



# Laparoscopic adrenalectomy: is the choice of the best surgical approach a resolved issue?

Andrea Balla, Silvia Quaresima, Alessandro M. Paganini

Department of General Surgery and Surgical Specialties “Paride Stefanini”, Sapienza University of Rome, 00161 Rome, Italy

Correspondence to: Andrea Balla, MD. Department of General Surgery and Surgical Specialties “Paride Stefanini”, Sapienza University of Rome, Azienda Policlinico Umberto I, Viale del Policlinico 155, 00161 Rome, Italy. Email: andrea.balla@gmail.com.

Comment on: Coste T, Caiazzo R, Torres F, *et al.* Laparoscopic adrenalectomy by transabdominal lateral approach: 20 years of experience. *Surg Endosc* 2017;31:2743-51.

Received: 18 March 2018; Accepted: 30 March 2018; Published: 23 April 2018.

doi: 10.21037/ales.2018.04.01

View this article at: <http://dx.doi.org/10.21037/ales.2018.04.01>

In the article “*Laparoscopic adrenalectomy by transabdominal lateral approach: 20 years of experience*” the authors reported their twenty years’ experience with laparoscopic lateral adrenalectomy to identify the predictive factors of intra- and post-operative complications and of conversions (1).

Since its first description by Gagner in 1992, laparoscopic adrenalectomy (LA) has quickly become the gold standard surgical technique for most adrenal lesions as an alternative to open adrenalectomy (2,3). Different minimally invasive approaches have been proposed in the last three decades to perform adrenalectomy (3). The first and most frequently reported approach is the transabdominal lateral one (TLA) with patient in lateral decubitus position, as proposed by Gagner and as performed also in the case series by Coste *et al.* (1,2,4). With this approach, excellent exposure of the operative field and a wide working space are achieved, with fluids being drained by gravity away from the operative field (3). Moreover, it is possible to reach the gland without retracting any organ, thereby reducing trauma to nearby organs. In a systematic review and meta-analysis by Constantinides *et al.* (5) the mean operative time with this approach ranged between 77.5 and 423 minutes, the conversion rate ranged from 2% to 14% and a 6.4% morbidity rate were reported. In the article by Coste *et al.* the mean operative time (141.3 minutes for right LA and of 136.7 minutes for left LA) and conversion rate (4%) are similar to those reported in the literature, but a higher morbidity rate is also reported (15.6%) (1).

The next mostly performed procedure is the retroperitoneal approach (RPA) with the patient in prone

position (4). This approach is preferred by some authors due to several reported advantages in comparison to TLA, including a shorter operative time, less intraoperative blood loss, lower postoperative pain and shorter hospital stay. Moreover, the absence of any intraperitoneal manipulation makes it ideal in case of peritoneal adhesions from previous surgery and reduces the risk of damage to intra-abdominal organs from mobilization, which also translates into quicker return to normal bowel functions (6-9).

The least common approach is the anterior one with the patient in supine position (3,10). More familiar anatomical recognition, the possibility to explore the abdominal cavity and to perform associated procedures, including contralateral adrenalectomy, without repositioning the patient on the operative table, are the main advantages of this approach (11,12). The postoperative outcomes that are reported in the literature are similar to the outcomes reported after other approaches (11,12).

Each of these approaches, however, has some inherent weakness. With TLA, early ligation of the adrenal vein may not be obtained without some degree of gland manipulation, with the consequent risk of catecholamines, hormones or cancer cells spread. RPA is reported to be difficult to perform in patients with large tumors (>7–8 cm) and in patients with a high BMI (13). Conversion to open surgery in case of massive bleeding is difficult and the patient’s position on the operative table can contribute in itself to hemodynamic instability, especially in case of pheochromocytoma. Finally, the anterior approach to left-sided lesions requires mobilization of the left colonic

flexure that results in prolonged operative time and a higher surgical risk.

In the authors' opinion the approach of choice for LA is the transperitoneal anterior one in case of right adrenalectomy and the transperitoneal submesocolic and retropancreatic one in case of left adrenalectomy (3,10). This approach provides more direct, early control of the adrenal vein as the first and foremost step of the procedure without any adrenal gland manipulation and therefore no risk of catecholamines, hormones or cancer cells spread. It is possible to perform associated procedures and to explore the contralateral gland without changing the patient's position and conversion to open surgery, if required, is straightforward. In case of right-sided lesions, early division of the adrenal vein gains space between the adrenal gland and the inferior vena cava in order to facilitate gland mobilization. In case of left-sided lesions, the submesocolic route provides the most direct access to the inferior adrenal vein, as compared to TLA, without any mobilization of the left colonic flexure or of the splenopancreatic complex, reducing the operative time and the risk of organ damage (3,10). The rare occurrence of postoperative wandering spleen and acute gastric volvulus from extensive mobilization of the splenopancreatic complex requiring delayed open surgical treatment, as reported by Corcione *et al.* (14) or of the not negligible occurrence of left pneumothorax requiring thoracic drainage, as reported also by Coste *et al.* as well as by other authors (15,16), are complications inherent to TLA that are very unusual after other types of approach.

