

Case Report

# Proctosigmoidoscopy Repair as the Primary Management for an Extensive Low Rectal Injury with Extraperitoneal and Intraperitoneal Involvement in a Girl

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**Key Words**

Rectal impalement;  
Proctosigmoidoscopy;  
Primary repair

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**Key Messages**

Immediate laparoscopy exploration and fecal diversion have been recommended for those with rectal penetration injury with intra-abdominal involvement. This paper aims to present the therapeutic features of the initial management in the repair of pneumoperitoneum-associated rectal impalement by proctosigmoidoscopy repair without colostomy to simplify the surgical procedures.

Penetrating rectal injury is relatively rare in children. Colorectal perforation is presumed a dirty wound in which local drainage and diversion colostomy should be considered in addition to primary repair. Laparotomy or laparoscopy as initial management has been recommended for those with intra-abdominal involvement. We presented a 5-year-old girl who accidentally sat on a long-handle spoon that penetrated into her anus and manifested with massive pneumoperitoneum. She was successfully managed by proctosigmoidoscopic transanal rectal repair with laparoscopic intra-abdominal drainage without a diversion colostomy. To simplify surgical procedures, a proctosigmoidoscopy transanal repair is an option for the initial management of pneumoperitoneum-associated rectal impalement.

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**R**ectal penetrating injury is relatively rare in children.<sup>1,2</sup> Mechanisms of penetrating rectal injury included fall from a height,<sup>3</sup> motor vehicle collisions,<sup>4</sup> impalement,<sup>1,4</sup> firearm,<sup>5</sup> and sexual assault.<sup>2</sup> Impalement was found less likely to result in multiple associated injuries.<sup>4</sup> Pneumoperitoneum caused by transanal

intraperitoneal injury is a surgical indication for either laparotomy or laparoscopic exploration.<sup>1,4,5</sup> A fecal diversion colostomy has been suggested in full-thickness rectal injuries that extended into the peritoneum.<sup>1-3</sup> This paper aimed to present the therapeutic features of initial management in the repair of pneumoperitoneum-

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associated rectal impalement by proctosigmoidoscope repair without colostomy to simplify the surgical procedures.

## Case History

We reported a 5-year-old girl who fell down and accidentally stepped and sat on a 15-cm handle plastic spoon while playing in the bathtub. She pulled out the spoon by herself from her anus without any discomfort initially. Abdominal pain accompanied by bloody stool developed 4 h later. Upon arrival at our emergency department, she was alert. On vital signs assessment, her temperature was 38.4 °C, blood pressure 110/60 mmHg; and heart rate 124 beats per minute. Physical examination revealed abdominal distension with lower abdominal pain. Some blood was found coating her anus. Laboratory findings showed leukocytosis (16930/ $\mu$ L) with a left shift (neutrophil: 81.2%). Abdominal computed tomography (CT) revealed extraluminal perirectal free air and a large pneumoperitoneum indicating full-thickness rectal or colon perforation (Fig. 1).

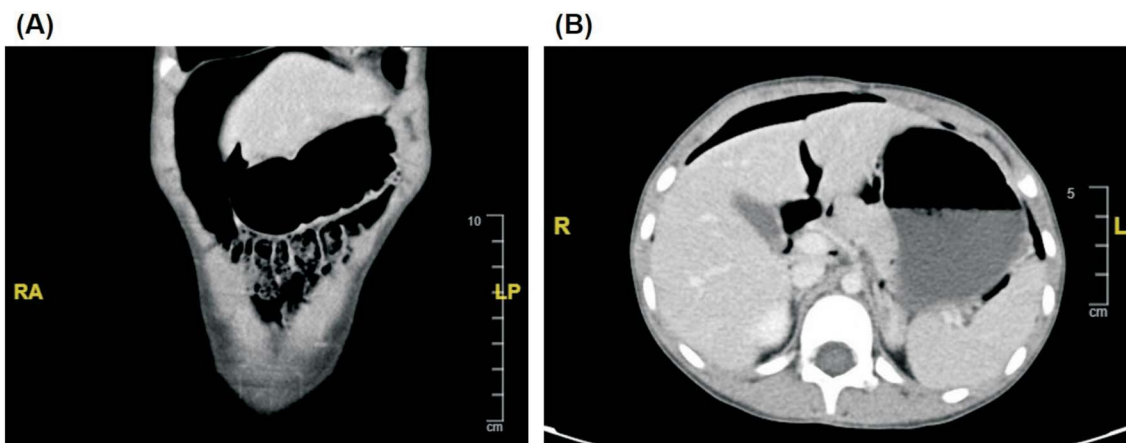
Under general anesthesia, no blood was found on a vaginal cotton swab. We then performed a rigid proctosigmoidoscopy to check for the rectal wound after stool evacuation. There was a 3 cm linear laceration on the anterior wall of the rectum at the site 5 cm from the anal verge. A stay suture was made on the laceration to pull out the rectal wall. Interrupted whole-

