Retroperitoneal Colon Perforation from Blunt Trauma: A Rare Presentation

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Blunt injury to the intestine is uncommon and injury to the colon is quite rare. Colon injuries occur in 2% to 5% of blunt abdominal trauma patients, with serious injuries (perforation, active bleeding) seen in about 0.5% of all trauma admissions. A 33-year-old male when brought to our centre after 2 weeks of road traffic accident sustaining severe degloving injury to right forefoot and Grade II left renal injury and spleen injury with minimal hemoperitoneum, who was previously hemodynamically stable and was eating normal diet and passing stool and flatus had vague mass in the left flank with pain. Suspicion of increasing hematoma of the local organ injury did computer tomography scan of abdomen reveled a different result. Patient had perforation of the retroperitoneal portion of the colon with feces in the retroperitoneum. Patient was explored and managed with resection of perforated bowel and diversion colostomy. Patient had complication in the postoperative period and was managed accordingly. In blunt traumatic colon injuries, delayed perforations may be found a few days later. These injuries in isolation may go unnoticed for an extended period of time if a high index of suspicion is not maintained. Retroperitoneal colonic lacerations by blunt trauma are uncommon.

Keywords: blunt trauma, colon injury, retroperitoneal perforation.

Blunt abdominal and pelvic trauma can cause significant and sometimes life-threatening injuries to retroperitoneal structures. Retroperitoneal injuries are known to occur in a significant minority of abdominal trauma cases (12% of hemodynamically stable patients evaluated at one center.[1] Physical examination and laboratory tests can be unreliable in detecting abdominal injuries, particularly retroperitoneal injuries.[2] Bedside tests such as diagnostic peritoneal lavage and focused ultrasonography for the assessment of trauma can yield negative findings or fail to help detect signs of retroperitoneal

injury, even in the presence of significant retroperitoneal injury, since these methods principally help assess the peritoneal space.[3]

Case Report

A 33-year-Old gentleman presented to emergency department after 2 weeks of road traffic accident, when a truck collided with a motorcycle in which he was travelling as a pillion rider. He sustained severe degloving injury over right forefoot with bimalleolar fracture for which he already had transmetatarsal amputation done. He also sustained blunt abdominal trauma over the left side of the abdomen and was managed conservatively. On radiological investigation (Computed tomography) done at other centre had Grade II Left renal injury and spleen injury with minimal hemoperitoneum. The patient had only radiological images with him and discharge paper and no other documents were available.

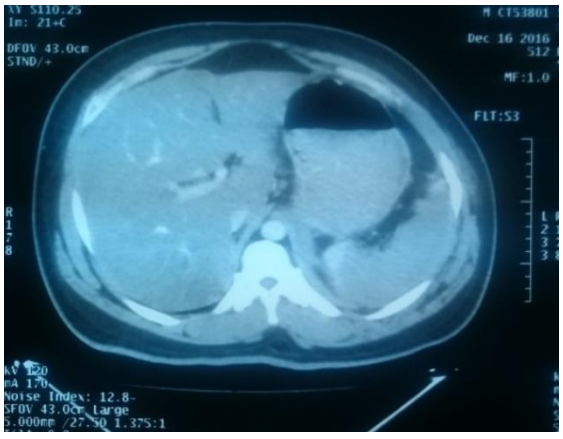

Figure 1: CT scan of abdomen, Axial section showing spleen injury

On arrival at emergency department, he was hemodynamically stable; chest compression was positive on the left side. Per abdomen examination revealed soft abdomen however, mild tenderness was observed over left hypochondrium region and a vague mass ~3x4cm was felt over the left loin region. His bowel sounds were present. He had normal anal tone and there was no blood staininig finger after digital rectal examination. There was extensive degloving injury of the right foot involving the whole extent of ankle and foot with loss of skin, gangrenous distal part with contamination, however distal peripheral pulse was present.

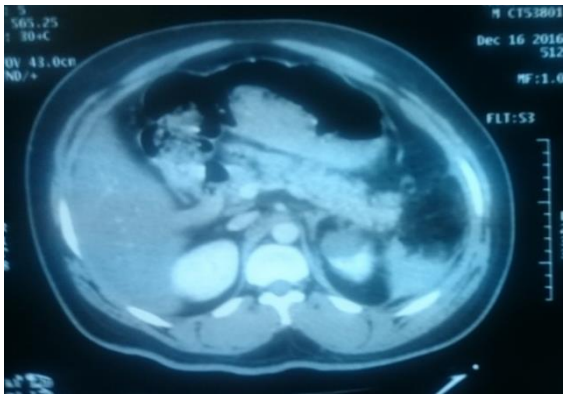

Figure 2: CT scan of abdomen, Axial section showing Left Renal Injury

Figure 3: CT scan of abdomen, Axial section showing air and fecal collection in the retroperitoneal area

On his hematological investigations, his hemoglobin was 9.2gm/dl, total count was 15,600cu/^{mm3} and all other parameters were within normal range. His chest x-ray showed 8th and 9th ribs fracture but there was no features pnemothorax or hemothorax. On x-ray abdomen both erect

and supine there were no abnormalities detected. He already had CT scan done 2 weeks back so, only ultrasonography of abdomen was done which showed minimal free fluid collection in the pelvis with features suggesting left renal and spleen injury **(Figure 1-4)**.

