ORIGINAL ARTICLE

Percutaneous Peritoneal Drainage for the Management of Intraperitoneal Bladder Perforations

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ABSTRACT

Aim: To determine the incidence and outcome of intraperitoneal bladder perforation (IPP) during transurethral resection managed by percutaneous drainage of peritoneal cavity.
Methods: From January 2012 to December 2014, medical records of patients who had IPP during transurethral resection were examined to determine the incidence and its outcome.
Results: 11 patients were identified. All were male ranging in age from 50 to 85 years. Percutaneous peritoneal dialysis catheters were placed to drain peritoneal cavity and urethral catheters were inserted to drain urinary bladder in all patients. All made uneventful recovery with no complications. Peritoneal catheters were kept from 2-4 days and urethral catheters remained indwelling from 7-14 days.
Conclusions: Percutaneous drainage of peritoneal cavity (along with urethral bladder drainage) is a perfectly safe alternative to formal bladder repair. It minimizes morbidity and saves cost.
Keywords: Bladder perforation, percutaneous peritoneal drainage

INTRODUCTION

The most common cause of bladder rupture is trauma (96%)[1]. Bladder rupture is categorized into extraperitoneal and intraperitoneal. Extraperitoneal bladder injuries are more common (60- 65%) and are rarely isolated. Mortality in these multiply injured patients is primarily related to non-urologic injuries (gut, pelvic fractures, solid intraperitoneal organs etc.) and range from 8 to 44%[2]. If an isolated injury, extraperitoneal rupture is usually treated conservatively by bladder drainage alone.

Intraperitoneal rupture occurs in approximately 25% of patients[1]. It can be due to blunt or penetrating trauma. In blunt trauma, probability of bladder rupture depends upon the degree of bladder distention. Therefore, a full bladder is more likely to rupture than an empty one. In this scenario rupture occurs at its weakest point i.e., the dome, and is intraperitoneal. Penetrating bladder trauma is also associated with significant non-urologic injuries and mortality rate. Nearly half of all penetrating bladder injuries are iatrogenic[3]. Obstetric and gynecologic injuries are the most common etiology of bladder injuries during open surgery[3].

In urologic practice, bladder perforation can occur during transurethral resection of prostate (TUR-P) as well as bladder tumors (TUR-BT). Extraperitoneal perforations are more common than intraperitoneal[4]. Intraperitoneal perforation usually presents in a dramatic fashion. Blood pressure usually drops and patient, if under spinal anesthesia, starts complaining pain and becomes restless. Rapid accumulation of fluid in peritoneal cavity pushes the diaphragm up, thus accounting for respiratory embarrassment. There is urgent need to drain the peritoneal cavity. Traditionally these patients undergo formal laparotomy to drain the peritoneal cavity and repair the bladder[4]. This almost always requires general anesthesia. Most of these patients are elderly and frail having co morbidities (chest and cardiovascular problems), thus incurring greater risk for general anesthesia. A number of authors have reported non-operative management of such cases by simple percutaneous drainage of peritoneal cavity along with per urethral drainage of bladder.[5,6] In this study we describe our experience with percutaneous peritoneal drainage involving such injuries.

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PATIENTS AND METHODS

From January 2012 to December 2014, for a period of three years, medical record of patients who underwent transurethral resection for prostatic enlargement (TUR-P) or bladder tumors (TUR-BT) were examined. Those patients who had bladder perforation during these procedures were included in the study. Details were analyzed to determine the method used to manage this complication as well as the final outcome. All patients were operated under spinal anesthesia. Abdominal pain and distension were the symptoms / signs which drew attention to the intraperitoneal perforation.

Peritoneal dialysis catheter (PD) was used to manage the perforation. PD catheter is a commercially available catheter, used primarily to

perform acute peritoneal dialysis in renal failure patients (Fig 1). We used it to drain the peritoneal fluid. It is a stilt based catheter with multiple holes in its distal part. It is placed in peritoneal cavity through a few millimeter nick in the midline abdominal skin under local anesthesia.

Fig. 1: Peritoneal dialysis catheter

Bladder was drained by inserting indwelling Foley catheter (20 to 22 Fr).

RESULTS

In all 11 patients were identified. All were male patients ranging in age from 50 to 85 years with mean age of 65.2 years. Details of the procedures in which perforations occurred are depicted in table 1.

