A Successful Repair of Ruptured Prostatic Part of Urethra : A case report

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ABSTRACT

Rupture of urethra is caused by either blunt trauma or by penetrating injuries perineal region. Blunt trauma of lower abdomen and pelvis may result in fracture of the anterior pelvic arch. In the patients with the pelvic fractures, 1.4 to 11% may suffer injury to the urethra. Falls crush injury from falling masonry after explosion or fires, or blows may all cause complete or partial transaction of the prostatic or membranous urethra. In these patients, the pubic rami or arch is most often fractured.

High velocity bullet wounds and fragments from mines were the chief cause of posterior urethral injury in war conditions. Mines have continued to be a source of perineal and scrotal wounds.

We had a case of gun shot injury to the right arm and followed by fall and the patient sustained blunt trauma perineal region. Urethroplasty performed 10 weeks after the injury resulted in a complete recovery of bladder function on 21st day of operation.

CASE-REPORT

A 25 years old serving soldier was heli-lifted from Rukum with history of bullet injury right arm and blunt injury perineum. On detailed asking, patient explained that he became unconscious when he got a bullet on his right arm and fell down from a height of 8 feets. The patient might have sustained blunt injury perineum while falling down. At the time of arrival to the emergency (Trauma Hall) patient had grossly distended bladder, multiple abrasions on both buttocks and the perineum. The scrotal haematoma and the blood at the meatus were obvious. An urethral rupture was suspected and a suprapubic catheterization using a trocar was performed at the trauma Hall relieves more than a liter of clear urine. There was an entry wound at the medial aspect of right arm and the bullet was palpable laterally, which was removed during wound debridment. After other resuscitative measures the patient was admitted for further investigation and management. The patient was perfectly alright prior to this accident and his past medical history was uneventful.

On physical examination he had pallor, a gun shot injury right arm with multiple abrasion gluteal and perineal region along with scrotal haematoma and penile oedema. Bruising in the perineum was obvious.

Radiological investigation of pelvic bone and right arm was performed which showed no fractures.

His hematological investigations showed haemoglobin of 5.4 gm% and other parameters were normal.

Retrograde urethrogram demonstrated rupture of urethra with extravasation of the contrast.

4 units of whole blood was transfused and planned for Urethroplasty after 12 weeks period.

Operative procedure:

The patient was put on lithotomy position. The membranous urethra was explored with a vertical perin incision. The proximal part of urethra was not approachable through this approach so retro pubic spac Retziz dissected. Prostate was mobilized. A metal bougie was introduced to the urethra transvasically prostate pushed down. Maintaining the pressure from the above helped to localize the proximal fibro and blunted end. A 20 Fr Bardia 3way catheter was pulled to the bladder and the balloon inflated.

By maintaining a gentle traction distally, the end-to-end anastomosis of the urethra with '000' vicryl performed. Perineal wound closed with a corrugated drain. Abdominal wound was closed placing a re pubic drain and suprapubic catheter.

The corrugated drain removed after 72 hours. The urethral catheter was removed after three weeks the suprapubic catheter clamped for 2 days and then removed after satisfactory voiding throu reconstructed urethra.

The patient was on antibiotic cover for three weeks.

Discussion

INTRODUCTION

Trauma to the male urethra must be efficiently diagnosed and effectively treated to prevent serious lo term sequelae. Patients with urethral stricture disease from poorly managed traumatic events are likel have significant voiding problems and recurring need for further interventions. Most urethral injuries associated with well-defined events, including major blunt trauma such as caused by motor vehicle accid or falls. Penetrating injuries in the area of the urethra may also cause urethral trauma. Straddle injuries r cause both short- and long-term problems. Iatrogenic injury to the urethra from traumatic catheter placem or dilation is not uncommon.

Urethral injuries can be classified into 2 broad categories based on the anatomical site of the trau Posterior urethral injuries are located in the membranous and prostatic urethra. These injuries are m commonly related to major blunt trauma such as motor vehicle accidents and major falls. They are m commonly associated with pelvic fractures. Injuries to the anterior urethra are located distal to membranous urethra. Most anterior urethral injuries come from blunt trauma to the perineum , but we posterior urethral injury caused by blunt trauma to the perineum.External penetrating trauma to the ure is rare, but iatrogenic injuries are quite common in both segments of the urethra. Most are relate difficult urethral catheterizations.

