



Pediatric anorectal impalement with bladder rupture: case report and review of the literature

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Abstract Rectal impalement involves foreign body trauma to the anus or rectum resulting in intra- or extraperitoneal rupture. Evaluation of suspected rectal impalement injury involves careful history and physical examination. Ruling out rectal perforation in patients with reported impalement is critical even if there is no evidence of trauma to the perineum. There are few reports on pediatric impalement and only 1 reported case of pediatric rectal impalement with bladder rupture. We report a rectal impalement with extraperitoneal bladder injury in a 12-year-old boy and review the literature on treatment of these injuries. © 2006 Elsevier Inc. All rights reserved.

1. Case report

A previously healthy 12-year-old boy presented to a referring hospital after traumatic insertion of a pool cue through his anus. The patient and his parents reported copious watery drainage mixed with stool and blood expelled per rectum. He had not voided since the incident and had no complaints of urinary urgency. When the boy was seen at our institution, he complained of mild lower abdominal pain. On physical examination, he appeared uncomfortable but was not in acute distress. His temperature was initially normal but increased to 38.2°C within the first hour. His heart rate was 140 without hypotension. He had mild lower abdominal tenderness to palpation and priapism. His shorts and underwear were punctured and contaminated with stool. His laboratory studies were notable for an elevated white blood cell count of 18,000. Upright chest and abdomen plain films were normal.

The patient received broad-spectrum antibiotics and was taken to the operating room for an examination under anesthesia. Upon induction, his priapism resolved. During the rectal examination, an anterior perforation was noted at 4 cm. His sphincter tone was normal. A rigid sigmoidoscopy confirmed the perforation. Suspicion for a bladder injury was high owing to the patient's priapism and history of watery drainage per rectum (urine). The patient also had not voided since the accident. A cystoscopy was performed, revealing a small laceration at the level of the trigone between the ureteral orifices. Free flow of urine was noted coming out of each orifice. There was also a contusion on the anterior bladder wall. A Foley catheter was placed intraoperatively. No further studies were performed before the exploration because it was felt that his rectal injury and clinical signs of sepsis warranted exploration and fecal diversion.

An exploratory laparotomy was performed, and there was no evidence of intraabdominal contamination. A small area of ecchymosis was noted on the anterior aspect of the bladder. Palpation of the posterior bladder did not reveal any fluctuant masses. The posterior, retroperitoneal bladder

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injury was not dissected, and the Foley catheter was left in place for bladder decompression. The anterior rectal injury was repaired transanally with interrupted Vicryl sutures, and the rectum was diverted with a sigmoid colostomy and Hartmann pouch.

The patient had an uncomplicated postoperative course. He was seen by psychiatrists and social workers during his hospitalization. He was started on a diet on postoperative day 3. The Foley catheter was removed on postoperative day 6, and a voiding cystourethrogram was performed, which was normal. He was discharged home without urologic complaints. He underwent an uneventful colostomy closure after 4 weeks. He was able to move his bowels without difficulty and had no complaints of fecal incontinence.

1.1. Discussion

Rectal impalement involves foreign body trauma to the anus or rectum resulting in intra- or extraperitoneal rupture [1]. The foreign body may enter the anorectal canal directly or may pass through the perineum or buttock first. Rectal impalement, an uncommon injury among children, is often caused by sexual assault or accidental falls [2,3]. Rectal impalement may also result from iatrogenic causes such as rectal thermometers or enemas. A careful history must be obtained, noting the shape of the impaling object, its force, and direction of impact [3]. Sexual assault must be considered in cases of isolated rectal injury and/or when the history does not correspond with the physical findings [4]. The absence of symptoms or external physical findings does not exclude intraabdominal pathology, and thus a high index of suspicion must be maintained.

1.2. Classification

Rectal impalement injuries may be classified according to site of entry and final location of the object. Anorectal injuries may penetrate the anal canal directly or indirectly. With transanal injury, the object enters directly through the anal canal [1,3]. Transanal injury may result in extensive perianal soft tissue injury or may not display any evidence of trauma, depending on the object and force of penetration. With indirect or perianal injury, the object enters first through the buttock or perineum, then penetrates the anal canal. A site of entry through the buttock or perineum will be evident.

