

Original Research Article

A study on pattern and outcome of various methods of management of bladder injuries: A retrospective study

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Abstract: Bladder injuries constitute one of the most common urological injuries involving the lower urinary tract. Purpose of this study is to provide a concise account of patterns of bladder injury in adult males and outcome of various methods of management which is paramount in reducing the short and long term complications. Retrospective reviews of 164 patients admitted with bladder injuries were enrolled. Cases were analyzed for etiology, methods of diagnosis, site of injury, immediate and delayed management and complications. Majority (72%) of bladder injuries were due to road traffic accidents. Retrograde filling CT cystogram was diagnostic of bladder injuries. Incidence of extra peritoneal bladder (EP) ruptures was more than that of intraperitoneal (IP) rupture. Pelvic fracture was observed in all cases of extraperitoneal ruptures but there was no correlation between the site of pelvic fracture and the site of bladder rupture. Persistent urinary leak observed in some cases of extraperitoneal bladder ruptures treated conservatively were due to early catheter removal. Bladder neck stricture was observed in cases of bladder injury with bladder neck involvement. Symptoms were seen more in intraperitoneal and combined intraperitoneal- extra peritoneal rupture cases, but all of them subsided by six months after episode of trauma. Pattern of presentation of bladder injuries is diverse. First step in acute management of bladder injuries is to obtain drainage of the bladder. There is uniformity of opinion regarding management of bladder injury. Consensus of definitive management still remains a challenge.

Keywords: Lower urinary tract injury, bladder injury, extra peritoneal bladder rupture, intraperitoneal bladder rupture.

INTRODUCTION

Lower urinary tract injuries, as it is not life threatening will assume lower priority in the initial management of trauma patients. Immediate diagnosis and treatment are important to reduce mortality and morbidity. Among the abdominal injuries that require surgical repair approximately 2% involve bladder injuries and this may occur as a result of blunt, penetrating, or iatrogenic trauma [1]. Approximately 83% of patients with bladder rupture secondary to blunt trauma have pelvic ruptures [2]. Disruption of bony pelvis tends to slash the bladder at its facial attachments.

Unrecognized bladder injuries may present as acidosis, azotemia, peritonitis, ileus, decreased urine output, urinary ascites and respiratory difficulties [3]. Radiologically, bladder injuries are classified as Type I bladder contusion, Type II intraperitoneal rupture, Type III interstitial bladder injury, Type IV extraperitoneal rupture- simple and/or complex and Type V combined bladder injury [1]

Although there are wide variety of injury patterns and associated injuries, there is uniformity regarding management of bladder injuries. Different factors influencing the therapeutic approach are discussed in this paper and a rational guideline is suggested to decrease the high complication rates.

METHODOLOGY

A retrospective study of 164 patients admitted to Yenepoya Medical College Hospital, Mangalore (India) during January 2012 to February 2016 with bladder injuries were selected from trauma registry. Only males with lower urinary tract injuries with or without pelvic fracture, presented to emergency room in less than 12 hours were included. Contusion injuries of both urethra and bladder, iatrogenic, pediatric and female patients were excluded. Cases were analyzed for etiology, methods of diagnosis, site of injury, management and complications.

RESULTS

A total 164 patients with bladder injuries were enrolled in the study. Out of these, 101 (61.6%) were extra peritoneal, 53 (32.3%) intraperitoneal and 10 (6.1%) combined intra and extra peritoneal injuries. Mean age presented was 31 ±13 (18-44) years.

Over all 119 (72.56 %) of bladder injuries were due to traffic accidents, 31 (18.9%) fall from

height, 14 (8.5%) were due to others (straddle, stab, kicks etc) (Fig1). All bladder injuries presented in this study were confirmed by ultrasonography pelvis, cystography (conventional pre-filling, full, post drainage films and CT cystogram in selected cases). Methods used for assessment of bladder injuries were symptoms of pelvic and perineal pain, inability to void, haematuria, signs of abdominal distension, pattern of pelvic and perineal trauma.

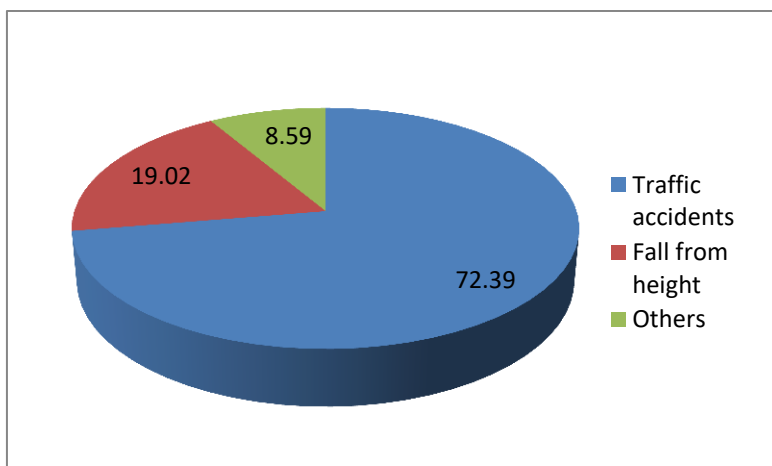


Fig 1: Bladder injuries presented in the study

Out of the 101 patients with extra peritoneal rupture, 86 (85.14%) cases were managed by single per-urethral catheter for 10-12 days and a cystogram was done before removal of catheter. 96 (95.05%) cases had no contrast extravasations and catheter was removed at day-10, 5 (4.95%) patients had contrast extravasation. Catheter was kept for an additional week and removed after a repeat normal cystogram. 15 cases (14.85%) of extra peritoneal injuries were managed by open surgical method due to associated bladder-neck, rectal injury and/or intraperitoneal injury. Catheter was removed on day-12, as cystogram was normal and two days after suprapubic catheter was also removed.

