

Endourological Management of Postoperative Urinary Leak Following Renal Surgery

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DESCRIPTION

Postoperative urinary leak is a complication that may occur after renal surgery, particularly following partial nephrectomy or complex reconstructive procedures involving the kidney. It results from disruption of the collecting system, leading to persistent drainage of urine into the perirenal space. This condition can delay recovery, increase risk of infection, and compromise renal function if not managed appropriately.

The incidence of urinary leakage is influenced by tumor complexity, depth of resection, duration of ischemia during surgery, and surgeon experience. Deep intrarenal tumors or those involving the collecting system are associated with a higher likelihood of postoperative urine extravasation. Intraoperative recognition and repair of collecting system entry significantly reduce the risk, but small undetected injuries may still manifest after surgery.

Clinical presentation typically includes persistent drainage from surgical drains, flank discomfort, fever in cases of infection, or fluid accumulation around the kidney identified on imaging. In some cases, the leak may be asymptomatic and detected only through routine postoperative surveillance imaging.

Diagnosis relies on radiological evaluation. Contrast-enhanced computed tomography with delayed excretory phases helps identify extravasation of urine and localize the site of leakage. Retrograde pyelography can provide more precise delineation when intervention is planned. Drain fluid creatinine measurement is also a simple and effective method to confirm urinary origin of postoperative fluid collections.

Initial management often involves internal urinary diversion. Placement of a ureteral stent allows urine to bypass the site of leakage, reducing pressure within the collecting system and promoting healing. In many cases, this alone is sufficient to allow spontaneous closure of the defect over time. Adequate drainage of perirenal collections using surgical or percutaneous drains may also be necessary.

Endoscopic evaluation may be performed in selected cases to assess the integrity of the collecting system. Flexible ureteroscopy allows

direct visualization of the renal pelvis and calyces, helping identify the exact location of injury when imaging findings are inconclusive. This can guide further management decisions.

Persistent urinary leakage beyond expected healing time may require additional intervention. Fibrin sealants or tissue adhesives have been used in selected cases to promote closure of small defects. These agents are typically applied endoscopically or percutaneously under imaging guidance.

Surgical revision is rarely required but may be considered in cases of large or non-healing defects. Re-exploration allows direct repair of the collecting system and reinforcement of the renal parenchyma. This approach is generally reserved for complex cases where less invasive measures have failed.

Complications associated with prolonged urinary leakage include infection, abscess formation, delayed wound healing, and loss of renal function. Early recognition and appropriate diversion are key factors in preventing these outcomes. In most cases, timely intervention results in complete resolution without long-term sequelae.

Advances in minimally invasive renal surgery have reduced the incidence of urinary leakage overall, but complex tumors continue to pose a challenge. Improved imaging, refined suturing techniques, and better energy devices have contributed to enhanced intraoperative control of collecting system injuries.

CONCLUSION

Postoperative urinary leak following renal surgery is a manageable complication when identified early and treated appropriately. Training and experience in renal surgery are important determinants of outcomes. Surgeons performing complex renal procedures must be proficient in identifying and repairing collecting system entry to minimize postoperative complications. Endourological techniques play a central role in both diagnosis and treatment, with most cases resolving through conservative measures involving urinary diversion and drainage.

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