Indocyanine green-guided robotic ureteroneocystostomy

Yanada B.A., Dias B.H., Zargar H.
Western Health, Dept. of Urology, Melbourne, Australia

Introduction & Objectives: Despite reports suggesting that robot-assisted ureteral reconstructions (RURs) are feasible and safe, the procedure remains technically challenging, particularly when attempting to identify the ureter in the setting of periureteral inflammation, which can disrupt dissection planes and cause fibrotic ureteral encasement. In the robotic setting, the surgeon relies on visual cues to identify the ureter, in the absence of tactile feedback. A novel method to accurately identify the ureter during RURs is to utilise antegrade intraureteral injection of indocyanine green (ICG). ICG is a dye that illuminates under near-infrared fluorescence. The use of intraureteral ICG allows for prompt identification of and progressive dissection of the ureter by the surgeon, reducing the risks of intraoperative vascular and bowel injuries. Its use serves other purposes such as real-time localisation of ureteral stenosis. The purpose of the video is to illustrate the use of intraureteral ICG during robotic ureteroneocystostomy.

Materials & Methods: The patient is a 67-year gentleman who underwent robotic radical prostatectomy for high volume ISUP Grade 3 prostate cancer. His preoperative prostate MRI and PSMA PET scan confirmed disease limited to the prostate gland. The patient developed pelvic pain and a high drain output on postoperative day 1, which prompted a CT intravenous pyelogram. This demonstrated a bilateral duplex ureteral system with obstructed right upper pole moiety. A right upper pole nephrostomy was placed and nephrostogram revealed a cut-off at the level of the distal ureter draining the upper moiety of the right kidney. The patient was counselled and prepared for right-sided robotic ureteral reimplantation. The right-sided ureteral opening could not be identified with cystoscopy. ICG was injected pre-operatively into the right ureter via the percutaneous nephrostomy. The parietal peritoneum of the lateral pelvic wall was carefully dissected to expose both right ureters within the common sheath with ICG guidance. Once the ureters were exposed, minimal dissection of the injured ureter was carried out and a side-to-side anastomosis was made between the bladder and right ureter, with insertion of an intraluminal ureteral stent.

Results: Intraoperatively, the estimated blood loss was 30 millilitres, and the total operative time was 120 minutes. There were no intraoperative complications, and the patient was discharged on postoperative day 2 following pelvic drain tube removal. The step-by-step procedure detailed above, and in the video, demonstrate the steps needed to accurately identify the right ureter with ICG, dissect away the encasing fibrotic tissue, and perform a right ureteroneocystostomy.

Conclusions: The use of intraureteral ICG is an effective method in facilitating safe robot-assisted ureteral reconstructions, such as robotic ureteroneocystostomy.