layer sutures were made on the rectal wound after obtaining bacteria culture. Laparoscopy was subsequently performed to examine for intra-abdominal organ injury. We found a 2 cm laceration on the anterior peritoneal reflection (Fig. 2). The peritoneal cavity was irrigated with 1 L of normal saline, and the puncture wound was left open without suture repair. A 7 mm Jackson-Pratt drain was placed just on the laceration for drainage and was removed 5 days later.

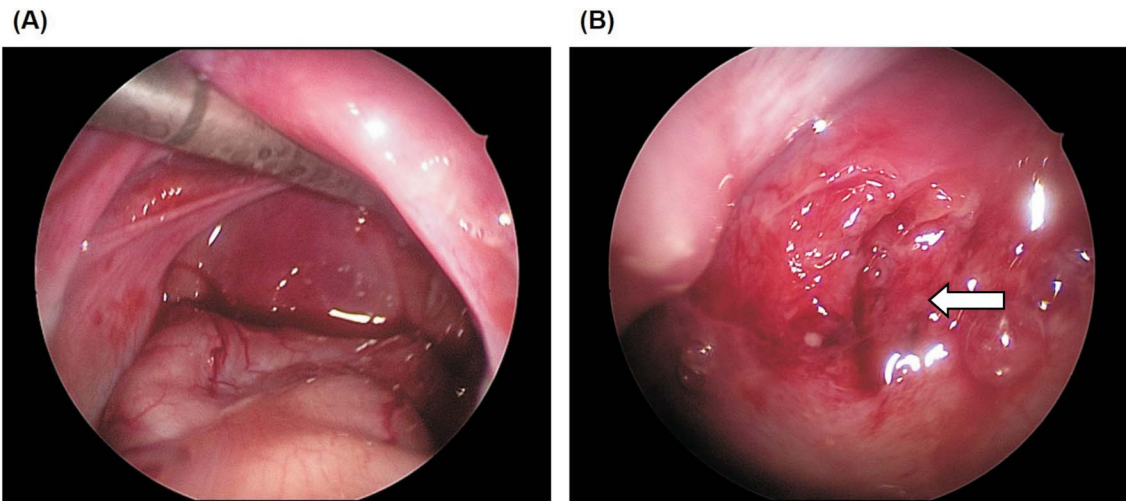
Ascites and rectal wound bacteria culture revealed *Escherichia coli*, *Klebsiella pneumoniae*, and enterococcus. Antibiotic therapy with tazocin and metronidazole was administered for 1 week. The patient resumed regular oral intake on postoperative day 3 with normal stool passage. She was discharged home on postoperative day 9 and recovered uneventfully in the 1 month follow-up.

## Discussion

Rectal impalement is limited to injuries caused by a sharp object penetrating the rectum, which is rarely discussed separately from other mechanisms of rectal injury in previous publications.<sup>1,2,5</sup> Studies have shown injuries less commonly associated in impalement rectal injury.<sup>4</sup> However, unlike blunt trauma, the lack of local findings in the perineal area does not indicate the severity of rectal injury, and rectal bleeding might be the only presenting symptom.<sup>2</sup> Careful history taking and physical examination are crucial. Abdomen CT



**Fig. 1.** Axial and coronal views of the abdominal computed tomography showed massive pneumoperitoneum.



**Fig. 2.** Laparoscopic view of bloody ascites and laceration wound on the anterior peritoneal reflection.

can provide information for extra- and intraperitoneal conditions<sup>2</sup> and was suggested as a routine examination for all patients by Arnaud et al. in Canada<sup>4</sup> because missed intraperitoneal injury could be fatal.