Posterior urethral injuries are most commonly associated with pelvic fracture, with an incidence 10%, but in our case pelvic bone was intact.

Etiology: As with many traumatic events, the etiology of a urethral injury can be classified as blu penetrating. In the posterior urethra, blunt injuries are almost always related to massive decelera events such as falls from some distance or vehicular accidents. These patients most often have a pe fracture involving the anterior pelvis. Blunt injury to the anterior urethra most often occurs from a blo the bulbar segment such as occurs when straddling an object or from direct strikes or kicks to the perine Blunt anterior urethral trauma is sometimes observed in the penile urethra in the setting of penile fract Penetrating trauma most often occurs to the penile urethra. Etiologies include gunshot and stab wou Iatrogenic injuries to the urethra occur when difficult urethral catheterization leads to mucosal injury

subsequent scarring and stricture formation.

Pathophysiology: Injury to the posterior urethra occurs when a shearing force is applied at the prostatomembranous junction in blunt pelvic trauma. The prostatic urethra is fixed in position because of the attachments of the puboprostatic ligaments. Displacement of the bony pelvis from a fracture type injury thus leads to either tearing or stretching of the membranous urethra.

Anterior urethral injury most often results from a blunt force blow to the perineum, producing a crushing effect on the tissues of the urethra. The initial injuries are often ignored by the patient, and urethral injury manifests years later as a stricture. The stricture results from scarring induced by ischemia at the site of the injury. Penetrating injuries also occur in the anterior urethra as a result of external violence.

Clinical: Diagnosis of urethral injuries requires a reasonably high index of suspicion. Urethral injury should be suspected in the setting of pelvic fracture, traumatic catheterization, straddle injuries, or any penetrating injury near the urethra. Symptoms include hematuria or inability to void. Physical examination may reveal blood at the meatus or a high-riding prostate gland. Extravasation of blood along the fascial planes of the perineum is another indication of injury to the urethra.

The diagnosis is made by performance of a retrograde urethrogram, which must be performed prior to insertion of a urethral catheter to avoid further injury to the urethra. Extravasation of contrast demonstrates the location of the tear. Further management is predicated on the findings of urethrography in combination with the patient's overall condition.

Anatomy: The male urethra may be divided into 2 portions. The posterior urethra includes the prostatic urethra, which extends from the bladder neck through the prostate gland. It then joins the membranous urethra, which lies between the prostatic apex and the perineal membrane. The anterior urethra begins at that point and includes 3 segments. The bulbar urethra courses through the proximal corpus spongiosum and ischial cavernosus-bulbospongiosus muscles to reach the penile urethra. The penile urethra then extends through the pendulous portion of the penis to the final segment, the fossa navicularis. The fossa navicularis is invested by the spongy tissue of the glans penis.

Potential areas for injury can be deduced from further study of the urethral anatomy. The membranous urethra is prone to injury from pelvic fracture because the puboprostatic ligaments fix the apex of the prostate gland to the bony pelvis and thus cause shearing of the urethra when the pelvis is displaced. The bulbar urethra is susceptible to blunt force injuries because of its path along the perineum. Straddle-type injuries from falls or kicks to the perineal area can result in bulbar trauma. Conversely, the penile urethra is less likely to be injured from external violence because of its mobility, but iatrogenic injury from catheterization or manipulation can occur, which is also possible in the fossa navicularis.

In cases of urethral trauma, patients often have multiple injuries. Immediate urethral repair is contraindicated because life-threatening injuries must be corrected first in any trauma algorithm. Urethral repair must be delayed until the pelvic haematoma has stabilized and hemorrhage is less of a concern.

Penetrating anterior urethral injuries should be explored; however, defects longer than 2 cm in the bulbar urethra and longer than 1.5 cm in the penile urethra should never be emergently repaired. They should be reconstructed at an interval following the injury to allow for resolution of other injuries and proper planning of the tissue transfers required for the repair.

Imaging Studies:

- Retrograde urethrogram: The retrograde urethrogram is the standard imaging study for the diagnosi of urethral injury. It is performed using gentle injection of 20-30 cc of contrast into the urethra. Examinatio is made for extravasation, which pinpoints the existence and location of the urethral tear.

TREATMENT

Surgical therapy: When faced with urethral trauma, initial management decisions must be made in th context of other injuries and patient stability. These patients often have multiple injuries, and managemer must be coordinated with other specialists, usually trauma, critical care, and orthopedic specialists. Life threatening injuries must be corrected first in any trauma algorithm.

