

Chapter 11

Laparoscopic Surgery of the Upper Urinary Tract

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Name of Procedure

Laparoscopic Nephrectomy/Hemi-nephrectomy/Pyeloplasty.

Lay Description

Laparoscopic surgery of the upper urinary tract involves an operation using multiple small incisions to either [1]:

1. Remove a part of or entire kidney
2. Repair a kidney/ureteral abnormality.

Intended Benefit

To remove a portion of (partial, heminephrectomy) or a whole kidney (nephrectomy) if a patient is having issues with recurrent urine infections, pain, high blood pressure, tumors or compression of surrounding structures. A kidney may become blocked due to abnormal anatomy (ureteropelvic junction obstruction, UPJ-O) and require reconstruction (pyeloplasty) to resolve pain or kidney swelling.

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Why Use the Laparoscopic Approach?

Goals of laparoscopic surgery are to decrease the amount of scar tissue in the abdomen, improve cosmetic result with small incisions and decrease pain after the operation.

What Happens Before the Operation?

The hospital will contact the family on the time to arrive in the preoperative holding area the day of surgery. All regular medications, if any, should be taken before these surgeries. Children will need to stop eating and drinking for a specific amount of time before surgery, depending on the hospital policy.

Technique

Where Are the Incisions?

Depending on the side of the operation, multiple 1–2 cm incisions (cuts) are made on the abdomen or back for instruments and camera access (Fig. 11.1).

How Is the Surgery Performed?

Through the small incisions, laparoscopic ports are placed for access to the abdomen. The abdomen is filled with CO₂ gas for working space to clearly see the inside structures. Using a camera and TV screens, the kidney is identified. The kidney is either removed or reconstructed inside of the abdomen using laparoscopic instruments (Fig. 11.2a). Decision to repair or remove is dependent on the primary pathology.

The incisions are all closed with stitches that dissolve and covered with a surgical glue or bandages that fall off in few days. If a drain is left, a stitch is passed through the skin to keep it in place.

Postoperative Expected Course

It is expected that there will be minimal pain after the operation and children may require tylenol or small amounts of narcotic medications (such as morphine).

Fig. 11.1 Sites for right sided kidney surgery. One cut is made in the belly button for cosmesis and two other incisions are inserted for dissection



All children are allowed to have clear liquids immediately after surgery and can advance to solid foods as long as they feel well.

A Foley catheter is placed through the urethra (where urine comes out) into the opening of the bladder while the child is asleep. This is kept in place overnight to drain the bladder.

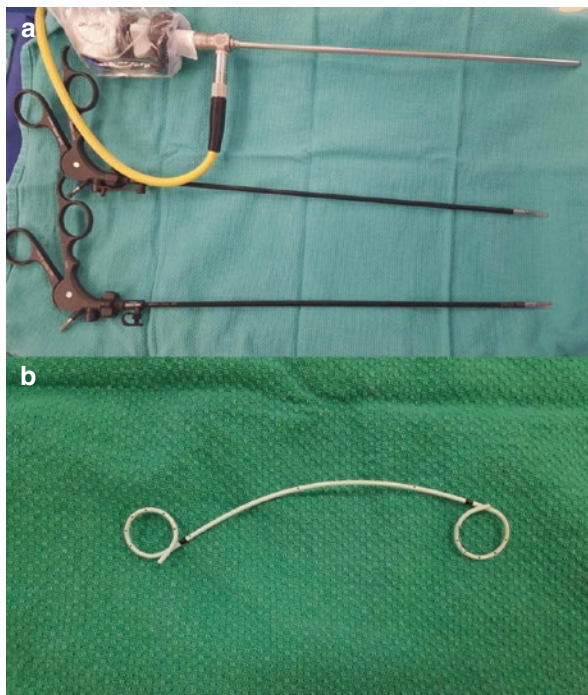
A stent will be placed in the kidney and down the ureter (the tube that drains the urine from the kidney to the bladder) after pyeloplasty surgeries (repair of blocked kidneys) (Fig. 11.2b). This stent is removed 2–6 weeks after the operation. Occasionally, a drain is left in place after the operation and stitched in place. This drain is removed after 5–7 days in the clinic depending on the amount of fluid drainage.

Most patients will be discharged from the hospital within 24–72 h. Some surgeons may prescribe antibiotics after surgery, especially if drains are left in place.

Follow Up

Patients will return to clinic or have a procedure while asleep to remove the stent for a pyeloplasty or any other drains.

Fig. 11.2 (a) Sample laparoscopic instruments and a camera. The camera is connected to a TV screen to see inside the abdomen. The instruments are used to work around the kidney. (b) Sample of the ureteral stent, tube to drain the urine from the kidney to the bladder



Follow up for all kidney surgery is 3 months after the operation with a kidney/bladder ultrasound to evaluate the results. After nephrectomy or heminephrectomy, it is important to follow up with primary care physicians for yearly blood pressure and kidney function evaluation.

If a kidney is removed for a tumor or cancer, follow up with the oncologist (cancer doctor) is important for continued long term evaluation based on the type of disease.

Success rates of laparoscopic pyeloplasty are 95–98 % [2].

Risk of Procedure/Complications

Though the surgical, nursing and anesthesia teams optimize every patient pre-operatively, every surgery still carries some risk [3].

Intraoperative

Laparoscopic surgery, when compared to open, can take a longer amount of time to complete.

During the surgery, other abdominal organs can be injured while operating on the kidney. Inside the abdomen, the kidney is surrounded by other organs (intestine and

liver/spleen) that sometimes need to be moved to gain access to the kidney. If damage occurs, every effort is made to repair the injury. When noticed in the surgery, the injuries are repaired during the same operation.

If a lot of bleeding is encountered, the surgery may require a larger incision and access to the abdomen with the traditional open technique [4].

Early

The kidney is made up of a solid portion (parenchyma) that makes urine from the body and a hollow portion (collecting system) that is used to collect and drain the urine. When kidney reconstruction is being performed and reconnecting the collecting system is being done then urine may leak from between the suture line (less than 2% of cases) [5]. Patients can develop pain, fevers, or nausea and vomiting as warning signs of such an occurrence. If this complication happens, a stent in the ureter or drain into the kidney (nephrostomy tube) is used to prevent urine from collecting inside the abdomen. Occasionally and prior to any major intervention such as a stent or tube in the kidney, a foley catheter is placed back into the bladder.

Late

Return of UPJ obstruction can occur in up to 7% of pyeloplasty cases due to scar formation [6]. We do not usually identify a specific reason for scarring but we think that urine leak around the suture line may increase the chances of scarring and blockage recurrence. If recurrence of the blockage occurs, patients can return to clinic with swelling of the kidney or symptoms of continued pain, similar to those experienced before the surgery.

The incisions may form abnormal scars leaving an unattractive appearance. These may require a fix with a small operation.

After removal of the kidney, it will be important to follow up with your family doctor to check regular blood pressure and kidney function.

Conclusions

Laparoscopic kidney and upper urinary tract surgery is a reasonable option to open surgery. It has the benefits of small scars and less post-operative pain, however can be a longer operation. Parents and patients should be evaluated by the surgeon to discuss all the available options to make an informed decision. Every patient should also be evaluated by all involved members of the medical team to ensure the child receives the best possible care.

References

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