

## Case Report

### **Foreign body in Urinary bladder - early CT cystogram is investigation of choice**

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#### **Abstract**

Extra peritoneal bladder injuries are very difficult to diagnose on clinical examination alone. CT-scan with cystogram (Contrast: Ultavista300) is a reliable diagnostic tool to evaluate such injuries at an early stage. For accurate diagnosis of bladder injury, enhancement of bladder contents is necessary otherwise extravasated urine can be mistaken for haematoma or ascites. Retrograde filling of bladder with minimum 250 -300 ml of contrast material is necessary before performing abdominopelvic CT to rule out any form of bladder injury.

Therefore in case of suspected bladder injury CT cystogram should be performed at the time of initial CT examination in the emergency room. We report a case of extraperitoneal bladder injury and foreign body in urinary bladder after a firework injury.

#### **Introduction**

Despite frequent occurrence of tragic and fatal incidents, fireworks are used throughout the world for celebrations. In Great Britain fireworks are very common in late October and early November close to Guy Fawkes' night.

The urinary bladder is well protected by the bony pelvis with the weakest point being adjacent to the peritoneum. Although rare, bladder injuries are one of most common form of injuries to lower urinary tract. In most cases bladder injuries are associated with other major multiple injuries and pelvic fractures. Common mechanisms are either blunt or penetrating injuries to lower abdomen accounting for 80% and 20% respectively. Wah et al<sup>3</sup> demonstrated that 80% of patients with bladder injuries have associated pelvic fractures, whereas approximately 10% of patients with pelvic fractures have bladder injuries.

The bladder is a highly vascular organ therefore bladder injuries are associated with significant haematuria. High index of suspicion for bladder injuries is required in pelvic fractures, multiple trauma, high speed motor vehicle accidents and falls. Presence of unexplained pelvic fluid after abdomino-pelvic trauma is a positive predictor of significant bladder injury. Power et al have shown that after abdominopelvic trauma bladder injury is present in 29%

patients with gross haematuria, and on other hand 90% patients with bladder rupture have gross haematuria.<sup>1</sup> Complete rupture of the bladder is associated with gross haematuria, while bladder contusions will lead to microscopic haematuria.

A case of extra peritoneal bladder injury and its management is presented.

#### **Case Report**

A 40 years old male attended the emergency department after a rocket contained in a metal tin exploded in his hand and hit his right groin from approximately two feet distance. There was significant bleeding at the scene and wound was washed with plenty of water by patient himself.

In the emergency department he was haemodynamically stable. Systemic examination revealed a 6cm laceration in the right groin. Femoral pulse was palpable just lateral to laceration. After initial evaluations patient underwent emergency exploration of the wound under general anaesthesia for a possible vascular damage. Per-operative image intensifier revealed a large metal fragment in the centre of the pelvis. Operative finding showed a large laceration medial to superficial Femoral artery extending deep along the Adductor Longus and Brevis muscle and through the obturator foramen. There was also comminuted fracture of superior and inferior pubic rami. The wound was washed thoroughly with normal saline and packed with betadine soaked gauze and mepore. At the same time a Foley's catheter was inserted draining 100mls of fresh blood.

A CT- scan of pelvis with cystogram was organized the following day. The scan showed 4-5 cms thin metallic object in contact with bladder wall posteriorly between wall of bladder and seminal vesicles. Flecks of free air within pelvis and posteriorly displaced right superior pubic ramus fracture were also noted. There was extraperitoneal bladder rupture with contrast lying anteriorly. The metallic fragment was lying within the bladder with its superior aspect protruding through the dome of the bladder. Subsequent cystoscopy confirmed the presence of a metal fragment within the bladder.

A midline incision laparotomy was performed.

Operative findings showed retropubic fluid with a hole in the bladder at its anterior aspect. Bladder was bivalved and 5x 2cm metal foreign body was removed. Free fragment of bone measuring 2x2 cm was also taken out from the right pubic ramus area. Bladder was closed in two layers. Suprapubic and urethral catheters were inserted and left on free drainage along with a retropubic drain.

A cystogram was performed on 10th post operative day which confirmed absence of any leak. Subsequently the urethral catheter was removed and patient went home with clamped suprapubic catheter. Next day in outpatient, suprapubic catheter was removed as he was passing urine peruretherally. Further follow up was arranged in six weeks.

