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Case Report

A rare case of isolated sigmoid colon injury in blunt trauma abdomen: a case report

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ABSTRACT

Isolated colonic injury due to blunt abdominal trauma is very rare. Modalities of detecting colonic injuries are also very inconclusive in the background of a blunt trauma abdomen. Here we present a case of blunt trauma abdomen in a 45 year old male who sustained steering wheel injury in a road traffic accident 5 days ago and presented with symptoms and signs of peritonitis. Ultrasonography showed free fluid in the pelvis that was confirmed by contrast enhanced CT of the abdomen which revealed additional intraperitoneal air pockets with hemoperitoneum. Patient was taken up for emergency laparotomy and findings included fecal peritonitis, sigmoid colon perforation with impending transection. Peritoneal lavage with Hatmann's procedure was done. Due to lack of a definitive diagnostic method, it is very challenging to detect such injuries and this will lead to delay in treatment and subsequently results in high morbidity and mortality.

Keywords: Blunt trauma, Sigmoid, Perforation, Hemoperitoneum, Transection

INTRODUCTION

Colorectal injuries occur most commonly after penetrating trauma to the abdomen rather than blunt trauma mechanisms. Colon and rectum are the second most commonly affected hollow viscera, first being the small bowel. This was seen in a study of series of 250 cases where the incidence of colorectal injuries was around 36.4% in penetrating trauma whereas the incidence of the same was less than 1% with an associated mortality of 13-20%.[1,2] From an examination standpoint, the retroperitoneal location of the right and left colon can obscure findings and injury identification which was not very obvious in case of blunt trauma abdomen.

CASE REPORT

A 45 year old male presented to the trauma emergency department with a history of road traffic accident-steering wheel injury to the abdomen while driving a bus, 5 days ago. He had a history of pain abdomen for which he was admitted at a nearby hospital. He was treated conservatively with analgesics and an ultrasound abdomen as done at that center which revealed free fluid in the abdomen and pelvis. He was referred to our centre for expert opinion and also further management.

History

On further probation, he revealed a history of abdominal pain associated with distension of the abdomen for 5 days since trauma. He also gave a history of vomiting for 3 days that was non bilious, non-projectile, aggravated on food intake. He had a history of constipation for 3 days followed by bleeding per rectum on the day of admission.

No history of T2DM, SHTN, BA, epilepsy, any drug intake or drug allergy was seen.

Examination

On examination: Glasgow coma scale E4V5M6 was 15/15; airway, breathing, circulation was adequate; pallor was positive, no icterus; tachypnea positive. Vitals were BP=110/70 mmHg; PR=114 /minute; saturation=97% in room air; RR=22 /minutel temperature was normal.

Per abdomen

Inspection

Abdomen was distended and all quadrants were moving proportionately with respiration. There was a contusion with patterned abrasion over the infra umbilical region measuring 7×5 cm.

Palpation

On palpation there was diffuse tenderness over all quadrants of the abdomen with localised guarding over the umbilical, suprapubic, right and left iliac fossa with no rigidity.

There was no other organomegaly or mass palpable per abdomen.

On auscultation bowel sounds were absent and percussion revealed no shifting dullness. Digital rectal examination was done which showed blood stained fecal matter with normal anal tone.

Investigations

Blood investigations revealed an elevated leukocyte count at 16,800; hemoglobin-8.5 g/dl with normal platelet count and renal and liver parameters. X-ray abdomen of the patient revealed no obvious air fluid levels or air under the diaphragm (Figure 1).

Figure 1: X-ray erect abdomen.

Given the hemodynamic stability of the patient, the patient was shifted for eFAST which revealed free fluid in the pelvis and the Morrison's pouch. Contrast enhanced CT scan of the abdomen was done which showed evidence of hemoperitoneum with multiple free intraperitoneal air pockets in abdomen and pelvis (predominantly along the right paracolic gutter), sigmoid colon thickening with mesenteric fat stranding and no significant non enhancing areas in the solid organs (Figure 2).

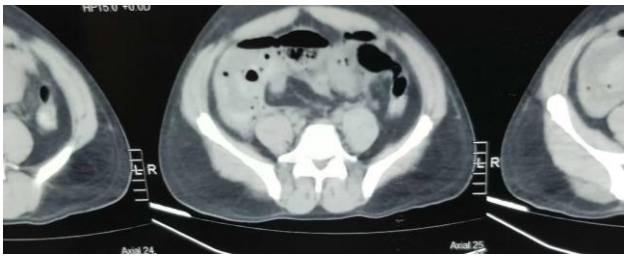

Figure 2: CT scan showing hemoperitoneum with multiple air pockets in right paracolic gutter.

