Case Study of the Month

Laparo-Endoscopic Single-Site Left Transperitoneal Adrenalectomy

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1. Case report

A 53-yr-old, hypertensive woman presented with only irradiated left-flank abdominal pain and unremarkable previous medical and surgical histories. On examination, she was overweight (body mass index: 29.7), haemodynamically stable with an angiotensin-converting enzyme inhibitor, and without signs of acute abdomen or renal pain. An ultrasonography, a contrast-enhanced abdominal computed tomography scan, and a magnetic resonance imaging scan showed a left 4\textsuperscript{1/2}–4 cm adrenal round mass (Fig. 1).

There was no family history of pheochromocytoma or other familial syndromes. An endocrinologic work-up excluded a functional adenoma (24-h urine catecholamines, metanephrines, vanillylmandelic acid, serum cortisol, and dehydroepiandrosterone levels were normal).

Laparo-endoscopic single-site (LESS) adrenalectomy with a TriPort trocar was proposed and consented to, given no prior abdominal surgery and low suspicion of malignancy.

1.1. Surgery

The patient was placed in the 45–60° modified flank position with the operating table minimally flexed. A TriPort trocar was used (Fig. 2A). To deploy it, we followed the described technique \cite{1}. The inner ring was preloaded onto an unbladed introducer (Fig. 2B), which was inserted through a 10-mm bag. A TriPort adrenalectomy was successfully completed in 240 min (blood loss: 20 ml). The postoperative period was uneventful (discharge within 3 d). In our opinion, the TriPort adrenalectomy is feasible and safe, with favourable peroperative and short-term outcomes and a delighted patient at the 8-mo follow-up.

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cinching down of the external rings drew the inner and outer rings together on either side of the abdominal wall, thereby creating tension in the sleeve between the rings that retracted the edges of the abdominal wall apart. The rings created an effective seal, preventing gas leakage and achieving a 14-mm Hg pneumoperitoneum (Fig. 2F). The fog was evacuated by alternative disconnection of the gas tube and laparoscopic aspirator.

Using a rigid 10-mm, 30° lens laparoscope (Karl Storz, Tuttlingen, Germany), the peritoneal cavity was examined, and we confirmed that nothing was unusual. The surgical strategy followed the conventional left transperitoneal adrenalectomy [2]. Once the Toldt white line was incised with a combination (Fig. 3) of a 5-mm articulable dissector (Roticulator Endodissect, Covidien, Norwalk, CT, USA; in the left hand) and 5-mm monopolar articulable scissors (Roticulator Enndomini-shears, Covidien, Norwalk, CT, USA; in the right hand), the junction of the colonic mesentery and Gerota’s fascia was identified. This plane was then dissected to the renal vein. The adrenal veins were identified, doubly clipped with 5-mm Hem-O-Lok clips (Teleflex Medical, Research Triangle Park, NC, USA), and divided. A 5-mm harmonic scalpel (Ethicon Endosurgery, Cincinnati, OH, USA; in the right hand) was also used to complete the adrenal dissection. The specimen was retrieved by inserting a 10-mm bag through the central 10-mm channel using a rigid 5-mm, 30° optic (Karl Storz, Tuttlingen, Germany) in a 5-mm channel. The specimen

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Fig. 1 – Contrast-enhanced (A) computed tomography scan and (B) magnetic resonance imaging scan of the left adrenal mass.

Fig. 2 – Sequential pictures of deployment of the TriPort. (A) The TriPort and the introducer. (B) The TriPort is preloaded into the introducer. (C) The introducer is inserted into the abdomen through a minilaparotomy. (D) The inner ring is released from the introducer. (E) Pulling on the sleeve in the outward direction, the abdominal wall is “entrapped” between the inner and external ring, and then the excess of sleeve is removed. (F) The deployed TriPort device during transperitoneal adrenalectomy.
was extracted by removing the bag and the trocar simultaneously, with the external ring disconnected and the inner one released. A tubular drain was left in situ through the incision. The operative time was 240 min (blood loss: 20 ml).

1.2. Outcomes

Postoperative recovery was uneventful. The patient required ketorolac (60 mg intramuscularly) on the first postoperative day, started the oral intake on the second day, and was discharged on the third day. She complained of a Visual Analogue Scale pain score of 5 on first postoperative day but reported a score of 1 on discharge.

The pathologic examination confirmed a 4-cm nonfunctioning adenoma of the adrenal (maximum longitudinal axis: 6 cm; weight: 66 g). The surgeon experienced severe difficulties in handling the instruments due to internal and external clashing and parallel driving. At the 8-mo follow-up, the patient felt good and was delighted with her scar (Fig. 4).

2. Discussion

Adrenal surgery remains technically demanding [3,4]. Different techniques and devices have been used to decrease morbidity [5,6]. Already used in complex procedures [7–9], the TriPort allowed us to realize the adrenalectomy through a small incision. To the best of our knowledge, no TriPort adrenalectomy has been published. The unique case of single-port-access adrenalectomy, already described, is a single-incision standard-trocar laparoscopy without any multilumen device [10]. In this paper, we describe a TriPort transperitoneal adrenalectomy, confirming its safety and feasibility. All postoperative variables indicated a favourable recovery, suggesting that this procedure is not far from standard laparoscopic adrenalectomies [2] for small adrenal masses. Although the surgeon faced several difficulties with reduced triangulation, fog evacuation, and clashing of the instruments, the procedure was technically successful, although it took longer than its traditional counterparts (200 min vs 130 min) [2]. The use of straight instruments placed into the multilumen trocar obliges the surgeon to operate in parallel or converging, which we refer to as chopstick surgery (Fig. 3). To facilitate the surgical act, 5-mm articulable instruments (with 80° articulation and 360° jaw rotation) were used, which afforded greater mobility over standard equipment. Specifically, angling the tip of the instruments helped us during Toldt white line incision and posterior adrenal surface dissection.

We know that there is room for improvement in LESS equipment (eg, the new TriPort has a smoke evacuation channel), and we will have assisted in the evolving development of flexible cameras and bent-rigid or articulable devices. Nevertheless, we demonstrated that a LESS adrenalectomy can be performed by combining standard equipment and articulable instruments.

This report represents the first case of TriPort adrenalectomy, hindering any general conclusion. Looking at data from standard laparoscopy [2], we did not observe substantial differences in terms of overall blood loss (50–1500 cm³) and hospital stay (mean: 5.1 d; range: 2–9).
This underscores how this new approach could be considered possible not only in the hands of laparoscopic specialists but also in the hands of an experienced and well-practiced urologist who regularly uses laparoscopic techniques.

We report the first case of an adrenalectomy using a single multilumen port, and we think that continuing advances in single-port technology will improve this surgery in the near future, probably replacing traditional laparoscopy.

Conflicts of interest: The authors have nothing to disclose.

References

EU-ACME question
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Question:

The adrenalectomy should be performed:
A. By open or robotic approach
B. Only in young healthy subjects
C. Preferably by a mini-invasive approach
D. Only for nonfunctioning adenomas