The traditional intervention for men with posterior urethral injury secondary to pelvic fracture is placemer of a suprapubic catheter for bladder drainage and subsequent delayed repair. This is the safest approac because it establishes urinary drainage and does not require either urethral manipulation or entrance int the haematoma caused by the fracture of the pelvis. This allows a formal repair to be carried out sever weeks later under controlled circumstances and after resolution of the haematoma. The suprapubic cathet can be safely placed either percutaneously or via an open approach with a small incision. Ultrasour guidance can aid in the percutaneous approach.

Ultimate repair of the posterior urethral injury can be performed 6-12 weeks after the event, after tl pelvic haematoma has resolved and the patient's orthopedic injuries have stabilized. It is often carried o via a perineal approach, and repair consists of mobilizing the urethra distally to allow a direct anastomos after excision of the stricture. A urethral catheter is left indwelling to stent the repair, and the suprapub catheter may be removed. Transpubic approaches for this repair have also been described and may l useful in men with fistulous tracts complicating a membranous urethral injury. Combining a perineal ar abdominal approach with pubectomy provides maximum exposure of the prostatic apex.

Penetrating anterior urethral injuries should be explored. The area of injury should be examined, ar devitalized tissue should be debrided carefully to minimize tissue loss. Defects of up to 2 cm in the bulb urethra and up to 1.5 cm in the penile urethra can be repaired primarily via a direct anastomosis over catheter with fine absorbable suture. This is the preferred method of repair for these injuries. Long defects should never be repaired emergently; they should be reconstructed at an interval following th injury to allow for resolution of other injuries and proper planning of the tissue transfers required for th repair. Urinary diversion can be accomplished with a suprapubic catheter during this interval.

Preoperative details: In all urethral injuries, the location of the injury should be localized with repe urethrography and cystoscopy if needed. If an open perineal repair is performed, the patient should l positioned in an exaggerated lithotomy position with the legs well padded. Deep venous thrombos prophylaxis with compression stockings is preferred. Access to the bladder via the indwelling suprapub catheter is also useful.

Intraoperative details: In open urethral reconstruction, careful dissection of the urethra is importar Anastomoses must be performed in a mucosa-to-mucosa fashion to ensure proper healing without furth scarring. All anastomoses should be performed over a catheter for stenting purposes.

Excessive mobilization of the urethra must be avoided to prevent tethering of the penis. If a gap of mo than 2 cm must be bridged, performing a flap procedure rather than placing the anastomosis under tensio or tethering the penis, which causes curvature, is better. This should be performed as part of a delaye reconstruction and not in the acute setting.

Postoperative details: In open repairs, the suprapubic catheter may be removed immediately, leaving the urethral catheter for drainage and stenting. The patient may be mobilized on the day following surgery and discharged when tolerating a diet. Antibiotics are maintained for 2 weeks, and the catheter is removed after 4 weeks. A similar pattern is followed for the endoscopic procedure except that the catheter is left indwelling for 6 weeks. After either type of procedure, retrograde urethrography may be indicated to ensure extravasation is not occurring prior to catheter removal. This is particularly true for patients with poor wound healing such as people with diabetes.

In our case we kept both suprapubic and urethral catheter for 3 weeks, and then removed the urethral catheter first, keeping the suprapubic catheter as a sefty valve in case of leak or block. Suprapubic catheter was clamped and voiding carefully observed, after satisfactory voiding the SPC was also removed.

Follow-up care: In all instances of urethral injury, follow-up should include assessment of the patient's voiding history, continence status, and potency. Undoubtedly, follow-up should be lifelong, although in the trauma population this is often difficult to achieve. Repeat cystourethrography and cystoscopy should be used whenever changes occur following reconstruction.

COMPLICATIONS

The main complication following reconstruction of posterior injuries is recurrent stricture. When managed with standard urethroplasty techniques, recurrent stricture should be observed in only 1-2% of patients.

OUTCOME AND PROGNOSIS

Men with urethral injuries have an excellent prognosis when managed correctly. Problems arise if a urethral injury is unrecognized and the urethra is further damaged by attempts at blind catheterization. In those instances, future reconstruction may be compromised and recurrent stricture rates rise. When managed well, these men have an excellent chance of becoming totally rehabilitated from a urinary standpoint.

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