Robotic-assisted versus laparoscopic living donor nephrectomy: a 12-step comparison of surgical technique

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Abstract: V8-04
Introduction and Objectives
Laparoscopic donor nephrectomy (LDN) has gained wide acceptance among surgeons and donors due to better short-term donor morbidity compared to the open approach without compromising graft outcome. The first robotic-assisted laparoscopic donor nephrectomy (RDN) was reported in 2002. A recent randomized comparative study reported less postoperative pain, less analgesic requirement, and shorter hospital stay with RDN versus LDN. In this video, we compare the operative technique of RDN vs. LDN at our institution at twelve critical steps of the procedure.

Methods
The 12 steps include: 1. Medial reflection of descending colon, 2. Complete mobilization of spleen, 3. Exposure of gonadal vessel and renal vein, 4. Ligation of adrenal, gonadal, and lumbar veins, 5. Mobilization of kidney laterally and posteriorly, 6. Dissection of adrenal off upper pole/superior mobilization, 7. Dissection of renal hilum, 8. Medial rotation of kidney along hilum and posterior hilar dissection, 9. Mobilization and ligation of distal ureter, 10. Preparation for extraction, 11. Ligation of renal artery and vein, and 12. Extraction of kidney. Our case series of RDN were then compared to our historical institutional LDN case series as previously reported in a 2009 manuscript.

Results
LDN utilizes fenestrated forceps in the left hand and Harmonic Ace shears in the right, while RDN utilizes bipolar precise forceps on the left arm and monopolar cutting scissors on the right. Notable differences also occur at Step 11, when ligation of the renal artery and vein is performed by the bedside surgeon in RDN versus by the primary surgeon in LDN, and Step 12, when LDN involves kidney extraction via a hand-assist device, while RDN utilizes a specimen bag introduced through the assistant port with extraction through a Pfannenstiel incision. A preliminary comparison of 512 historical LDN cases versus 17 RDN cases reveals RDN has a lower intraoperative estimated blood loss, but similar operative time, warm ischemia time, length of stay, rates of transfusion, and conversion rate versus LDN.

Conclusions
We outline several differences in operative technique between RDN and LDN during ligation of the renal hilum and extraction of the kidney. Short-term outcomes appear similar between the two approaches, with the exception of significantly less estimated blood loss in RDN.