

Homemade Single-port Laparoscopic Retroperitoneal Adrenalectomy

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To the Editor: Laparoendoscopic single-site surgery (LESS) has been widely used for various urologic diseases in order to improve safety, outcomes, and cosmesis, and to further reduce invasiveness.^[1] Here, we reported our initial experience with laparoendoscopic single-site retroperitoneal partial adrenalectomy using a homemade single-port device in a municipal hospital.

Totally, 18 patients (seven men and 11 women, aged 31–76 years, average age: 56 years) with adrenal tumors were enrolled in this study from June 2011 to June 2014. Laboratory tests including urine cortisol, serum cortisol, sodium, potassium, renin, angiotensin, aldosterone, and catecholamine were performed to assess the nature of pathological changes. The patients' height, weight, and body mass index were measured. All patients were diagnosed and localized before operation using multiple devices including ultrasound, computed tomography, magnetic resonance imaging. Ten lesions localized in the left side, and eight lesions localized in the right side. The adrenal tumor diameter ranged from 1.1 to 3.5 cm with an average of 2.1 cm. All patients underwent laparoscopic retroperitoneal adrenalectomy using homemade single-port LESS.

A homemade single-port device was introduced to laparoscopic retroperitoneal adrenalectomy. The device was made from #18 Foley's urine tube by bending the front side of the tube to a ring with about 6 cm in diameter and cutting off the rest of catheter. The ring was wrapped by sterile latex gloves packages rings up to the thumb roots of 5 cm and was fixed with sterile adhesive tape. Since the ring can fix the single-port device on the abdominal muscle and fascia, all finger channels can be used for surgical instruments operations (Olympus A50002A Electronic Laparoscopic, Olympus UHI-3 aerator, Olympus OTV-S7/Olympus CLV-S40 Image acquisition system and traditional hard laparoscopic instruments from Olympus Inc., Japan, LigaSure from Valleylab Co., USA, Hem-o-lok Clip and Titanium Clip from Weck Co., USA).

Through a muscle-splitting incision (about 2.5–3.0 cm) in the midaxillary line, the retroperitoneal space was entered. During insertion of the homemade single-port device, the ring was fixed lower than the muscle layer. Two sets of 10-mm puncture

trocars and one 5-mm puncture trocar were placed and were fixed by ligature to ensure the tightness after the tip of the finger of sterile gloves cut open. Carbon dioxide insufflated to maintain an intra-abdominal pressure of 15 mmHg. Then, through the other 10 mm and the 5 mm trocar, LigaSure or ultrasonic knife and dissecting instruments were introduced. The adrenal adenomas can be found within the triangle among the upper pole of the kidney, peritoneal and diaphragm when the renal fascia was dissected. After operations, the patients were followed up by 6–24 months.

All cases were successfully performed without conversion and traditional laparoscopic surgery. The surgical operation time ranged 28–120 min (mean 67.5 ± 31.4 min). The amount of bleeding was 5–80 ml, with a mean of 38.6 ± 20.9 ml. The mean hospital stay after the operations ranged from 4 days to 7 days (average 5.9 days). There were no severe complications in the group including great vessel injuries or other complications.

The first case of nephrectomy using single-port laparoscopy was reported in retroperitoneal single-port laparoscopic surgery in urology.^[2] Single-port surgery has been utilized for all kinds of intra-abdominal surgeries such as renal cyst unroofing and ureteral incision nephrolithotomy.^[3,4] The laparoscopy has been widely used in the treatment of adrenal diseases because of its remarkable benefits and adopted as the gold standard for adrenal resection. The retroperitoneal laparoscopy can directly find the hidden adrenal glands with clear surgical vision and excellent view. It is helpful to reduce the occurrence of intraoperative complications and blood loss.

In this study, we developed single-port laparoscopy using disposable sterile latex gloves based on multi-port laparoscopy. According to the requirements of the operation, Trocar was prepared and fixed with suture ligation. The urine tubes made of aprons in glove cuffs and fix the ring on abdominal muscle of fascia lumbar incision, filling the CO₂, then pulling gloves at the same time makes them close to the incision, so leakage does not occur. The single-port laparoscopy based on conventional laparoscopic system and related equipment, it is easy to make and convenient to use. We have to choose a camera with light fiber integrated laparoscopy because collisions among devices occurred often. The surgeons should operate devices in the same field of view with parallel operation mode, try to make the lens barrel localized between the two instruments and avoid them

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cross with each other. However, the single-port laparoscopic approach is not recommended for large adrenal neoplasm (>6 cm) because the smaller space will result in collisions among operation equipment. In this study, 18 cases were performed using homemade single-port laparoscopic adrenal gland neoplasm resection and single-port laparoscopy is beneficial for smaller tumors without increase of operation difficulty while reducing trauma at the same time. The average operation time was only 67.5 min and an average of 38.6 ml intraoperative blood loss. There are no severe postoperative and intraoperative complications, which reflected that this operation is safe and feasible.

In summary, the laparoscopic adrenal gland neoplasm resection has gradually replaced the status of the open surgery. Moreover, homemade single-port laparoscopic adrenal gland neoplasm resection can be handled by experienced surgeons. Not only the pain and trauma in patients can be reduced, but also the hospital stay does not increase.

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