### Discussion

Bladder injuries were considered to be fatal in the past. High index of suspicion along with good clinical examination and appropriate radiological investigations are required to diagnose bladder or urethral rupture in the emergency department. Early diagnosis will help in prompt medical or surgical management whereas delay in diagnosis and treatment will prolong hospital stay and consequently increases both morbidity and mortality.

Bladder rupture can either be extraperitoneal, intraperitoneal or combined extra and intraperitoneal. Sandler et al<sup>2</sup> described five types of bladder injuries with conventional cystography. Extraperitoneal rupture or type-4 is the most common type which occurs in 80% of cases. It is generally secondary to adjacent pelvic fracture or an avulsion tear at fixation points of puboprostatic ligaments. Intraperitoneal bladder rupture usually is iatrogenic or secondary to penetrating injury.

Clinical signs of bladder injury are subtle and often missed in the emergency department especially in multiple trauma patients. A clinical triad of gross haematuria, suprapubic pain or tenderness and difficulty or inability to void will point towards bladder rupture. Gross haematuria is the hallmark of bladder rupture. More than 98% of bladder ruptures are associated with gross haematuria, and 10% are associated with microscopic haematuria. Haematuria in the presence of pelvic fracture in a patient with abdominopelvic trauma is a strong indicator of bladder or urethral injury.<sup>3</sup>

Before the advent of CT scan, the only diagnostic tool available for diagnosing bladder injuries was cystography. Cystography involved administration of dilute contrast medium into the bladder under fluoroscopic guidance and images were obtained during filling, in full distention and after drainage. The importance of proper

filling and drainage films cannot be overemphasized. A significant number of injuries may be missed if the cystogram is not performed correctly.

Although this technique has a high accuracy rate in expert hands, it is difficult to practice in the emergency room, especially in a multitrauma patient. Moreover it involves movement of the patient from the emergency department to the radiology department. Cystography also does not provide information about the surrounding pelvic structures.<sup>1</sup>

For accurate diagnosis of bladder rupture, enhancement of bladder contents is necessary, and this can be achieved by either "intravenous" or "retrograde" route. Intravenous route is highly inaccurate in demonstrating bladder rupture. Pao et al<sup>4</sup> demonstrated that intravenous enhancement of the bladder missed 4 out of 8 bladder ruptures. The most common cause of this missed diagnosis was inadequate distention of bladder by intravenous contrast. This was thought to be due to many reasons such as: hypotension in multiple injury patient, poor renal functions or external bladder compression by a haematoma.

On the other hand CT cystography, where 300-400ml of contrast is administered directly into bladder via a Foleys catheter and CT scan is performed subsequently, is highly accurate for diagnosing bladder ruptures especially in the emergency department. CT Cystography has a sensitivity of 95% and specificity of 100% in diagnosing bladder ruptures.<sup>1</sup> The intraperitoneal or extraperitoneal nature of bladder ruptures can be determined easily with CT cystography and subtle perforations are identified.<sup>5</sup> The CT scan of the pelvis provides valuable information on the status of the pelvic organs and osseous pelvis in a multiple injury patient.

### Conclusion

Early diagnosis of bladder injuries in emergency room at the time of first presentation is important in reducing morbidity and mortality. CT cystography has replaced conventional cystography as the most sensitive test for bladder perforation.

### References

1. Power N, Ryan S, Hamilton P. Computed Tomography cystography in bladder trauma: pictorial essay. *Can Assoc Radiol J*.2004; 55: 304-8.
2. Sandler CM, Hall JT, Rodriguez MB, Corriere JN Jr. Bladder injury in blunt pelvic trauma. *Radiology* 1986, 158:633-8.
3. Wah TM, Spencer JA. CT of adult urinary tract trauma. *Imaging* 2005; 17: 53-68.
4. Pao DM, Ellis JH, Cohan RH, Korobkin M. Utility of routine trauma CT in detection of bladder rupture. *Acad Radiol* 2000; 7: 317-24.
5. Vaccaro JP, Brody JM. CT Cystography in the Evaluation of Major Bladder Trauma. *Radiographics* 2000, 20:1373-81.