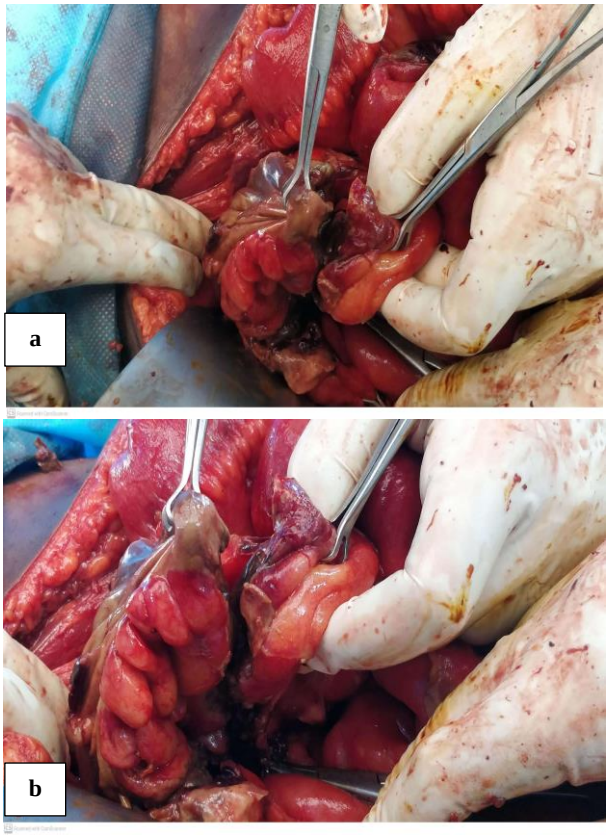

Figure 3 (a and b): Sigmoid colon perforation of size 5×6 cm with impending transection.

Operative procedure

Patient was taken for emergency laparotomy after adequate resuscitation with blood and blood products. Patient was transfused with 2 packets of PRBC and 4 packets of fresh frozen plasma. Findings included diffuse

fecal peritonitis of about 300 ml with sigmoid mesocolon injury with sigmoid colon gangrene leading to perforation of size 5×6 cm with impending transection of the sigmoid colon about 6 cm proximal to the rectosigmoid junction (Figure 3 a, b and 4). Solid organs like liver, spleen and pancreas were found to be normal. Other parts of small bowel and large bowel along with mesentery were found to be normal. Thorough peritoneal lavage was done with 5 litres of warm saline and antibiotic solution. We proceeded with resection of the gangrenous sigmoid colon with placement of proximal colostomy and closure of distal stump-Hartmann's procedure. Abdomen was closed in layers after ensuring complete haemostasis and verifying the pads and instruments count.

Figure 4: Post-operative specimen of sigmoid colon showing gangrenous areas with transection.

Post-operative care

Post procedure, the patient's recovery was uneventful. He was started on an oral diet on day 2 and stoma output and functioning were monitored serially. He developed superficial surgical site infection on day 7 which was managed conservatively with serial wound cultures and antibiotics discharged on post-operative day 14.

He was admitted for stoma take down after 3 months and reversal of the stoma was done after performing a loop contrast study. Post-operative period was uneventful and the patient was discharged on post-operative day 8 without any complications.

DISCUSSION

Colonic injuries generally occur after a penetrating trauma to the abdomen, but the incidence of the same in blunt trauma abdomen was reported to be around 1% according to a study done by Ricciardi et al.[3] Trauma due to road traffic accidents was found to be the major cause of blunt trauma abdomen followed by falls and assault according to Dauterive et al and Hughes et al.[4,5]

Zheng et al conducted a retrospective study on 82 patients out of which 57 patients (69.5%) presented due to a road traffic accident, 18 patients (21.9%) had injury of the colon due to an occupational accident, six patients (7.3%) had sustained an assault, and one patient (1.2%) presented due to an explosion.[6] The retrospective study conducted by Öztürk et al on 64 patients revealed that 32 patients (50%) presented due to motor vehicle accident, 13 patients (20.3%) presented due to fall from height, 12 patients (18.7%) presented due to car crashing and seven patients (10.9%) presented due to assault.[7]

Table 1: Grading of colonic injuries.

