Pelvic trauma with posterior urethral and bladder neck injury

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ABSTRACT

In general, injuries with urethral rupture occur in combination with polytraumatisms from automobile accidents, falls, or industrial accidents. Pubic diastasis, pubic rami fractures, or more complex pelvic fractures can be associated with urethral rupture. Posterior urethral trauma management is complex and requires extensive knowledge of anatomy and reconstructive techniques.

Patient is a 36-year-old man whose illness began eight hours prior to hospital admittance. Walking along the street he fell one and a half meters astride a metallic cylindrical structure. He presented with volume increase and persistent pain in the perineal and scrotal region that increased when walking and he had important mobility arch reduction in inferior members. Penile base had purplish coloring, scrotum was edematous, testes had normal appearance and were not painful when palpated, and there was perineal ecchymosis extending to inguinoscrotal region with “butterfly” image. Rectal examination revealed high prostate that was partially palpable, mobile, and painful. Laboratory studies were done as well as scrotal ultrasound and urethrocystography that identified posterior urethral injury together with pubic diastasis, sacroiliac articulation luxation, and coccygeal

RESUMEN

Las lesiones con rotura de la uretra ocurren por lo general en combinación con politraumatismos en accidentes automovilísticos, caídas o accidentes industriales. La diástasis del pubis, las fracturas localizadas de las ramas pubianas o las fracturas pélvicas más complejas, pueden asociarse con rotura de la uretra. El manejo del trauma de uretra posterior es complejo, requiere de un amplio conocimiento de la anatomía y técnicas reconstructivas.

Presentamos el caso de un varón de 36 años, que inició su padecimiento ocho horas previo a su ingreso, deambulando en la vía pública se cayó a horcajadas sobre una estructura metálica cilíndrica desde 1.5 metros de altura, presentó aumento de volumen y dolor persistente en la región perineal y escrotal que se incrementaba con la deambulación, así como disminución importante de los arcos de movilidad de los miembros inferiores, coloración violácea en la base del pene, escroto edematizado, testículos palpables, sin dolor y con características habituales, equimosis perineal con extensión a la región inguinoscrotal en imagen en mariposa. Tacto rectal: próstata alta, parcialmente palpable, móvil, dolorosa; se realizaron estudios de laboratorio además de ultrasonido escrotal y uretrocistografía. Se identificó lesión uretral posterior en combinación con diástasis del pubis, luxación de articulación sacro-iliaca y fractura del coxis. Se realizó exploración quirúrgica,
fracture. Surgical exploration revealed approximate 700 mL urinoma in retropubic space, pubic symphysis diastasis, bladder injury with approximate 1.5 cm tear in transverse neck, laceration in anterior wall of prostatic urethra, and pelvic wall injury with corpora cavernosa exposure. Bladder neck injury and injury to anterior wall of prostatic urethra were repaired with 0 chromic catgut with hemostatic sutures on the Santorini plexus. Anterograde 18 F Foley transurethral catheter was placed and cystostomy with 20 F Foley catheter was carried out.

Key words: Urethra, urethral injury, pelvic trauma, Mexico.

INTRODUCTION

Injuries due to urethral rupture generally occur in combination with polytraumatisms resulting from automobile accidents, falls, or industrial accidents. Pubic diastasis, localized fractures of the pubic rami, or more complex pelvic fractures can be associated with urethral rupture. Exposed saddle fractures or injuries causing rotation and vertical pelvic instability are associated with the highest risk for urological injury. Because the posterior urethra is attached to the urogenital diaphragm, as well as to puboprostatic ligaments, the bulbomembranous junction is more vulnerable to injury in pelvic fractures. Upon examination, urethral section becomes evident by the triad of blood in the meatus, micturition incapacity, and full bladder. When blood is seen at the urethral meatus level retrograde urethrogram should immediately be done to exclude urethral injury. Immediate placement of suprapubic tube is still standard treatment. More and more, patients with pelvic ring fracture undergo early orthopedic surgical fixation to reduce bleeding, improve cicatrization, and to speed up walking. In stable patients primary realignment of the injured zone can be attempted. There can be pelvic hematoma infection risk with prolonged endoscopic realignment attempts. When urethral catheter is removed after 4-6 weeks it is essential to leave a suprapubic catheter because the majority of patients develop posterior urethral stricture despite alignment. Catheter placement through a urethral rupture rarely lets the wound cicatrize without narrowing. Patients treated only with suprapubic tubes almost always develop complete stricture (96%) that requires posterior urethroplasty. Some authors defend open exploration with realignment in cases of high or unreachable bladder or rupture associated with bladder neck in men.

Objective: A clinical case of pelvic trauma associated with injury to the posterior urethra and bladder neck is presented here. The literature on initial management of this type of injury was also reviewed.

