

What's new in endocrine surgery?

Endocrine surgery has become a well-defined part of general surgery.

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Endocrine surgery has steadily evolved from relative obscurity into a well-defined subdiscipline of general surgery. Success in this area relies on close co-operation with endocrinologists, radiologists, nuclear physicians, and pathologists. Endocrine surgeons have a pivotal role in the management of nodular thyroid disease and thyroid cancer, hyperparathyroidism, as well as functional adrenal and pancreatic tumours.

Unlike other solid tumours, endocrine neoplasms make their presence known by systemic effects of excess hormone production, rather than by local symptoms related to tumour size or local invasion. As laboratory diagnostic methods and radiology imaging techniques have improved, so the demand for surgical expertise in this area has increased.

Techniques of minimally invasive surgery have transformed the practice of general surgery. In some cases, such as cholecystectomy or anti-reflux surgery, laparoscopy has become the unquestioned standard of care; in others, such as hernia or colorectal surgery the debate continues. In this article I will describe the role such techniques have to play in the surgical management of endocrine conditions.

Adrenal

Adrenalectomy is performed for cure of adrenal causes of Conn's and Cushing's syndrome, pheochromocytoma, as well as incidental adrenal tumours. Laparoscopic removal is unquestionably the approach of choice for most of these.¹ The adrenal is a small, relatively inaccessible gland tucked away on top of the kidney in the retroperitoneum, in close proximity to the liver, inferior vena cava (IVC) on the right, and aorta, spleen, and pancreas on the left. Open removal requires a large incision to expose the anatomy safely, yet the tumours are frequently quite small, often less than 5 cm in diameter. A generous surgical exposure is therefore needed to remove a small pathological organ. Laparoscopy circumvents these difficulties neatly and effectively.

Most laparoscopic adrenalectomies are performed via a transperitoneal approach with the patient in a 90 degree lateral position.

An alternative is a completely retroperitoneal approach, done with the patient in a prone position, via posteriorly placed ports. The final decision rests with the surgeon, and there is not much to choose in terms of outcome benefits. There is a wealth of published information available supporting the use and benefits of minimal access surgery in this context, and in most cases patients are discharged within 48 hours of surgery, with little morbidity and minimal mortality.²

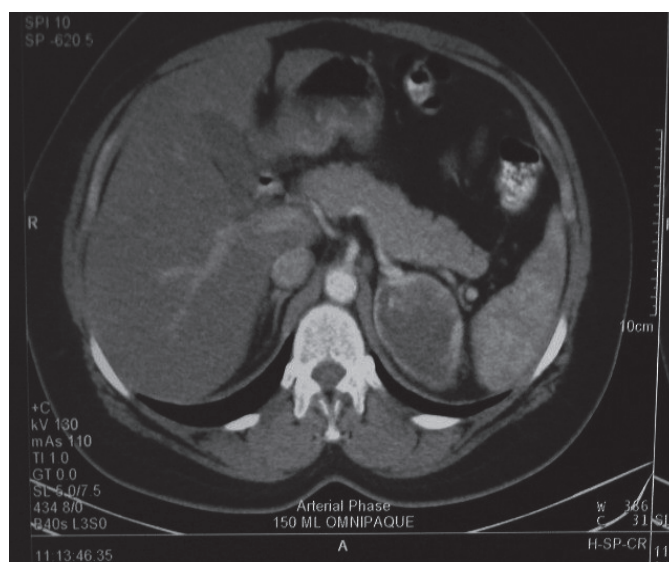


Fig. 1. CT scan of the abdomen illustrating a 7 cm pheochromocytoma in the left adrenal gland.



Fig. 2. The patient is in the left lateral position, 4 ports are placed subcostally.

The debate of 'laparoscopic versus open adrenalectomy' is out of date and is replaced by issues on what cases to select for an open approach *de novo* – my practice is to consider all adrenal masses under 10 cm for a laparoscopic approach unless the preoperative images suggest invasion or unequivocal malignancy. For larger lesions I use a laparotomy via a subcostal incision, reserving a thoraco-abdominal approach for the truly massive tumours, i.e. larger than 15 - 20 cm.

