Intraperitoneal urine leak following robot-assisted laparoscopic radical prostatectomy

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Section: Uroradiology & genital male imaging
Area of Interest: Urinary Tract / Bladder
Procedure: Complications
Procedure: Comparative studies
Imaging Technique: CT
Special Focus: Acute Case Type: Clinical Cases
Authors: Tonolini Massimo, Villa Federica
Patient: 68 years, male

Clinical History:

Oliguria, diffuse abdominal pain and distension without fever and peritonism, in a patient recently discharged from hospital, ten days after robot-assisted laparoscopic radical prostatectomy including iliac and obturator lymphadenectomy, with uneventful early postoperative course.
Laboratory evidence of severe renal function impairment (creatinine 3.2 mg/dl, 20 ml/min estimated glomerular filtration).

Imaging Findings:

Due to renal dysfunction, unenhanced multidetector CT (MDCT) upon admission (Fig. 1) showed abundant fluid-density peritoneal effusion. The urinary bladder appeared contracted with Foley catheter in place, minimal fluid was present anteriorly to the surgical bed without abnormal blood or abscess collections.
Conservative treatment including antibiotics and hydration allowed prompt improvement of renal function. Five days later, contrast-enhanced MDCT follow-up (Fig. 2) showed normally perfused kidneys with non-dilated, well-opacified collecting systems. Most peritoneal effusion had resolved, with mild right parietocolic and pelvic residual fluid.
Excretory phase acquisition revealed anterior vesico-urethral leak giving rise to a prevesical iodinated urine collection. Opacified urine was seen in the peritoneal cavity, thus demonstrating urinary origin of the peritoneal effusion.
The attending urologist chose to obviate surgical repair of vesico-urethral leak, and to position bilateral ureteral stents, which were left in place for 45 days. Subsequent course was uneventful, and the patient recovered well.

Discussion:

Worldwide, robot-assisted laparoscopic radical prostatectomy (RALRP) is increasingly accepted as the preferred minimally invasive treatment approach for localized prostate cancer. Recently reported experiences in major centres reported reduced perioperative morbidity and hospital stay with the RALRP technique, plus good long-term oncologic and functional results (continence and potency) [1-5].
Although considered a safe surgical procedure in experienced hands, RALRP is associated with major intra- and postoperative complications (Grade III or higher according to the clinical Clavien classification) in 5-8% of cases, that may require surgical reintervention. The commonest early RALRP-related complications include ileus, lymphocele, wound or surgical site infections, vesico-urethral anastomotic leakage (VUAL), and deep venous thrombosis. Very rare, rectal injury represents the most feared occurrence. In most patients, postoperative
complications are suspected on the basis of abdominal, pelvic and/or perineal pain, fever, oliguria, high output from drainage tube, laboratory signs of blood loss, or worsening renal function [1-4]. After RALRP, urine leak from VUAL is reported in 8.6-13.6% of cases, which is similar to the incidence observed in radical retropubic (open) prostatectomy (RRP). In the past, patients undergoing prostatectomy were routinely assessed with fluoroscopic voiding cystography to exclude contrast medium leak at cystography. Nowadays, early Foley catheter removal 7-10 days after RALRP without cystography is accepted practice [6, 7]. Thanks to delayed (excretory phase) acquisitions obtained 5 to 20 minutes after contrast medium administration, multidetector CT (MDCT)-urography including multiplanar reformations allows comprehensive visualization of presence, site, extent, and topography and extent of urine leaks, heralded by extraluminal opacified urine in the site of fluid collections on unenhanced scans [8].

In the majority of cases, VUAL after prostatectomy occurs extraperitoneally in the prevesical space of Retzius. Alternatively, the transperitoneal surgical access creates two potential routes of communication between the vesico-urethral anastomosis and the peritoneal cavity, respectively anterior and posterior to the bladder. Uniquely associated with RALRP (and not with RRP), the uncommon (0.7-1.4%) intraperitoneal urine leak is easily misdiagnosed as ascites or abscess if excretory-phase MDCT images are not acquired. As this case demonstrates, MDCT-urography is particularly suited to demonstrate intraperitoneal VUAL, whereas urine ascites has very limited conspicuity on fluoroscopic cystography. Alternatively, persistent suspicion of VUAL may be further investigated by means of MDCT-cystography. Treatment is usually conservative [6, 7].

Differential Diagnosis List: Intraperitoneal urine leak from vesico-urethral anastomosis after robotic laparoscopic prostatectomy, Ascites, Peritonitis, Surgical site infection – abscess, Surgical site bleeding, Extraperitoneal vesico-ureteral leak

Final Diagnosis: Intraperitoneal urine leak from vesico-urethral anastomosis after robotic laparoscopic prostatectomy

References:

Description: Unenhanced acquisition due to renal impairment show fluid-density diffuse peritoneal effusion (*). **Origin:** Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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The urinary bladder appears contracted with Foley catheter (arrowhead). Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Detail image of the surgical bed shows minimal fluid collections (*). The urinary bladder appears contracted with Foley catheter (arrowhead). Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: With improving renal function, contrast-enhanced acquisition shows normally perfused kidneys in the nephrographic phase (a), non-dilated opacified collecting systems in the excretory phase (b). **Origin:** Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: With improving renal function, contrast-enhanced acquisition shows normally perfused kidneys in the nephrographic phase (a), non-dilated opacified collecting systems in the excretory phase (b). Urinary bladder appears contracted with Foley catheter (arrowhead). Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Peritoneal effusion is mostly resolved, with the exception of minimal right parietocolic (*) and pelvic residual fluid. Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: In the surgical bed, minimal postoperative fluid (*) appears stable compared to previous unenhanced examination. Note urinary bladder still contracted with Foley catheter (arrowhead). Origin: Tonolini M, Department of Radiology, “Luigi Sacco" University Hospital – Milan (Italy)
**Description:** In the excretory phase, anterior vesico-urethral leak (thin arrow) is demonstrated, along with prevesical urine collection (arrow). Note urinary bladder still contracted with Foley catheter (arrowhead). **Origin:** Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: In the excretory phase, prevesical urinoma (arrow) from vesico-urethral leak is demonstrated by opacified urine. Note urinary bladder still contracted with Foley catheter (arrowhead).

Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: In the excretory phase, prevesical urinoma (arrow) from vesico-urethral leak is demonstrated by opacified urine. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** Opacified urine (arrows) is seen in the peritoneal cavity, demonstrating the urinary origin of the peritoneal effusion. **Origin:** Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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