Grade	Type of injury	Description of injury
I	Hematoma	Contusion or hematoma without devascularisation
	Laceration	Partial thickness, no perforation
II	Laceration	Laceration <50% of circumference
III	Laceration	≥50% of circumference without transection
IV	Laceration	Transection of the colon
V	Laceration	Transection of colon with segmental tissue loss
	Vascular	Devascularised segment

In our case report we presented a case of sigmoid colon injury due to a road traffic accident caused by steering wheel injury which was a form of deceleration injury.

Isolated colon injury was a very rarely encountered condition. It was usually associated with other injuries, for example, to the small bowel, solid viscera like liver, spleen or pancreas. Even in the study conducted by Zheng et al only 20 patients presented with isolated colon injury out of total 82 patients and in the study by Öztürk et al only 7 patients out of 64 patients had isolated colonic injury.

Several mechanisms have been proposed for the cause of colonic injury in blunt trauma abdomen. The colonic segment may get crushed between two objects like the seat belt anteriorly and the vertebrae or pelvis posteriorly. In this case report, the mechanism of injury was a shearing force which was produced by a steering wheel hitting against the lower abdomen of the patient. This usually resulted in localised lacerations of the bowel wall, mesenteric hematomas leading to devascularization and full thickness gangrene or contusion of the bowel wall.

Sometimes devitalisation may result in late perforations, which happened to be the case in our patient. Rapid deceleration was another mechanism which can create shearing forces between natural fixed points like the Treitz ligament, both ends of the sigmoid colon, ileocaecal junction and lastly the mobile portions of the colon. This can lead to rupture of the bowel when the intraluminal pressure increases. The transverse colon was the most vulnerable colonic segment to blunt trauma due to its unprotected location. The sigmoid colon was relatively less vulnerable.

In a patient suspected to have colonic injury due to blunt abdominal trauma, the time interval between emergency department admission and surgery was of utmost

importance. A shorter duration minimized the morbidity and mortality that would be encountered in the post-operative period. The rate of complications associated with colon injury was significantly higher if the duration was longer than 24 hours after the injury.[8]

At present there was no single diagnostic modality to detect colonic injuries in a setting of blunt trauma abdomen. Penetrating injuries usually provided a clue to the diagnostician and the surgeon as to the possible site of entry and the possible injury caused by the mechanism. Examination findings of abdominal distension, tenderness, presence of guarding or rigidity should raise a clinical suspicion. However, the absence of such clinical findings does not necessarily rule out an intra-abdominal injury. This in combination with leukocytosis can prove to be significant.

Ultrasonography may reveal free fluid in the abdomen and pelvis particularly between the intestinal loops without the presence of solid organ injury may indicated a bowel injury. Computed tomography was the most appropriate diagnostic tool to comment on abdominal injury, however, its diagnostic value for patients with colon injury still remained controversial. On computed tomography, presence of free air in the abdomen and extravasation of the contrast agent were significant findings. In this case, contrast enhanced CT of the abdomen showed hemoperitoneum with multiple air pockets which was of diagnostic significance.

Surgical treatment options included primary closure of the perforation, resection with anastomosis and fashioning a colostomy. Primary repair of the perforation was reserved for injuries involving less than 50% of the colonic wall. Resection and anastomosis can be considered when there was extensive mesenteric injury impairing the blood supply or when the tissue loss was more than 50% of the colon circumference, necessitating a resection of the gangrenous portion followed by anastomosis. Colostomy was the preferred surgical treatment when there was gross fecal contamination and the time between the injury and treatment exceeds eight hours. In this case report, the patient had extensive fecal contamination, hence anastomosis was deferred and a colostomy was performed.

The most common postoperative complications were wound site infection, intra-abdominal abscess, intra-abdominal sepsis and post-operative bleeding. Surgical site infection was encountered in our patient post procedure on day 7 and it was managed conservatively.

CONCLUSION

The low incidence of sigmoid colon injury due to blunt abdominal trauma and the lack of a definitive diagnostic method can lead to delay in diagnosis and treatment, subsequently resulting in high morbidity and mortality. Only less than 50% of gastrointestinal tract injuries resulting from blunt trauma are reported to have sufficient clinical findings to indicate the need for laparotomy. The purpose behind this case report is to raise clinical suspicion regarding delayed presentation of blunt abdominal trauma and its effect on operative decision, so that timely diagnosis and proper surgical management could be carried out. As such there is no standard algorithm to surgically manage patients who present late to the surgeon. The management algorithm of blunt trauma abdomen who present early cannot always be applied to the management of patients who present late. Hence a high index of suspicion is needed for ensuring early diagnosis and initiating appropriate treatment protocols.

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