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Case report

Delayed presentation of an isolated sigmoid Colon injury following blunt abdominal trauma: A case report with review of literature

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ABSTRACT

Introduction and importance: Isolated Colon injury due to blunt abdominal trauma is very rare. Due to lack of a definitive diagnostic method; it's very challenging to detect such injury and this will lead to delay in treatment and subsequently resulting in high morbidity and mortality. The current literature is relatively sparse concerning the management of blunt colon injuries.

Case presentation: Here, we report a case of a 17-year-old male patient with isolated sigmoid injury presented 5 days after MVC. He underwent sigmoid resection and end colostomy followed by reversal 6 weeks later. Currently, the patient is disease-free with a completely healed wound.

Conclusion: The purpose behind this paper is to raise clinical suspicion regarding delayed presentation of blunt abdominal trauma and it effect on operative decision, so that timely diagnosis and proper management could be carried out. And to discuss the applicability of the defined management algorithm for penetrating colon injury on delay blunts colonic injury.

1. Introduction

Colon injuries generally occur after penetrating abdominal trauma, whereas they are rarely encountered after blunt abdominal trauma. Studies have reported the incidence of colon injuries due to blunt abdominal trauma to be 0.1% to 0.5% [1–6] (it follows then that the literature is relatively sparse concerning the management of blunt colon injuries) [5,6]. The high morbidity and mortality associated with the traumatic perforation of the bowel have been attributed to the clinical difficulties in establishing an early diagnosis [1–5,7]. This work has been reported in line with the SCARE 2020 criteria [11].

2. Case presentation

17-year-old male patient, not known to have any previous medical or surgical history presented himself to our Emergency Department with history of sudden, severe lower abdominal pain for one day duration, associated with significant anal pain not related to defecation, with no history of nausea or vomiting, no change in bowel habit, other systemic review was unremarkable. He had history of road traffic accident 5 days ago but didn't have any symptoms at that time, so he did not seek any medical attention. No history of medication use. family and psychosocial history was unremarkable.

2.1. Physical examination

The patient was alert and oriented with Temperature of 37,9 C, pulse 110 b/min, and blood pressure 115/75 mmHg. Abdominal examination revealed mildly distended abdomen with tenderness all over, the rest of the examination was within normal.

Laboratory findings were normal apart from leukocytosis of 11.89 mg/dl. His chest and abdominal x-rays were unremarkable. CT with double contrast showed pocket of extra luminal air close to left psoas muscle with fluid collection mixed with air foci and edematous sigmoid colon with abdomino-pelvic free fluid (Fig. 1a, b).

After resuscitation; patient underwent exploratory laparotomy. Intra-operative findings were; hematoma at mesenteric site of sigmoid, multiple serosal tears and perforated distal sigmoid colon with intra abdominal pus collection and biogenic membrane on multiple parts of the large and small bowel (Fig. 2). Patient underwent resection of the

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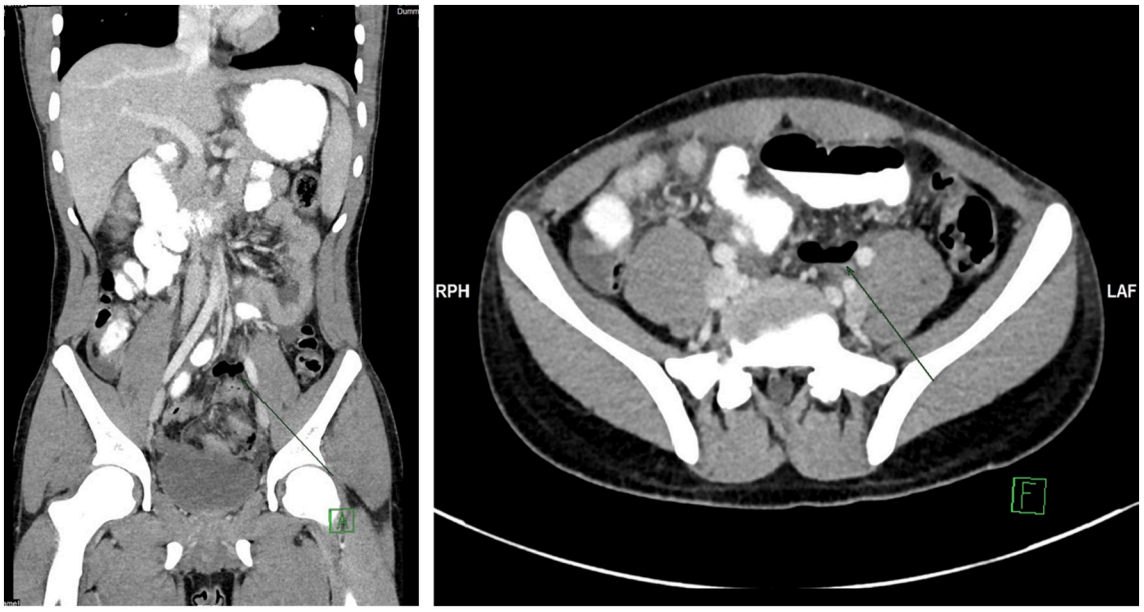