Pneumoperitoneum detected in imaging studies can reveal intra-abdominal hollow-organ perforation. In our patient, the pneumoperitoneum was massive and it was associated with fever and leukocytosis, which indicated a large rectal perforation and infection. Laparoscopic exploration is currently considered the initial management for diagnostic and therapeutic purposes in penetrating rectal injury with intra-abdominal involvement.<sup>1,4</sup> Most of the surgeons chose laparoscopy for the immediate management of such conditions.<sup>4</sup> Proctosigmoidoscopy was not regularly used in children with rectal injury.<sup>2,3</sup> However, we emphasized the value of an initial proctosigmoidoscopy as it permits to classify the local extent of rectal injury<sup>1,4</sup> and possible primary rectal repairment such as in our case. Immediate repair of rectal laceration transanally could reduce the extent of fecal contamination to the extraperitoneal soft tissues and intra-abdominal space, and prevent subsequent pelvic abscess. In our experience, oral intake could be resumed earlier.

Laparoscopy was recommended for the examination of intra-abdominal associated injury, and intraperitoneal bowel repair, and can guide colostomy creation.<sup>1,4</sup> However, if laparoscopy was performed first in this case, a large laceration on peritoneum reflec-

tion could jeopardize extensive retroperitoneal dissection for low rectal penetrating wound repairment, which is time consuming, traumatic and technical requirements. In contrast, with initial primary rectal repairment detected by proctoscopy, intraperitoneal punctured wound is just suitable for contaminated wound drainage to prevent or early detect pelvic infection.

Diversion colostomy was once recommended in pediatric patients with full-thickness rectal injury with intraperitoneal involvement.<sup>2,3,5</sup> However, studies have confirmed the safety of primary repair without colostomy in selected patients, especially those with a hemodynamic stable condition, without associated injuries,<sup>5</sup> managed within 6 h, with limited fecal contamination, without peritonitis initially,<sup>4</sup> or with isolated extraperitoneal rectal injury.<sup>2</sup> We successfully treated our patient without a colostomy by primary repair of the full-thickness rectal penetration and intra-abdominal dirty wound drainage. Avoiding routine fecal diversion is cost-saving and improves the quality of life.<sup>5</sup>

Early diagnosis, optimal management, and broad-spectrum antibiotics are key to the treatment of a severe impalement rectal injury with extra- and intraperitoneal involvement. In conclusion, initial proctosigmoidoscopy transanal rectal repair with peritoneal drainage can simplify the management and prevent infection in the patient with pneumoperitoneum-associated rectal injury.

**Source(s) of Support**

None.

**Presentation at a Meeting**

None.

**Conflicting Interest**

None.

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**病例報告**

# 直腸乙狀結腸鏡修復作為女孩低位直腸穿刺合併腹膜外和腹膜內損傷的主要治療方法

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穿透性直腸損傷在兒童中相對少見。結腸直腸穿孔被認為是污染性傷口，除了直接修復外，還應考慮局部引流和結腸造口術。對於合併腹腔內損傷的患者，文獻建議將剖腹探查術或腹腔鏡檢查作為初步治療。我們介紹一個 5 歲的女孩不小心坐在一個長柄勺子上，勺子穿透了她的肛門，表現了大量氣腹。我們成功地以直腸乙狀結腸鏡經肛門直腸修復術及腹腔鏡腹腔內引流治療，而無需進行結腸改道造口術。選擇先以直腸乙狀結腸鏡經肛門檢查及修復直腸穿刺合併氣腹，可簡化且避免了其他創傷性外科手術治療。

**關鍵詞** 直腸穿刺、直腸乙狀結腸鏡檢查。