Coste *et al.* also provide the important data that blood transfusion, conversion to open surgery, intraoperative incidents and lesion diameter more than 4.5 cm are associated with an increase of the overall complication rate (1). As reported in the literature, lesion size of more than 4 cm is associated with increased risk of malignancy and this must be considered in the choice of the surgical strategy before the intervention (17).

Finally, the greatest experience of the senior surgeons in the article by Coste *et al.* seems to be associated with an increase of postoperative complications. This can be explained by the fact that a randomization to young or senior surgeon has not been done and consequently the more difficult cases are treated by senior surgeons. However, in accordance to Coste *et al.*, it is important to underline that LA can be performed by junior surgeons under adequate supervision by a senior surgeon, without increase of intra- and postoperative complications or

conversion to laparotomy.

## Acknowledgments

*Funding:* None.

## Footnote

*Provenance and Peer Review:* This article was commissioned by the editorial office, *Annals of Laparoscopic and Endoscopic Surgery*. The article did not undergo external peer review.

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ales.2018.04.01>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

*Open Access Statement:* This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

## References

1. Coste T, Caiazzo R, Torres F, et al. Laparoscopic adrenalectomy by transabdominal lateral approach: 20 years of experience. *Surg Endosc* 2017;31:2743-51.
2. Gagner M, Lacroix A, Bolté E. Laparoscopic adrenalectomy in Cushing's syndrome and pheochromocytoma. *N Engl J Med* 1992;327:1033.
3. Paganini AM, Guerrieri M, Balla A, et al. Management of adrenal incidentaloma by laparoscopic transperitoneal anterior and submesocolic approach. *Langenbecks Arch Surg* 2016;401:71-9.
4. Chen H, Sippel RS, O'Dorisio MS, et al. The North American Neuroendocrine Tumor Society consensus guideline for the diagnosis and management of neuroendocrine tumors: pheochromocytoma,

- paraganglioma, and medullary thyroid cancer. *Pancreas* 2010;39:775-83.
5. Constantinides VA, Christakis I, Touska P, et al. Systematic review and meta-analysis of retroperitoneoscopic versus laparoscopic adrenalectomy. *Br J Surg* 2012;99:1639-48.
  6. Mohammadi-Fallah MR, Mehdizadeh A, Badalzadeh A, et al. Comparison of transperitoneal versus retroperitoneal laparoscopic adrenalectomy in a prospective randomized study. *J Laparoendosc Adv Surg Tech A* 2013;23:362-6.
  7. Nigri G, Rosman AS, Petrucciani N, et al. Meta-analysis of trials comparing laparoscopic transperitoneal and retroperitoneal adrenalectomy. *Surgery* 2013;153:111-9.
  8. van Uitert A, d'Ancona FCH, Deinum J, et al. Evaluating the learning curve for retroperitoneoscopic adrenalectomy in a high-volume center for laparoscopic adrenal surgery. *Surg Endosc* 2017;31:2771-5.
  9. Vrieling OM, Wevers KP, Kist JW, et al. Laparoscopic anterior versus endoscopic posterior approach for adrenalectomy: a shift to a new golden standard? *Langenbecks Arch Surg* 2017;402:767-73.
  10. Paganini AM, Balla A, Guerrieri M, et al. Laparoscopic transperitoneal anterior adrenalectomy in pheochromocytoma: experience in 62 patients. *Surg Endosc* 2014;28:2683-9.
  11. Matsuda T, Murota T, Kawakita M. Transperitoneal anterior laparoscopic adrenalectomy: the easiest technique. *Biomed Pharmacother* 2000;54 Suppl 1:157s-60s.
  12. Linos DA, Stylopoulos N, Boukis M, et al. Anterior, posterior, or laparoscopic approach for the management of adrenal diseases? *Am J Surg* 1997;173:120-5.
  13. Walz MK, Alesina PF, Wenger FA, et al. Posterior retroperitoneoscopic adrenalectomy--results of 560 procedures in 520 patients. *Surgery* 2006;140:943-8; discussion 948-50.
  14. Corcione F, Tricarico F, Barbaros U, et al. Gastric volvulus after laparoscopic left adrenalectomy: case report. *Surg Laparosc Endosc Percutan Tech* 2008;18:207-8.
  15. Piccoli M, De Luca GM, Pasculli A, et al. Laparoscopic transperitoneal left adrenalectomy and wandering spleen risk. *JLS* 2014;18.
  16. Henry JF, Defechereux T, Raffaelli M, et al. Complications of laparoscopic adrenalectomy: results of 169 consecutive procedures. *World J Surg* 2000;24:1342-6.
  17. Grumbach MM, Biller BM, Braunstein GD, et al. Management of the clinically inapparent adrenal mass ("incidentaloma"). *Ann Intern Med* 2003;138:424-9.

doi: 10.21037/ales.2018.04.01

**Cite this article as:** Balla A, Quaresima S, Paganini AM. Laparoscopic adrenalectomy: is the choice of the best surgical approach a resolved issue? *Ann Laparosc Endosc Surg* 2018;3:36.