

Adhesive intestinal obstruction following blunt abdominal trauma

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ABSTRACT

Advances in diagnosis and management of multiple trauma patients have led to adopting a conservative approach for most patients with blunt abdominal trauma. Intestinal obstruction is a rare complication for this approach. Herein, we report a 37-year-old male, who did not have an abdominal operation, and who developed adhesive intestinal obstruction 7 weeks following blunt abdominal trauma. We detected no signs of peritonitis or intra-abdominal bleeding clinically or radiologically on admission. We initially treated the intestinal obstruction conservatively, but the obstruction did not resolve. Finally, we performed laparotomy, which showed that the small bowel was matted together by thick fibrous layers of adhesions. We performed adhesiolysis, and the patient was discharged home 3 weeks later. Histopathological findings of the fibrous layer were consistent with repair due to previous trauma and hemorrhage. We review the literature of this rare condition.

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Management of blunt abdominal trauma continues to be a challenge for trauma surgeons. In the absence of peritonitis or uncontrolled bleeding, most of these patients are usually managed non-operatively.¹ On rare occasions, such patients may develop delayed intestinal obstruction. This can be due to small bowel strictures, entrapment or adhesions. Strictures can be caused by small bowel perforation, localized bowel ischemia, or mesenteric vascular injury.²⁻⁴ Bowel loops can be entrapped between pelvic fracture fragments.^{5,6} Adhesive intestinal obstruction following blunt abdominal trauma is under-reported.⁷ Herein, we report a case of adhesive intestinal obstruction following blunt abdominal trauma and review the literature on this topic.

Case Report. A 37-year-old Bangladeshi male was hit by a pickup truck when he was riding his

bicycle. The left side of his pelvis was hit from the back and he fell on the ground. On arrival to our hospital, the patient was talking and had free air entry on both sides of the chest. His blood pressure was 135/80, pulse 94/minute and Glasgow coma score was 15. The abdomen was soft and lax. He sustained bilateral rib fractures, fractured left scapula, and a displaced fracture in the roof of the left acetabulum extending into the iliac crest (**Figure 1**). A CT scan of the brain and abdomen were normal. A CT chest showed bilateral minor hemothorax and basal lung contusions. Bilateral chest tubes were inserted. The patient had no history of chronic medical illness, surgery, abdominal radiation, intra-abdominal infection, or inflammatory bowel disease. Three days after admission, open reduction and internal fixation of the pelvic fracture was performed. Surgery was completely extraperitoneal. The patient tolerated normal diet well. Seven weeks later the patient developed

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central colicky abdominal pain, vomiting, abdominal distention, and constipation. Clinical examination demonstrated a distended abdomen, tympanic percussion and metallic bowel sounds. Plain abdominal x-ray revealed distended bowel loops and a radiopaque shadow in the right upper quadrant (**Figure 2**). Ultrasound showed multiple gallstones with normal gall bladder wall. Gastrographin study showed delayed passage of the dye to the rectum (**Figure 3**). An abdominal CT scan with oral and intravenous contrast showed that there was no retroperitoneal hematoma (**Figure 4**). A clinical picture of partial intestinal obstruction was confirmed. He was treated conservatively for a week. He continued to pass small amounts of stool and flatus, but the intestinal obstruction did not resolve. Finally, laparotomy was performed. The small bowel was matted together by a thick fibrous layer of adhesions (**Figure 5**). The whole small bowel was distended, except the terminal 60 cm. The screws, which were used for the internal fixation of the iliac crest, did not transect the peritoneum. There was no definite band at the site of the internal fixation. Adhesiolysis was performed and the whole bowel was released. Three enlarged ileocolic lymph nodes and part of the fibrous tissues were sent for histopathology. Histopathology of the fibrous layer showed mainly proliferating fibroblasts, congested blood vessels and a moderate amount of hemosiderin pigment (**Figure 6**). All lymph nodes showed reactive changes. No hemosiderin pigment was seen in the lymph nodes. Histopathological features were consistent with repair due to previous trauma and hemorrhage. There was no evidence of tuberculosis. Postoperatively, he received total parental nutrition for 3 weeks. He was discharged home eating normal diet and using a stick as walking aid.

Discussion. Delayed intestinal obstruction following blunt abdominal trauma is rare. Few cases have been reported in the literature. Most of these described strictures as a cause of intestinal obstruction.²⁻⁴ Controversy exists regarding the actual mechanism leading to intestinal strictures. Some thought that small subclinical perforations might seal off spontaneously, producing stricture due to scar formation.⁸ Others thought that localized bowel ischemia follows trauma, which results in hemorrhagic mucosal infarction and subsequent healing by fibrosis and stenosis.^{1,9} It is most likely, however, for focal ischemia of the gut to be secondary to mesenteric injury. This is due to mesentery vessels are more likely to be injured by shearing forces at the base. The mesentery root is fixed to the posterior abdominal wall and is less elastic than the small intestine. The affected parts of the small bowel are usually the terminal ileum and proximal jejunum, which are relatively fixed.⁴