In addition to the entry site, it is also important to determine whether the object has violated the intra- or extraperitoneal spaces (see Table 1). The direction of force determines involvement of the peritoneal cavity. When transanal impalement is directed posteriorly, retrorectal, retroperitoneal, and vascular injury must be considered. If the force is directed anteriorly, the peritoneum is likely to be violated at the pouch of Douglas, and injury to the bladder, uterus, and bowel should be ruled out. Intraperitoneal rupture of the rectum, bowel, and bladder may not be immediately evident on initial physical examination; thus, if

Table 1 Associated injuries of rectal trauma

	Intraperitoneal injury	Extraperitoneal injury
Direct injury (transanal)	Rectum, bowel, bladder	Retrorectal, retroperitoneal, vascular injury
Indirect injury (perianal)	Rare	Local soft tissue destruction

the level of suspicion is high, further investigation should be performed. Perianal impalement entering the anorectal canal is likely to result in local soft tissue destruction and possible injury to the anal sphincter, vagina, and urethra. Intraperitoneal involvement with perianal impalement is rare [3].

1.3. Workup/diagnosis

Evaluation of suspected rectal impalement injury involves careful history and physical examination. The history should include identifying the object, the force, and direction of penetration, reports of hematochezia or hematuria, inability to void, and abdominal pain. A physical examination should include an abdominal examination, inspection of the perineum, a digital rectal examination, and in females, a vaginal examination. However, lack of physical findings does not rule out intraabdominal injury. The development of peritonitis or localized sepsis may not be immediately apparent; thus, further evaluation or close observation is necessary depending on the index of suspicion. An examination under anesthesia is warranted when a thorough physical examination in the awake child is untenable or if there is obvious perineal injury.

The diagnostic evaluation of injury from rectal impalement should include proctosigmoidoscopy to examine the rectal mucosa and evaluate for perforation. A water-soluble enema would also delineate a perforation; however, a proctoscopy and examination under anesthesia would allow for diagnosis and immediate management. Bladder injury should be excluded with cystoscopy or cystography in patients with hematuria. In addition, vaginoscopy should be performed in females. In hemodynamically stable patients without peritonitis, signs of sepsis, or free air on abdominal plain films, a triple contrast computed tomography scan may be considered.

1.4. Treatment

Treatment of impalement injuries is initiated with broad-spectrum antibiotics. A Foley catheter should be placed to decompress the bladder. Extraperitoneal perineal wounds should undergo limited debridement of necrotic tissue, and damaged structures should be repaired. Fecal diversion with a colostomy is not necessary, unless there is extensive soft tissue destruction. Extraperitoneal rectal injury may be initially treated conservatively with antibiotics and close observation. If the patient develops signs of sepsis, then a colostomy is indicated [2,3].

Patients with perianal or transanal intraperitoneal injuries are treated similarly. The rectal injury may be repaired primarily with absorbable sutures. A diverting colostomy has typically been performed for fecal diversion in rectal injuries. In a recent retrospective review of pediatric patients with colorectal injury by Haut et al [5], 60% of children with colon injuries were managed with primary anastomosis alone; however, all patients with rectal injuries were treated with colostomy. Presacral drainage has not been demonstrated to improve outcomes, particularly in cases where the injury has already been exposed and repaired [6,7]. However, it may have a role in combined penetrating rectal and genitourinary trauma [8]. Colostomy reversal may be performed within 4 to 6 weeks without adverse consequence. In the adult population, studies have demonstrated that stable patients free of sepsis may successfully undergo early colostomy closure (within 2 weeks); however, there have been no studies in the pediatric population.

Anal insufficiency is a complication of rectal impalement [9]. Anal insufficiency can be detected on digital rectal examination and may be demonstrated with enema and manometry studies. Most children have only temporary sphincter weakness and may be treated with biofeedback training. Colostomy reversal should be performed only after the child has regained sphincter function.

Historically, suprapubic catheters have been used at the time of open bladder repair. Recent literature supports the use of transurethral catheter decompression in patients with intraperitoneal bladder injury [10-12]. Extraperitoneal bladder rupture may be managed with urethral catheterization alone and close observation [12,13]. A cystogram should be performed after 10 to 14 days of bladder drainage, and the catheter may be removed if there is no extravasation.

There are few reports on pediatric impalement and only 1 reported case of pediatric rectal impalement with bladder rupture [2-4,9,14]. Ruling out rectal perforation in patients with reported impalement is critical, even if there is no evidence of trauma to the perineum. Another option for the management of this patient would have been to perform a proctoscopy, cystoscopy, and laparoscopy, thereby avoiding laparotomy. In our patient, an examination under anesthesia was performed immediately because of the high likelihood of rectal and bladder injury based on location and

mechanism of injury, as well as his history of, presumably, urine drainage per rectum. Rigid sigmoidoscopy revealed a rectal injury, and in light of his fever and elevated white blood cell count, a diverting colostomy was performed. Intraoperative cystoscopy revealed bladder rupture; however, upon exploration, this was found to be extraperitoneal and was thus managed conservatively with Foley catheter drainage. The patient has undergone colostomy reversal without complication.

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