Case Study of the Month

Hybrid Transvaginal Nephrectomy

Aníbal W. Branco a, Alcides J. Branco Filho a, William Kondo a,*, Rafael W. Noda a, Nilton Kawahara b, Affonso A.H. Camargo a, Luciano C. Stunitz a, Jarbas Valente a, Marlon Rangel a

a Cruz Vermelha Hospital, Curitiba, Paraná, PR – Brazil
b Clinics Hospital of FMUSP, São Paulo, SP – Brazil

1. Case report

A 23-yr-old woman presented with right flank pain and recurrent urinary tract infection due to a nonfunctional right kidney. Our hospital's Ethical Board authorized the procedure after reviewing the case and the experimental nature of the procedure was explained and discussed with the patient.

Under general anesthesia, she was placed in a dorsal lithotomy position. Orogastric and Foley catheters were inserted and a prophylactic antibiotic (cefazolin) was administered. The surgical field, including the vaginal cavity, was prepared with povidone iodine solution.

As soon as the carbon dioxide pneumoperitoneum was achieved by a Veress needle placed in the umbilicus, a 5-mm laparoscopic port was positioned in the same site. The intra-abdominal pressure was maintained between 12 and 14 mm Hg and vaginal access was facilitated as the gas filled and distended the cul-de-sac. Vaginal walls were retracted and the cervix was anteriorly pulled to expose the posterior fornix. The vaginal mucosa in the posterior cul-de-sac was opened by a longitudinal 1.5-cm incision and the abdominal cavity was entered (Fig. 1A and B).

The double-channel flexible endoscope (Karl Storz Endoskope, Tuttlingen, Germany) was introduced into the peritoneal cavity (Fig. 1C) and a uterine manipulator mobilized the uterus anteriorly exposing the posterior uterine wall, the cul-de-sac, and the rectum. The flexible tip of the device was
turned 180° to face the vaginal dome and rule out any possible bleeding and visceral injury. She was then placed in a 45° left lateral position and her chest and lower limbs were secured to the table.

The abdominal cavity was carefully inspected and one additional 5-mm trocar was placed just below the xyphoid (Fig. 1D). Dissection was performed under endoscopic view, with the help of endoscopic instruments, following the steps of a regular laparoscopic nephrectomy. The line of Toldt was incised and the right colon medially mobilized (Fig. 2A and B) until the psoas muscle became visible. The ureter was identified and isolated from the adjacent structures. Its upper third was then lifted...
by an endoscopic grasping forceps (Olympus, Tokyo, Japan) exposing the renal hilum (Fig. 2C). Dissection of the hilum revealed one renal artery and three renal veins, which extended the time spent in this step of the procedure. Renal veins were ligated with Hem-o-lok® clips (Weck Closure Systems, Research Triangle Park, NC, USA; Fig. 2D) and sectioned followed by ligation of the renal artery by the same device (Fig. 3A). The artery was sectioned and the kidney was freed from the right adrenal and the abdominal wall. The ureter was clipped and divided and the surgical specimen ready for removal.

A polypectomy snare (Olympus) was used to hold the kidney (Fig. 3B). Colpotomy was extended and the kidney was retrieved (Fig. 3C). The vaginal mucosa was closed with a running 2-0 absorbable suture. Total procedure time was 170 min and estimated blood loss was 350 cc (Fig. 3D).

The patient was given a regular diet the following morning. Postoperative pain control was achieved with intravenous nonopioid analgesics (1 g dypirone 4 times daily). Hospital outcome was uneventful and the patient was discharged on the first postoperative day, only 12 h after the last skin suture was placed. She was strongly advised to avoid vaginal intercourse in the following 40 d.

The patient returned after 7 d for a routine follow-up consultation and expressed neither abdominal nor genital complaints. She claimed she was able to return to her regular activities on postoperative day 3. Pathologic analysis revealed chronic pyelonephritis and renal atrophy.

2. Discussion

The first natural orifice transluminal endoscopic surgery (NOTES) series was reported in 2004 by Kalloo et al [1] and consisted of cases of transgastric liver biopsies. Following this publication, other investigators demonstrated the feasibility of transgastric ligation of fallopian tubes [2], cholecystectomy [3], cholecystogastric anastomosis [3], gastrojejunostomy [4], partial hysterectomy with oophorectomy [5], splenectomy [6], gastric reduction [7], and nephrectomy [8], all based on experimental porcine models.

On April 2, 2007, Marescaux and coworkers [9] reported the first “no scar” surgery in humans and called it “Operation Anubis.” It was a transvaginal cholecystectomy with a flexible endoscope coupled with a 2-mm needle port for gas instillation and abdominal pressure monitoring.

The acknowledged advantages of laparoscopy over open surgery have led minimally invasive surgeons to expect additional benefits of NOTES over laparoscopy: (1) lack of skin incisions; (2) reduced postoperative pain; (3) possibility of anesthesia other
than general; (4) preferable approach for obese patients and for those with conditions that affect the abdominal wall, such as scars, burns, and infections; (5) diminished risks of postoperative hernias; (6) easier access [10]; and (7) other aspects such as earlier recovery, reduced adhesion development, and shorter postoperative ileus.

The vagina has been considered a viable route for kidney retrieval following laparoscopic nephrectomies. This access allows improved cosmetic results and minimizes morbidity when compared to abdominal incision removals [11]. The present report demonstrates the feasibility of nephrectomy using NOTES in a patient, with the vaginal access not only for specimen extraction but also as a working port.

We experienced similar difficulties to the ones reported by Swain [10] in regard to holding and exposing intra-abdominal structures with the endoscopic instruments. This occurs because the flexible floppy tip of the conventional endoscope limits the control and the tension applied to the tissues. Although we were able to hold and lift structures with the endoscopic devices, delicate maneuvers like the dissection were not possible. There were also some difficulties related to the endoscope’s lateral view. Alternatives for better viewing, such as turning the monitor upside down and using a 30° 5-mm laparoscope through one of the ports, were necessary during some steps of the procedure.

The described technique certainly requires further development in the fields of scopes, instruments, and surgical expertise. Nevertheless, its use was feasible for groups with experience in both laparoscopic and endoscopic procedures. In the future, NOTES might be a real option for the treatment of renal and other urologic conditions. This novel technique may provide additional benefits related to postoperative pain, recovery, and cosmetic results even when compared to today’s minimally invasive procedures.

Conflicts of interest

The authors have nothing to disclose.

References


EU-ACME question

Please visit www.eu-acme.org/europeanurology to answer the below EU-ACME question on-line (the EU-ACME credits will be attributed automatically).

Question:

Laparoscopic surgery is a minimally invasive surgical technique that has progressively become the standard treatment for several benign and malignant renal conditions. However, the ultimate goal of minimally invasive surgery is to complete a procedure with no skin incisions (natural orifice transluminal endoscopic surgery [NOTES]). Is there any possible advantage of performing such a procedure?

A. No, this kind of procedure has only cosmetic advantages and the risks do not justify the benefits.
B. No, because NOTES still cannot be applied to urologic procedures.
C. No, because laparoscopy is still in development in the urologic field and urologists are not prepared to a new technology like that.
D. Proponents of no-scar surgery expect additional benefits of NOTES over laparoscopy such as lack of skin incisions, reduced post-operative pain, possibility of anesthesia other than general, diminished risks of postoperative hernias, and easier access, among others.