Eight (90.56%) patients with intraperitoneal bladder rupture and all cases of combined intra and

extra peritoneal ruptures were managed by open surgical repair, per-urethral and suprapubic catheters. Cystogram was done on day 10-12 before per-urethral catheter removal and suprapubic catheter removed after 2 days. Five cases (9.43%) of doubtful IP rupture on cystogram were managed conservatively with wide bore per urethral catheter alone, which were on day 12, after a normal cystogram.

Complications of bladder injuries were persistent leak bladder neck stricture and lower urinary tract symptoms (LUTS). 4.88% extra peritoneal bladder rupture were not able void on catheter removal (day 10) but could void one week of catheter maintenance (Table 1).

Table 1: Complications of bladder injuries

Complication	EP cases	IP cases	Combined
Persistent leak	Conservative-22F P/U CATH. After 12 days: 4.88% After 3 weeks: Nil Surgical: Nil	Surgical- After 12 days: Nil	Surgical- After 12 days: Nil
Bladder neck stricture	Without BN involvement: Nil With BN involvement: 33.3%	Nil	Nil
Lower urinary tract symptoms (storage symptoms)	3.88%	16.67%	28%

Intraperitoneal, combined intra and extra peritoneal bladder ruptures managed by open surgical repair and intraperitoneal rupture, with doubtful leak on

cystogram, managed by wide bore per urethral catheter alone, were without leak, when catheter was removed on day 12. Fifteen cases of extra peritoneal rupture with

bladder neck involvement which were managed by open surgical repair, one had bladder neck stricture at three months. Intraperitoneal and combined intra and extra peritoneal rupture cases had no bladder neck stricture.

Lower urinary tract symptoms were quantified from frequency volume charts, validated symptom and quality of life questionnaires and symptoms were graded in to mild (grade-1), moderate (grade-2), severe (grade-3). All of them were mild in nature, and was noted in 3.88% of extra peritoneal, 16.67% intraperitoneal, and 28% of combined intra and extra peritoneal rupture cases, and subsided within 6 months following the trauma.

DISCUSSION

The empty human bladder is tetrahedral having a superior surface with an apex at the urachus, two infero lateral surfaces, a postero inferior surface or base with the bladder neck at the lowest point. Superior surface of the bladder is covered by peritoneum, anteriorly the peritoneum sweeps gently onto the anterior abdominal wall. Posteriorly the peritoneum passes to the level of the seminal vesicles meets the peritoneum on the anterior rectum to form the rectovesical space. When filled bladder has a capacity of approximately 500 ml and assumes an ovoid shape [4].

Bladder trauma associated injuries are common and include mainly pelvic fractures (93%-97%), long bone injuries (50%-53%), and CNS (28%-31%) and thoracic injuries (28%-31%) [5, 6]. The mortality related to bladder trauma can be as high as 34% and is largely a consequence of associated injuries rather than bladder perforation itself. Minor bladder injuries (According to American Association for the Surgery of Trauma [AAST] Grade 1) may be managed conventionally and even without a catheter in some cases. Indications for surgical exploration are (1) IP injury; (2) EP injury with bladder neck involvement; (3) all penetrating injuries; (4) bony fragments compressing or within the bladder; and (5) failed conservative management [7].

Bladder rupture is usually not an isolated event, in conscious patients it presents as nonspecific symptoms such as inability to void, abdominal, pelvic pain penetrating injuries of buttock, pelvis or lower abdomen with any degree of haematuria warrant cystography. Conventional retrograde filling cystography (three film technique-pre filling, full bladder up to 350 ml or to a sense of discomfort in conscious patients, post drainage films) is nearly 90%-

100% sensitive for bladder injury [8]. CT-retrograde filling cystography (drainage film not required, contrast should be diluted) is as accurate and reliable as plain film cystography in suspected bladder injuries. Flame shaped dense contrast material in the pelvis is characteristic of EP extravasations. Contrast material extravasations outlining bowel loops is indicative of intraperitoneal extravasations.

There are several mechanisms of bladder damage associated with pelvic such as bony fragments lacerating the EP surface, avulsion due to harsh displacement forces when the rigid pelvis is fractured and ligamentous attachments are disrupted and direct force causing a "burst" injury to a full bladder [9]. In the present study the incidence of EP ruptures was more than that of IP rupture, and agrees with earlier reports [10].

