



Correspondence article to “Evaluating the learning curve for posterior retroperitoneoscopic adrenalectomy”

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As discussed by Li *et al.*, retroperitoneoscopic adrenalectomy (RPA) is becoming the new “gold standard” for small (<7 cm) benign adrenal tumors in patients with BMI <35 kg/m². RPA has become increasingly popular due to recent publications that show favorable perioperative outcomes compared to the transabdominal laparoscopic approach (TLA) (1). Although RPA requires a different cognitive orientation to relevant anatomical structures, multiple studies have shown that through proctoring by an expert the learning curve is short (2-4). The learning curve seems comparable and maybe even shorter than the learning curve of TLA, although a strict comparison cannot be made due to the previous laparoscopic experience all surgeons already had in TLA (5,6). TLA has already proven to be safely imbedded in the training of surgical residents (7). Recently, a systematic review and network meta-analysis was performed by Heger *et al.* comparing different approaches of adrenal surgery, including open, laparoscopic, retroperitoneoscopic and robotic (8). The results regarding length of hospital stay, operating time, complications and blood loss were compared between mostly controlled clinical trials instead of randomized controlled trials. In this review it is shown that RPA is superior in operating time and length of hospital stay compared to TLA. Furthermore, with the robotic technique a shorter hospital stay was seen compared to the TLA. When examining the robotic technique more closely, a recent RCT by Kahramangil *et al.* comparing the robotic transabdominal approach (RTA) and retroperitoneoscopic approach (RRA) has shown that RRA is superior to RTA regarding operating time (136.3±38.7

versus 154.6±48.4 min; P=0.005) (9). Overall, the length of hospital stay was short (median 1 day).

The study of Cabalag *et al.* shows an impressive short learning curve of 15 cases for RPA (3). This could be explained by the intensive proctoring in the first cases or the experience and skills of the surgeon. Compared to our study results several factors like patient selection explain the short learning curve. First of all, a higher number of female patients (66%) was reported compared to our study (48%). This supports our view that female patients have a favorable anatomy and less hostile fat around the kidney. Further, the number of pheochromocytoma patients was lower (16% versus 24%, respectively), which may have influenced the duration of surgery. Also, in the first 20 patients of our study, five pheochromocytoma patients were included. The volume of patients operated on was higher (50 patients in 28 months versus 113 patients in 94 months, respectively), which could have resulted in a short learning curve. The length of hospital stay was relatively short (median 1 day) with eight same-day discharges. This reflects patient selection with endocrinologically less complex cases. In the study by Bakkar *et al.* (2) an even shorter learning curve is shown, possibly a result of a very strict patient selection in the first 14 cases based on tumor size, pathology, left sided surgery, a high percentage of female patients (64%) and no pheochromocytomas.

Adequate patient selection is the key to improving the results of adrenal surgery in the near future. TLA or even RTA, which provides better exposure and working space, should be the techniques of choice when dealing with large

or malignant tumors to prevent surgical complications and tumor spill. RPA or RRA should be the techniques of choice with small, benign adrenal tumors, due to short operating time and length of hospital stay. Also in bilateral tumors posterior RPA seems superior, since the patients need to be positioned only once. Although robotic surgery provides three-dimensional vision, better instrument control and more magnification, it is still associated with a longer duration of surgery and higher costs compared to conventional laparoscopy. However, due to increasing popularity and availability of robotic surgery this might change in the future. For the very large and malignant tumors there is always a place for open surgery and perhaps for robotics. Since TLA is already embedded in resident training, this could also be the case for RPA when adopting strict proctoring and adequate patient selection.

Finally, upcoming techniques like perioperative fluorescence imaging may have a role in adrenal surgery (10). However, these novelties need further evaluation to determine their influence on perioperative outcome.

In conclusion, RPA is more and more becoming the “gold standard” in adrenal surgery. The article by Li *et al.* gives an excellent overview of the current literature regarding retroperitoneal adrenalectomy and the associated learning curve. The study of Bakkar *et al.* shows that strict patient selection can further reduce the learning curve (2). Future research will hopefully focus on optimizing the different surgical techniques for adrenal diseases with an individually chosen approach without compromising patient safety.

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to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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