Thyroid

The technique of thyroidectomy was described as early as 937AD in China. Kocher developed it into a safe operation at the turn of last century and received a Nobel prize for his work. The surgical approach to thyroid has been largely unchanged since, until minimally invasive techniques arrived on the scene. Husher³ was the first to perform a videoscopic thyroidectomy. There are 2 types of operations. The first minimises the incision but keeps it in the neck. The best studied is the video-assisted central neck access approach, described by Miccoli from Pisa, Italy.⁴ The other type, performed mostly in Asian countries, moves the incision from the neck and places it at cosmetically hidden sites, such as the axilla, periareola and breast skin folds. Here, ports are placed and instruments tunneled to the neck where the operation is done under complete video guidance. The main advantage of this is that it is completely scar free in the neck. Both these approaches have been shown by their proponents to be safe and technically feasible. Their main advantage over conventional approaches is only cosmetic, and since most thyroid surgery can be done with a small incision anyway, usually well hidden in a skin crease in the neck, critics argue that it may not be a significant advantage over conventional practice at present.

Parathyroid

Parathyroidectomy has moved from mandatory 4-gland exploration to a selective, minimally invasive approach. This has been facilitated by accurate preoperative imaging that allows the surgeon to explore the affected gland only. The imaging modality of choice is a nuclear medicine sestamibi scan (with approximately 80% accuracy), and some surgeons also use neck ultrasonography. If the nuclear scan and ultrasound are concordant a focused exploration can be undertaken with a confident expectation of success. A further adjunct to focused exploration is the use of intraoperative

parathyroid hormone (PTH) testing. This was first proposed by Irving *et al.*⁵ from Florida, and has found many supporters in practice worldwide. Newer PTH assays can give a result within 15 - 20 minutes. Since PTH has a very short half life, confirming an immediate drop in PTH values correlates well with long-term cure of the condition.

All of the above have allowed surgeons to perform more focused surgery without compromising long-term results. Patients benefit by having smaller incisions, less dissection, and generally an easier postoperative recovery. In selected cases a parathyroidectomy can be done under local or regional anaesthesia, clearly an advantage in very elderly or unfit patients.

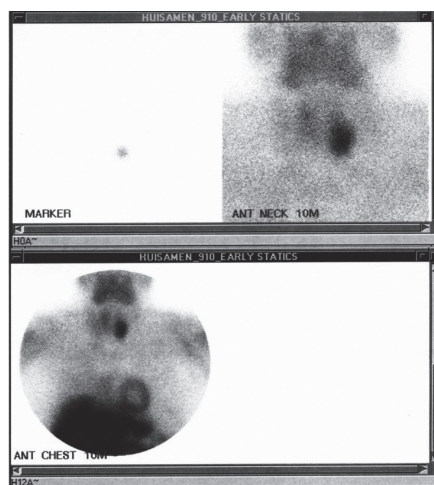


Fig. 3. Sestamibi scan allowing confident preoperative localisation of a parathyroid adenoma located in the left lower position. This was removed successfully with a limited exploration.

A number of other gadgets have also staked their claim in this operation, mostly with little success. Neck surgery can be done via trochars inserted at differing sites, and under video guidance – this is the video-assisted parathyroidectomy.⁶ Since a parathyroidectomy can be performed with a limited skin incision under direct vision anyway, the advantages of the video-assisted approach are difficult to prove, and this technique remains in the hands of a few enthusiasts only. Another option

to aid the intraoperative localisation of a parathyroid adenoma is the hand-held gamma camera. This tool is commonly used in the detection of sentinel lymph nodes, and can be easily used via small skin incisions. The technique relies on a preoperative injection of sestamibi, which would then be taken up by the abnormal adenoma within 2 - 3 hours of its administration.

If the operation is timed appropriately the excess radiation emitted by the adenoma can be located by the gamma camera, thus helping to identify the adenoma. I find this an awkward adjunct to surgical exploration, and it has a role mostly in complex repeat explorations, rather than in routine cases.

Conclusion

Minimally invasive surgery is the standard for routine adrenalectomy; minimally invasive parathyroidectomy is becoming a standard with the traditional bilateral exploratory procedures; minimally invasive thyroidectomy is still more hype than standard of treatment.¹ As localisation and minimally invasive techniques continue to evolve, we will see the frontier of minimally invasive endocrine surgery continue to advance.

References

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In a nutshell

The common themes that emerge in minimally invasive endocrine surgery are that:

- proper patient selection is crucial to good results
- it is best to localise the tumours preoperatively whenever possible for a focused operation
- invasive cancers and very large tumours are usually contraindications to minimally invasive approaches
- multiple techniques are usually available, although some may be more versatile than others
- surgeon and institutional experience is of paramount importance in the choice of specific surgical technique and in obtaining good results
- good prospective studies are sorely needed to evaluate these techniques.