VIDEOABSTRACT

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Robotic assisted partial nephrectomy with cold ischemia applying ice pieces and intraoperative frozen section evaluation of the mass: complete replication of open approach with advantages of minimally invasive surgery

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Key Words: robotic partial nephrectomy ‹› cold ischemia ‹› frozen section ‹› renal mass ‹› robotic surgery

With rapid dissemination of robotic surgical platforms in the world, robotic assisted partial nephrectomy (RAPN) is commonly used. Main criticisms of RAPN include inability to apply large ice pieces as it is done in open surgery to ensure cold ischemia and the inability to obtain intraoperative frozen section evaluation of the mass. Previous studies applied ice slush that was given through the 12–15 mm sized assistant port to obtain cold ischemia. However, due to the limited caliber of the assistant ports, it is not practical and easy to administer sufficient amount of ice slush. Although a small sized kidney mass can be taken out via a 12–15 mm assistant port for frozen section evaluation, a larger mass cannot be taken out similarly.

Case summary: A 64-year old female patient with known kidney failure was diagnosed with a 4.2x3.7x4.3 cm sized incidentally detected mass on the right kidney middle pole. Her preoperative serum creatinine was 2.01 mg/dl and the glomerular filtration rate (GFR) was 24 ml/min/1.73 m^2. A Da Vinci xi surgical robot (Intuitive Surgical) was used with 4-robotic arms and 2 assistant ports (10 mm/5 mm). Initially, a small sized Alexis port (Applied Medical) was inserted following a 4 cm skin incision located about 3-4 cm medial-inferior to the right anterior superior iliac spine. Robotic 1st-arm with a Prograsp forceps was inserted through it. Renal artery and vein were isolated and the mass was identified. Robotic 1st-arm was undocked, Alexis port cap was removed and two hand-made endobags (using surgical gloves) full of large ice pieces were introduced into the abdomen. Following docking of the 1st-arm, large ice pieces were easily placed around the kidney. A sterile sponge was placed over them to prevent their spillage. A laparoscopic bulldog clamp was applied on the artery. During a cold ischemia of 24 minutes, mass was excised (with internal & external renorraphy). Robotic 1st-arm was undocked, Alexis port cap was removed, mass was taken out and sent for frozen evaluation that confirmed negative surgical margins (SMs). Estimated blood loss was 200 cc. Overall console time including frozen evaluation was 3 hours. No perioperative and post-

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operative complications occurred. Final pathology showed clear cell renal cell carcinoma, 4.2x3.5x3.3 cm in size with clear SMs. Patient was discharged on postoperative day 3. Her preoperative 1st-month serum creatinine was 1.85 mg/dl and GFR was 28 ml/min/1.73 m^2.

Using a small sized Alexis port for RAPN is easy to apply, enables introducing large ice pieces into the abdomen to create cold ischemia similar to open surgery, gives the opportunity to take the excised mass out of the abdomen for intraoperative frozen evaluation. Robotic arm can conveniently go through the Alexis port without gas leakage that can be undocked & docked easily. This approach enables complete replication of open surgery with the additional benefits of robotic approach. In addition to patients with chronic renal failure, our technique with cold ischemia applying ice and frozen evaluation of the mass could be particularly useful on complex and larger sized masses where longer ischemia time is expected and solitary kidneys harbor a large mass.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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