surgery. Various published studies have demonstrated the possibility of total thyroidectomy, and even lymph node dissection in patients with differentiated carcinomas, with an efficiency similar to conventional surgery.<sup>17</sup> Use of an endoscope appears to offer a reduction in incision size as the sole advantage.<sup>18</sup> Some countries have shown great interest in not leaving a large neck scar, so they are working intensely on developing techniques that use an extra cervical approach via the armpit or periareolar breast incision, aided robotically in some cases.<sup>19-21</sup> Although it is true that their recognition as minimally invasive techniques is debatable, they certainly have a cosmetic advantage. Finally, it is important to note that thyroid resection via a trans-oral approach has been evaluated in experimental studies as part of a trend towards surgical procedures via natural orifices.

Continued technological advances are clearly leading to a large number of surgical techniques, which must first

pass through scientific and subjective approval before being included in clinical practice.

## REFERENCES

1. Brunt LM, Doherty GM, Norton JA, Soper NJ, Quasebarth MA, Moley JF. Laparoscopic adrenalectomy compared to open adrenalectomy for benign adrenal neoplasms. *J Am Coll Surg.* 1996;183:1-10.
2. Lee J, El-Tamer M, Schiffnert T, Turrentine FE, Henderson WG, Khuri S, et al. Open and laparoscopic adrenalectomy: analysis of the National Surgical Quality Improvement Program [discussion 959-61]. *J Am Coll Surg.* 2008;206: 953-9.
3. Castillo OA, Vitagliano G, Secin FP, Kerkebe M, Arellano L. Laparoscopic adrenalectomy for adrenal masses: does size matter? *Urology.* 2008;71:1138-41.
4. Humphrey R, Gray D, Pautler S, Davies W. Laparoscopic compared with open adrenalectomy for resection of pheochromocytoma: a review of 47 cases. *Can J Surg.* 2008;51:276-80.
5. Schreinemakers JM, Elias SG, Borel Rinkes IH. Retroperitoneal endoscopic versus conventional open adrenalectomy: a cost-effectiveness analysis. *J Laparoendosc Adv Surg Tech A.* 2008;18:707-12.
6. Schteingart DE, Doherty GM, Gauger PG, Giordano TJ, Hammer GD, Korobkin M, et al. Management of patients with adrenal cancer: recommendations of an international consensus conference. *Endocr Relat Cancer.* 2005;12: 667-80.
7. Gagner M, Lacroix A, Bolte E, Pomp A. Laparoscopic adrenalectomy. The importance of a flank approach in the lateral decubitus position. *Surg Endosc.* 1994;8:135-8.
8. Walz MK, Peitgen K, Hoermann R, Giebler RM, Mann K, Eigler FW. Posterior retroperitoneoscopy as a new minimally invasive approach for adrenalectomy: results of 30 adrenalectomies in 27 patients. *World J Surg.* 1996;20:769-74.
9. Berber E, Tellioglu G, Harvey A, Mitchell J, Milas M, Siperstein A. Comparison of laparoscopic transabdominal lateral versus posterior retroperitoneal adrenalectomy [discussion 625-6]. *Surgery.* 2009;146:621-5.
10. Fernandez-Cruz L, Cesar-Borges G. Laparoscopic strategies for resection of insulinomas. *J Gastroint Surg.* 2006;10:752-60.
11. Briggs C, Mann C, Irving G, Neal C, Peterson M, Cameron I, et al. Systematic review of minimally invasive pancreatic resection. *J Gastrointest Surg.* 2009;13:1129-37.
12. Tibblin S, Bondeson AG, Ljungberg O. Unilateral parathyroidectomy in hyperparathyroidism due to single adenoma. *Ann Surg.* 1982;195:245-52.
13. Henry JF, Sebag F, Cherenko M, Ippolito G, Taieb D, Vaillant J. Endoscopic parathyroidectomy: why and when? *World J Surg.* 2008;32:2509-15.
14. Gagner M. Endoscopic subtotal parathyroidectomy in patients with primary hyperparathyroidism. *Br J Surg.* 1996;83:875.
15. Miccoli P, Berti P, Materazzi G, Massi M, Picone A, Minuto MN. Results of video assisted parathyroidectomy: single institution's six- year experience. *World J Surg.* 2004;28: 1216-8.
16. Mihai R, Barczynski M, Iacobone M, Sitges-Serra A. Surgical strategy for sporadic primary hyperparathyroidism an evidence-based approach to surgical strategy, patient selection, surgical access, and reoperations. *Langenbecks Arch Surg.* 2009;394:785-98.

17. Miccoli P, Berti P, Raffaelli M, Materazzi G, Baldacci S, Rossi G. Comparison between minimally invasive video-assisted thyroidectomy and conventional thyroidectomy: a prospective randomized study. *Surgery*. 2001;130: 1039-43.
18. Alvarado R, McMullen T, Sidhu SB, Delbridge LW, Sewak MS. Minimally invasive thyroid surgery for single nodules: an evidence-based review of the lateral mini-incision technique. *World J Surg*. 2008;32:1341-8.
19. Ikeda Y, Takami H, Niimi M, Kan S, Sasaki Y, Takayama J. Endoscopic thyroidectomy and parathyroidectomy by the axillary approach. A preliminary report. *Surg Endosc*. 2002;16:92-5.
20. Ohgami M, Ishii S, Arisawa Y, Ohmori T, Noga K, Furukawa T, et al. Scarless endoscopic thyroidectomy: breast approach for better cosmesis. *Surg Laparosc Endosc Percutan Tech*. 2000;10:1-4.
21. Tan C, Cheah WK, Delbridge L. «Scarless» (in the neck) endoscopic thyroidectomy (set): an evidence-based review of published techniques. *World J Surg*. 2008;32:1349-57.

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