A review of literature of complications of bladder injury reported fewer complication, such as fistula, sepsis, clot retention with open repair of extra peritoneal bladder rupture (5% overall) versus conservative management (12% overall). However, the complications of original pelvic injury are difficult to differentiate from the complications of attempts to repair urethral and bladder injuries. Most of studies conclude that complications are the results of injury itself and not of the treatment. Most patients who become impotent as a result of pelvic fracture have some degree of arterial insufficiency i.e. impotent patients become more vulnerable to restenosis after urethroplasty as a result of bulbar urethral ischemia [11].

Algorithm of suspected urologic trauma is given in the Fig 3. First step in acute management of bladder injury is to obtain drainage of the bladder. Usual treatment of uncomplicated extra peritoneal bladder rupture is continuous bladder drainage with large bore (22 French) urethral catheter alone. Cystography is recommended before catheter removal (i.e.12-14 days after injury). Antibiotics should be given on the day of injury until 3 days after urinary catheter is removed. Blunt EP injuries with any complicating features like bladder neck, rectal or vaginal injury, pelvic fracture requiring open reduction and internal fixation, select stable patients undergoing laparotomy for other reasons, bone fragments projecting in to bladder warrant immediate open repair. All Intraperitoneal and penetrating injuries should be managed by immediate surgical repair as most of them are large, unlikely to heal spontaneously and chances of urinary peritonitis is high.

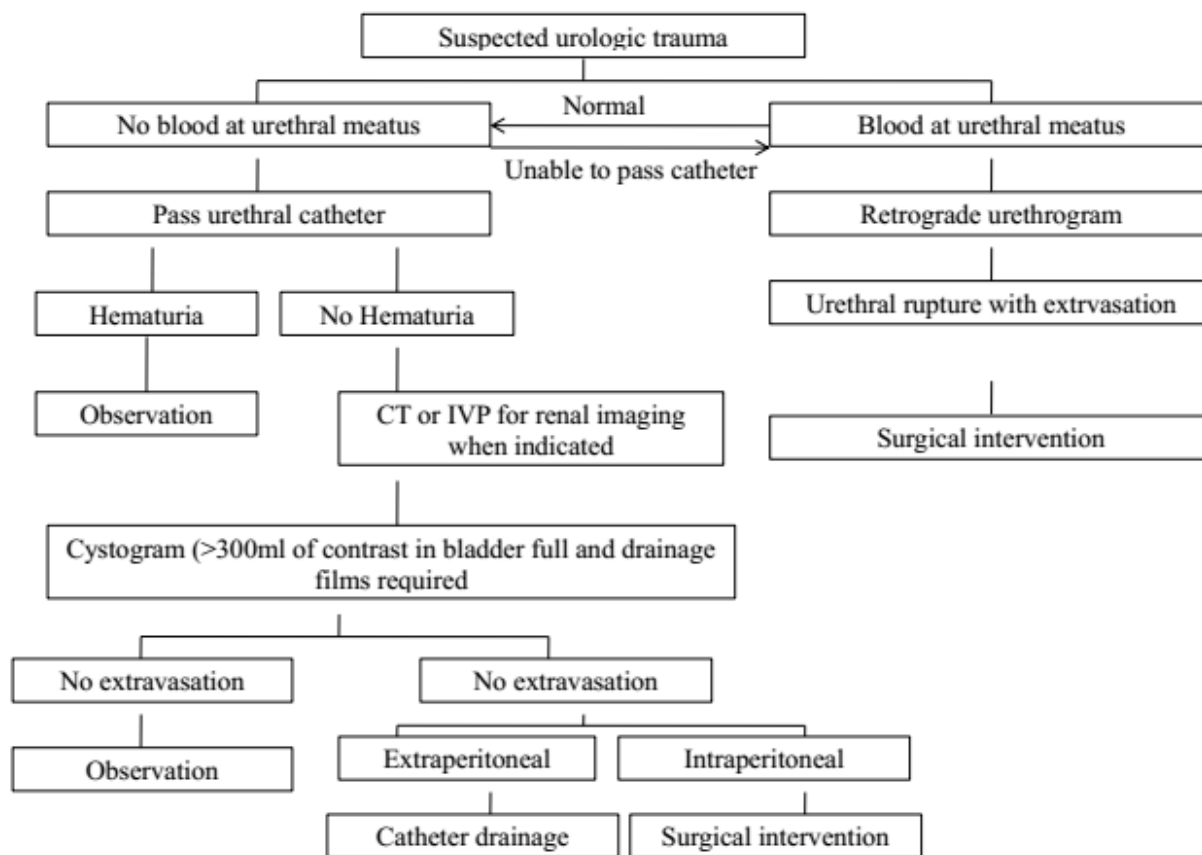


Fig 2: Algorithm of suspected urologic trauma

CONCLUSION

In conclusion, pattern of presentation of bladder injuries is diverse. In the emergency setting priority should be given for airway, breathing and circulation. The incidence of EP bladder rupture was more than that of IP rupture. There is no correlation between the site of bladder rupture and pelvic fracture. Persistent urinary leak observed in cases of EP bladder rupture were due to early catheter removal. Bladder neck stricture was seen in cases of EP bladder rupture with bladder neck involvement.

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