MR imaging of male urethral injury

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Purpose: Urethral injury occurs as a result of blunt or penetrating trauma or iatrogenic cause. Retrograde urethrography (RUG) is a gold standard to evaluate disruption of involved urethra, however, MR imaging has been reported to be useful to assess the presence and extent of urethral injury and to predict the occurrence of complications. The purpose of this exhibit is to demonstrate various patterns of urethral injury and show the advantage of MR imaging in perioperative management.

Outline of Content:

1. Normal anatomy of urethra and adjacent structures, including anatomical variations.
2. Role of MR imaging in urethral injury: to evaluate extent of injury and presence of hematoma or fibrosis in addition to conventional RUG.
3. Sequence consideration: thin-slice T1- and T2-weighted imagings are essential. Contrast-enhanced T1-weighted image can visualize normal urethra. Sagittal or coronal plane is suitable to assess bulbar urethra and axial plane is best to evaluate membranous urethra.
4. Various types of urethral injury: anterior or posterior urethral injury. Type I-V classification (Goldman classification, table 1).
5. Surgical treatment of urethral injury and the relevance of MR findings.
6. Postoperative complications: hemorrhage, abscess formation, re-stenosis and fistulas.
7. Case presentation: from common cases of trauma to rare cases including complication of sex-transformation surgery.

Summary: MR imaging is useful to evaluate male urethral injury. Extent of injury and presence of hematoma or fibrosis are crucial preoperative information. Postoperative complications are also detectable.

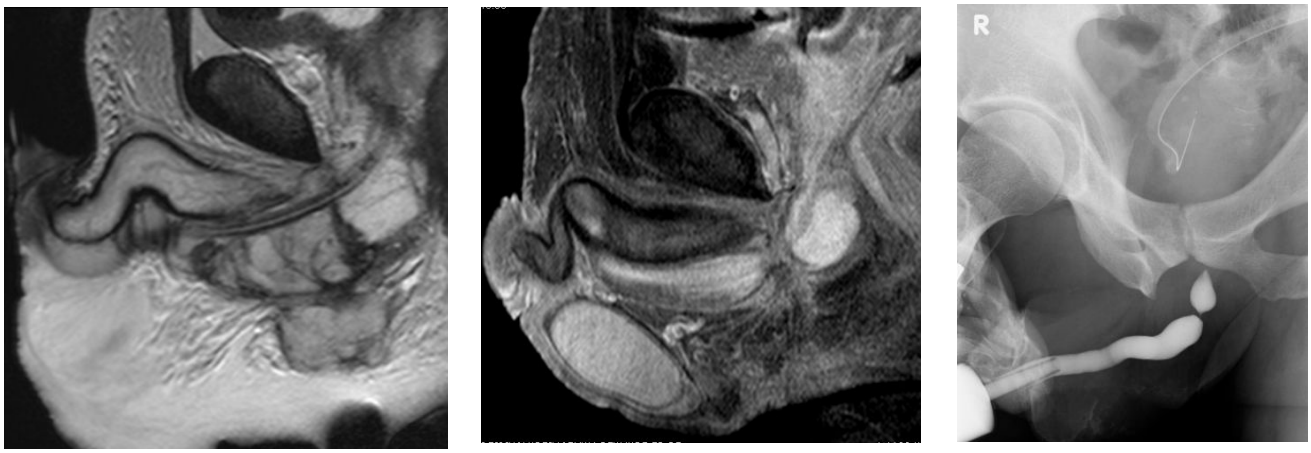

Figure 1. Sagittal T2-weighted (a) of acute phase injury (1 day after the injury). Hematoma surrounding bulbar urethra (white arrow). Sagittal contrast-enhanced T1-weighted image (b) of the same patient after 5 months show short-segment fibrosis. Retrograde urethrogram (c) also shows short-segment stricture.

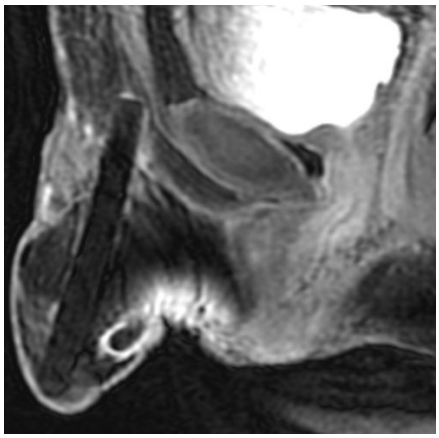

Figure 2. Contrast-enhanced sagittal T1-weighted image of urethrocutaneous fistula after sex-transformation surgery.

Class	Defenition
I	The posterior urethra stretched but intact
II	Rupture of the prostatomembranous urethra above the urogenital diaphragm
III	Partial or complete combined anterior/posterior urethral injury with disruption of the urogenital diaphragm
IV	Bladder injury extending into the urethra
IVA	Injury of the base of the bladder with periurethral extravasation simulating posterior urethral injury
V	Partial or complete pure anterior urethral injury

Table 1. Classification of urethral defects by Goldman and colleagues