CASE PRESENTATION

Patient is a man in the fourth decade of life. Illness onset was 8 hours before hospital admittance. Walking along a public roadway, he fell one and a half meters astride a metallic cylindrical structure. He presented with volume increase and persistent pain in perineal and scrotal region that increased when walking and had important mobility arch reduction in inferior members. Physical examination revealed flat, soft, depressible, and painless abdomen with increase in volume and no signs of peritoneal irritation. Peristalsis was diminished with no urinary retention data. Suprapubic region presented with ecchymosis (Image 1). Uncircumcised penis presented with no apparent lesions, with increased volume and purplish coloring at base, and there was blood in urethral meatus (Image 2); there was painless scrotal edema, and testes were palpable with normal characteristics. Perineal ecchymosis was extended to inguinoscrotal region in butterfly image (Image 3). Rectal examination revealed high prostate that was partially palpable, mobile, and painful. Basic laboratory studies were done as well as scrotal ultrasound and urethrocytography that identified posterior urethral injury together with pubic diastasis, sacroiliac
diastasis, bladder injury with approximate 1.5 cm tear in transverse neck, laceration in anterior wall of prostatic urethra, and pelvic wall injury with corpora cavernosa exposure. Bladder neck injury and injury to anterior wall of prostatic urethra were repaired with 0 chromic catgut and hemostatic sutures were placed on the Santorini plexus. Anterograde 18 F Foley transurethral catheter was placed, along with cystostomy with 20 F Foley catheter. For counteropening, open reduction and external fixation were done and sling with orthopedic frame was placed.

**DISCUSSION**

The key element in initial management of urethral injury is early diagnosis, adequate injury evaluation, and appropriate surgical intervention to reduce the probability of developing comorbidities such as incontinence, impotence, and urethral strictures. Even though in some cases it is still controversial, posterior urethral injury due to contusive trauma is best managed with primary alignment (when possible). Urinary diversion is preferred in bulbar urethra damage resulting from straddle injuries and primary repair and urinary diversion is recommended in penetrating injuries.4

Urethral lesions are not very common. Most of them are related to contusive trauma due to pelvic fracture or straddle injuries. Initial urethral injury management is dependent on the degree and localization of injury, on hemodynamic stability, and on associated injuries.5 A proposed mechanism of this injury is thought to be due to cutting forces between the fixed prostate and articulation luxation, and coccygeal fracture (Image 4) with contrast medium leakage at level of prostatic urethra (Image 5) and partial flow of contrast medium towards bladder, along with cephalic displacement of bladder neck (Image 6).

Surgical exploration revealed approximate 700 mL urinoma in retropubic space, pubic symphysis

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**Image 1.** Volume increase observed in scrotum and penis, along with pelvic region ecchymosis.

**Image 2.** Blood in the urethral meatus.

**Image 3.** Butterfly-wing ecchymosis.
There are two scales commonly used in urethral injury classification from the American Association of Surgical Trauma (AAST) and Colapinto and McCallum. The first emphasizes the degree of disruption (partial vs complete) and the degree of urethral separation. The second emphasizes fascial anatomy and urethral injury localization in relation to the urogenital diaphragm.

Injury grade is correlated to clinical patient management. In other words, the recommendation for patients with Grade I is observation; Grades II and III can be managed conservatively with cystostomy and urethral catheterization; grades IV and V can require primary or delayed open or endoscopic management; and grade VI requires open management (Table 1). Injury grade is correlated to clinical patient management. In other words, the recommendation for patients with Grade I is observation; Grades II and III can be managed conservatively with cystostomy and urethral catheterization; grades IV and V can require primary or delayed open or endoscopic management; and grade VI requires open management (Table 1).

The most important sign is blood in the meatus, with 98% sensitivity for posterior urethral lesions and 75% sensitivity for anterior urethral lesions. When there is blood in the meatus, urethral catheterization should not be attempted until adequate images have been obtained. In relation to treatment time, it is typically classified as immediate when it is within the first 48 hours after injury; as primary delay when it is 2-14 days after injury, and as deferred when it is 3 or more months after injury. When there is pelvic contusion, bladder neck injury may occur, although it is rare. Primary injury repair reduces the probability of incontinence, infection, and fistula formation. Bladder neck repair is recommended in complete disruption/avulsion. This type of repair is technically demanding and should be delayed in unstable patients.

Posterior urethral trauma management is complex. It requires extensive knowledge of both anatomy and reconstructive techniques. The bulbomembranous urethra is the most vulnerable to injury. Prostatomembranous urethral injury can vary from simple narrowing (25%), partial rupture (25%), or complete section rupture (50%). Incidence of injury to
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Both the urethra and bladder is from 10-20% in men and these double injuries can be intraperitoneal (17-39%), extraperitoneal (56-78%), or both. Urethral lesions in themselves are not life-threatening except when they are associated with pelvic fractures or multiorgan injuries, as occurs in 27% of cases. The majority of patients develop posterior urethral stricture despite alignment. There is some degree of erectile dysfunction in 30-40% of patients with injury due to urethral traction.

Some patients that become impotent after the trauma spontaneously recover their erectile function 2 or 3 years later.

CONCLUSIONS

Opportune diagnosis and management of posterior urethral injury leads to a reduction of short-term and long-term complications. Urinary tract injury should be suspected in this type of trauma mechanism and suspicion should increase when there is blood in the meatus, micturition incapacity, or full bladder upon palpation.

BIBLIOGRAPHY