Fig. 1. CT showing Thickened sigmoid colon with adjunct fat stranding in coronal (A) and axial view (B).

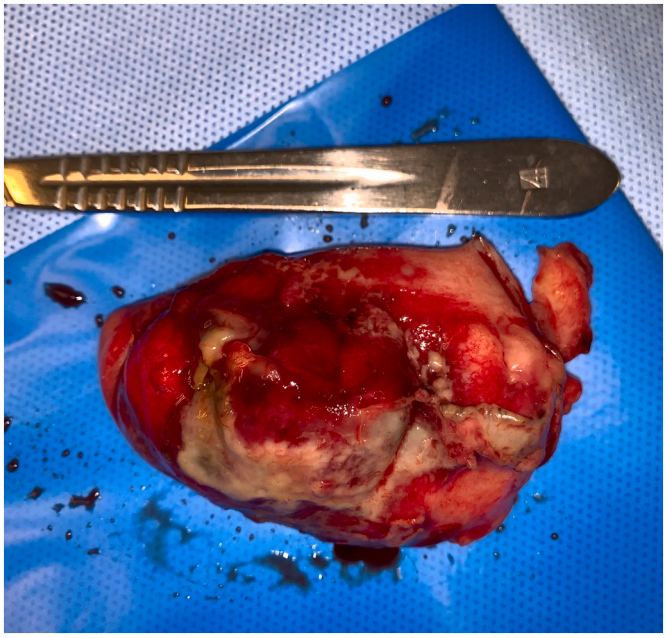

Fig. 2. Resected sigmoid specimen with biogenic membrane and perforation.

perforated part of the colon with end colostomy (Hartman procedure). Post-operatively, he had uneventful recovery and was discharged home on post-operative day 2. The Histopathological examination of the specimen revealed foci of ulceration, the muscularis propria and sub-serosal tissue show fibrosis, edema, and hemorrhage, the serosal surface in all section covered by fibrinopurulent material.

Six weeks later, the patient underwent elective laparotomy and stoma closure (reversal of Hartman) both surgeries was performed by trauma surgeon and did well postoperatively and was discharged home after 2 days also.

Follow-up visits were arranged, and patient was found to be completely healthy with a well-healed wound.

3. Clinical discussion

Colon injuries generally occur after penetrating abdominal trauma, whereas they are rarely encountered after blunt abdominal trauma, Studies has reported the incidence to be 0.1% to 0.5% [1–6]. Most of such injuries are associated with other solid organ injury [2,3]. In our case we found no accompanying intra-abdominal organ injury. Same finding was reported by Ertugrul et al. [1]. Traffic accidents are the most common cause of blunt colon injuries [1,3,5,6].

Several mechanisms for colon injuries in blunt abdominal trauma have been proposed: (a) crushing of the bowel against the spine; (b) rapid pressure increase in a relatively narrow bowel segment; and (c) shearing of the bowel or mesentery at a fixed point [1–5,7]. This results in local lacerations of the bowel wall, mural and mesenteric hematomas, transection of the bowel, and localized devascularization and full-thickness contusion of the bowel [1,3–6]. The transverse colon is the most vulnerable colonic segment to blunt trauma due to its unprotected location. The sigmoid colon is relatively less vulnerable [1,3,5,6]. In 2019 a study included a total of 3949 patients with blunt colon injuries and was found that the sigmoid injury where (34.8%) [8]. At present, there is no single test or investigation to accurately diagnose colon injuries caused by blunt abdominal trauma.

Computed tomography is the most appropriate diagnostic tool for abdominal injury; however, its diagnostic value for colon injury remains controversial [1–3,5,7]. In our case CT findings were suggestive of sigmoid perforation. Negative laparotomy done based on clinical findings can reach up to 40% [2,3]. Treatment options include primary closure, resection with or without anastomosis, and with or without colostomy [1,3].