Entrapment of the bowel by pelvic fracture fragments may cause bowel obstruction following blunt abdominal trauma. Acute intestinal obstruction may follow internal fixation or skeletal traction of the pelvic fracture.¹⁰⁻¹² We do not think that this is the cause in our patient. The screws, which were used for the internal fixation of the iliac crest of our patient, did not transect the peritoneum. There was no definite band at the site of the internal fixation. Pelvic fracture and associated retroperitoneal hematoma are known causes for posttraumatic ileus. Ileus usually stays for short duration, but occasionally is prolonged.¹³ The clinical and radiological picture of our patient was suggestive of mechanical intestinal obstruction and not ileus. Entrapment of the small bowel in pelvic fractures may be delayed, presenting as a fecal fistula.^{14,15}

Adhesive intestinal obstruction following blunt abdominal trauma is a very rare complication. Trauma may not be identified as the cause of adhesive intestinal obstruction especially if the trauma was old and trivial.⁷ Our patient with adhesive intestinal obstruction following blunt abdominal trauma is the first in the literature to be proven by histology. Initial clinical and abdominal CT findings did not detect intra-abdominal bleeding. However, this cannot completely rule out minor peritoneal bleeding. Pelvic fractures are known to be associated with retroperitoneal hematomas that may leak intraperitoneally. Some patients may complain of repeated episodes of abdominal pain and vomiting lasting for years before developing the full picture of intestinal obstruction. This may affect the patients' life and add to his/her suffering especially when no definitive diagnosis is made.⁷ Our patient developed mechanical intestinal obstruction 7 weeks after the injury.

The cause of intestinal adhesions following trauma is unclear. Peritoneal contusion following trauma may decrease the fibrinolysis and result in formation of adhesions.⁷ The histopathological findings in our patient indicate that intraperitoneal fibrosis and adhesions were caused by previous intraperitoneal bleeding. This was most likely caused by the blunt abdominal trauma at the time of injury.

In summary, intestinal obstruction following blunt abdominal trauma can be caused by strictures, entrapment or adhesions. Adhesions are the least reported cause of posttraumatic intestinal obstruction. It is possible that this complication is under reported as surgeons think that it is common and not worth reporting. Another explanation is that surgeons performed diagnostic laparotomies more freely in the past, and they possibly blamed surgery for the adhesions. Blunt abdominal trauma may cause adhesive intestinal obstruction even without a laparotomy.



Figure 1 - A displaced fracture in the roof of the left acetabulum extending to the iliac crest.

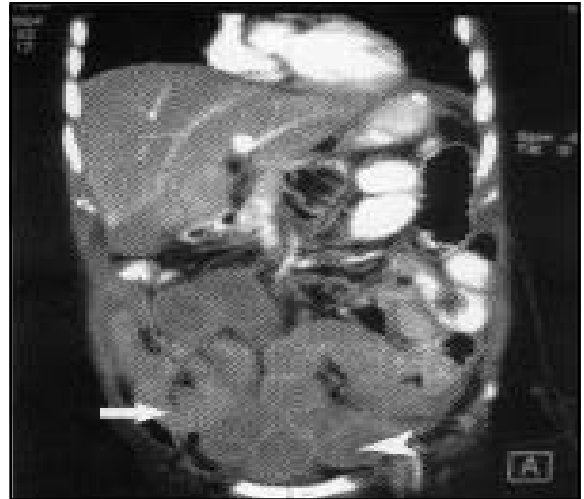


Figure 4 - Coronal reconstruction of abdominal CT scan with oral and intravenous contrast showing distended small bowel loops (triangle arrow) and collapsed terminal ileum (complete arrow).



Figure 2 - Plain abdominal x-ray showing distended bowel loops and a radiopaque shadow in the right upper quadrant (arrow).



Figure 5 - Laparotomy showing distended small bowel loops, which were matted together by thick fibrous layer of adhesions.



Figure 3 - Follow up gastrograffin study showing that most of the dye has passed to the rectum.

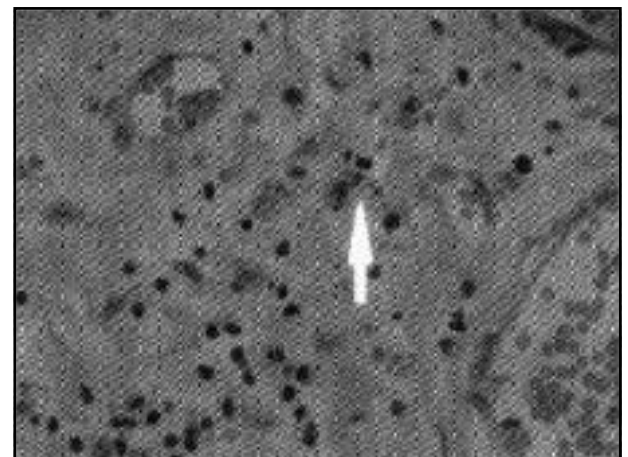


Figure 6 - Histopathology of the fibrous layer showing mainly proliferating fibroblasts, congested blood vessels and moderate amount of hemosiderin pigment (arrow), which indicates previous hemorrhage at the site.

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