Table 1:

Procedure	No. Performed	Intraperitoneal Perforations
TUR – P	494	9 (1.82%)
TUR – BT	188	2 (1.06%)

Antibiotics (mostly 3rd generation cephalosporin) were prescribed to all patients. Peritoneal catheters were kept until they stopped draining fluid (2 to 4 days). In TUR-P related perforations urethral catheters were removed after 7 days once cystogram revealed no leakage. In two patients with TUR-BT related perforations Foley catheter was kept for a longer period of 14 days. Patients were discharged once peritoneal catheter was removed, i.e., on 2nd to 4th postop day. All patients made uneventful recovery.

DISCUSSION

We had 1.82% incidence of intraperitoneal perforations (IP) in our TUR-P patients. Although extraperitoneal perforations (EP) are said to be more common than IP, we could not identify any EP in our patients. Most likely explanation is that these small perforations were asymptomatic and went unrecognized. Incidence reported in literature varies from 2% to 0.01% without any distinction between intra or extra peritoneal perforations[7]. It looks likely that 2% incidence is extraperitoneal perforation whereas 0.01% is IP perforation. If so, then our incidence of 1.82% is quite high. In our experience, intraperitoneal perforation during TUR-P most commonly occurs when too deep resection is done at the bladder neck around 6 o'clock. This undermines the trigone and resectoscope can easily slip into peritoneal cavity if one is not careful. Sometimes perforation occurs at the end of the procedure if catheter needs to be passed through introducer. Introducer can easily slip through that weak spot.

Reported incidence of intraperitoneal perforations during TUR-BT in international literature varies from 3.5 to. 58%[8]. In our study incidence is 1.06% which is quite low. May be we are more conservative while resecting bladder tumors because of fear of perforation and subsequent tumor spread. Our incidence of intraperitoneal perforations in TUR-P patients is quiet high as compared to TUR-BT. This is probably due to the reason that we consider TUR-B a challenging procedure as compared to TUR-P, therefore only senior surgeons perform this procedure. TUR-P is performed by residents as well, thus accounting for its higher incidence. All patients in our institution were managed successfully by putting in Peritoneal dialysis (PD) catheters percutaneously. In all eleven patients perforations were identified quickly because irrigating fluid accumulated rapidly in peritoneal cavity, causing abdominal distention and pain. Thus PD catheter was passed either on the operating table or in the recovery room.

This can be done quickly in few minutes under local anesthesia, thus providing prompt relief to the patient. PD catheters were kept for 2 to 4 days. Duration of PD catheter drainage depends on the need for continuous irrigation after TUR. Therefore adequate hemostasis should be secured as soon as perforation is recognized, thus minimizing the need for post operative irrigation. In all patients urinary bladder was drained by urethral catheter. Urethral catheter was kept for a longer duration in TUR-BT patients (14 days) as there was concern about the slow healing of the cancerous tissue. No complications were encountered in our study. Patients were discharged once peritoneal catheter was removed and urethral catheters were removed on outpatient basis. This would not have been possible had patients undergone formal repair. Thus non- operative management saves cost.

The earliest reports about the successful non-operative management of intraperitoneal bladder rupture were published in 1970s in the form of case reports[5,6]. In 2002, Pasadoro et al (two patients) and in 2003 Manikandan et al (three patients) reported intraperitoneal bladder perforations during transurethral resection of bladder tumors (TUR-B)[9,10]. All patients were managed by Intraperitoneal drains and Foley catheter drainage of bladder. No complications were reported and authors concluded that open surgical repair can be avoided in such cases. Percutaneous drainage started initially as a

non-operative management for iatrogenic bladder perforations, its use is expanding for other indications as well (trauma, cancer).

In 2005, Osman et al[11] reported result of a retrospective study involving eight children with isolated intraperitoneal bladder rupture due to blunt trauma. First four children underwent open surgical repair. Subsequently other four children were managed conservatively by draining peritoneal cavity and bladder. Intraperitoneal drains were removed at 1-4 days whereas mean duration of indwelling Foley catheters was 11.8±2.6 days. There were no complications.In 2008, Basiri and Rafdar[12] published a case report of successfully treating spontaneous intraperitoneal rupture of bladder due to prostate cancer.

Complete and continuous drainage of the urinary bladder seems to be the absolute prerequisite for the success of non-operative management. Peritoneal drainage is often required, especially if leakage is large and causing respiratory embarrassment.

CONCLUSION

Percutaneous drainage of peritoneal cavity following bladder perforation is practicable and safe alternative to formal surgical repair provided bladder and peritoneal cavity can be drained promptly and effectively. It reduces morbidity and saves cost.

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