The first guidelines for the management of colon injuries were published in 1944 and colostomy was recommended for all colon injuries since they were associated with a high mortality rate [6] until 1979, when a study was reported by Stone and Fabian, in which primary repair was associated with fewer complications than fecal diversion in selected patients [4–6,8]. Stewart et al. developed the ALG after reviewing 6 years of colon injuries and evaluating different management tools and risk factors involved in the treatment of these wounds. Their data identified large preoperative and/or intraoperative transfusion requirements (>6 U PRBCs) and multiple medical comorbidities as risk

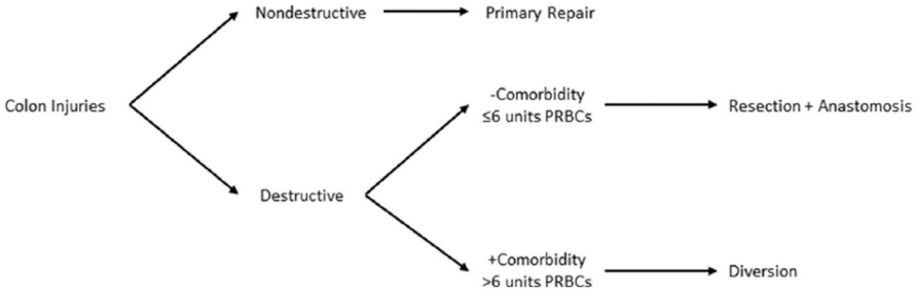

Fig. 3. Management algorithm for penetrating colon injuries.

factors for suture line failure after resection and anastomosis of destructive colon injuries (Fig. 3) [4–6,8,9].

Indicators of blunt destructive colon injuries were serosal wounds involving >50% of the colon wall circumference, mesenteric devascularization and full-thickness perforations [1,3–6].

Sharpe et al. [5] performed another retrospective study of 151 blunt colon injuries in which they followed a defined algorithm (ALG) reported by Stewart et al. for penetrating colon injuries [4–6,8] and they concluded that ALG is applicable in the setting of blunt colon injuries as well [5,6]. Contemporary literature clearly favors primary anastomosis. The few studies that recommend ostomy creation; reserve it for patients with massive blood loss, hypotension, or comorbidities [4–6,8].

In study reported by Cheng V et al. comparing clinical outcomes after primary anastomosis versus ostomy creation after subgrouping patients by colon injury; ostomy creation was significantly associated with lower rates of mortality in patients sustaining destructive sigmoid colon injuries [8]. In our case we decided to go with ostomy as area was severely inflamed and contaminated due to delayed presentation. Therefore, traditional management schemes for penetrating colon injuries may not apply to blunt injuries, putting these patients at a higher risk for suture line failure [4,5,8,10]. [As authors suggested that Colostomy should be performed when there is gross fecal contamination, and when the time between the injury and surgery exceeds 8 h [1,3][. While the decision to perform diversion in a patient with a destructive blunt colon injury may protect against the development of subsequent suture line failure, diverting stomas expose the patient to additional complications, Furthermore, diversion generally commits the patient to another operation with its own complications [1,3–6,8–10].

4. Conclusions

Isolated colon injuries are rarely encountered after blunt abdominal trauma. The low incidence and the lack of a definitive diagnostic method can lead to delays in diagnosis and treatment, subsequently resulting in high morbidity and mortality. Existing literature tends to focus on penetrating colon injuries, with few studies concentrating on blunt colon injuries. Most studies that include blunt injuries do not distinguish their analyses by mechanism, site and timing despite the fact that blunt and penetrating colon injuries differ significantly in pathophysiology. The defined management algorithm, originally defined for penetrating colon injuries, was efficacious for the management of early blunt colon wounds but in delayed injury diversion was found to be associated with lower rates of mortality and morbidity. In our case we decided to do diversion (Hartman procedure) due to delay presentation and vulnerability of bowel. We believe that the defined management algorithm for penetrating colon injury can't be applied to delay injury as in this case the colon are more vulnerable due to the present of contamination and pus collection for prolong period of time, which increases risk of postoperative complication and leaks. Additional research is needed to completely define the patient population that benefits from fecal diversion after delayed blunt colon injury requiring resection.

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Ethics approval

This clinical case has been approved by the Institutional Ethics Committee.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

CRediT authorship contribution statement

All authors contributed equally to this work including writing and critical revisions.

Declaration of competing interest

None of the authors have any conflict of interest to declare.

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Registration of research studies

Not applicable.

Guarantor

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