Figure 4: CT scan of abdomen, Coronal Section showing collection in the retroperitoneal area

A provisional diagnosis of "Road Traffic Accident with Grade II Left Renal and Grade II spleenic injury with hemoperitoneum and degloving injury of right foot" was made. Patient was admitted in high care unit for close observation. A joint approach from the orthopedic and general surgery for the management of the case was done.

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Daily examination and observation was done, however patient was tachycardic, blood pressure was high and per abdominally tenderness had increased and the mass has increased since the admission. On suspicion of increasing hematoma trans-abdominal ultrasound done, but showed a different report; there was minimal fluid and rest of the abdomen was normal. CT-scan of abdomen was done which showed large air and fluid collection in left side of retroperitoneum connecting with transverse and descending colon extending superiorly up to the level of irregular splenic margin and also connecting with few air foci of left lateral abdominal wall as described-likely perforation/rupture of splenic flexure with large loculated retroperitoneal collection. Splenic injury (laceration) [AAST grade III] and Left Kidney injury Grade II (contusion)

Patient underwent exploratory laparotomy with resection of injured colon and double barrel colostomy. Intraoperatively, about 50ml of clot was present in paracolic gutter. Dense adhesion present between spleen, lateral wall, splenic flexor present. About 2/3rd of splenic flexor was disrupted and around 500ml of fecolith present. All other transverse colon, small intestine and descending colon appeared normal. But on 5th post-operative day patient had fever and his colostomy site appeared blackish colored and his left flank was tender. Trans-abdominal ultrasound showed about 300ml of collection with air bubble & terminal echoes seen in subsplenic area. Patient was again taken for exploratory laparotomy and refashioning of the colostomy done. As the length of the bowel was short and couldn't be properly mobilized from the colostomy site midline

approach was taken and drain was kept at sub-splenic area. Black colored proximal end of colostomy and about 500ml of dirty foul smelling fluid drained from sub-splenic area was seen intraoperatively. The drain was continued for 2 weeks, as it was draining continuously and colostomy closure was done after 6 weeks.

Discussion

Blunt injury to the intestine is uncommon and injury to the colon is quite rare. Colon injuries occur in 2% to 5% of blunt abdominal trauma patients, with serious injuries (perforation, active bleeding) seen in about 0.5% of all trauma admissions. Colon perforation accounts for 10% to 22% of bowel perforations, and colonic mesenteric injuries account for about a third of mesenteric injuries. The majority of blunt colon injuries (75–90%) are due to motor vehicle collisions. The use of seatbelts, though decreasing overall mortality, has resulted in a three-fold increase in colonic injuries, particularly when worn in an incorrect position.[4]

Multiple mechanisms have been postulated. These include compression of the colon between the abdominal wall and the spine, which results in a sudden increase in intraluminal pressure and rupture. This is believed to be the reason for perforations being most common in the transverse and sigmoid colon. Shear injuries resulting in serosal tears and mesenteric bleeding as well as intramural hematomas are more common at points of fixation such as the right and left colon. Although different series report varying anatomic distributions of injury, overall colon injuries seem to be relatively equally distributed though out the colon.[4]

Hemorrhagic contusion is the most frequent type of injury to the colon, followed by serosal tears, which occur most commonly in the transverse colon. Severe injuries occur more commonly in the sigmoid, right colon and cecum, where frank rupture or devitalization from vascular compromise may result. Because of the force required to injure the colon, other intra- and extra-abdominal injuries often coexist. Injury to the transverse colon appears to have more associated injuries than other sites of colon injury.[5] As in our case, patient had injury over splenic flexure along with injury to spleen and left kidney. Typically, a large energy transfer is necessary to injure a hollow, mobile structure, so associated injuries are very common. Intra-abdominal injuries are typically in the liver, spleen, and small bowel mesentery. Extra-abdominal injuries are commonly skeletal, facial, and neurologic injuries. Colon injuries in isolation are quite rare, but they are exceptional difficult to diagnose. These can result from low-speed collisions, explosive blasts, and impact on body armor. These injuries in isolation may go unnoticed for an extended period of time if a high index of suspicion is not maintained.[4]

Anterior penetrating abdominal injuries involving the ascending and descending colon, including the flexures, usually affect the intra and retroperitoneal posterior walls. Symptoms caused by the intraperitoneal component lead to exploration. Posterior retroperitoneal wounds without intraperitoneal component may not present without intraperitoneal component may not present symptoms initially and, unless there are other reasons

for exploring the abdomen, may not be discovered until they have led to complications such as retroperitoneal abscess or phlegmon. As in our case, the patient had an increasing vague mass over the left flank and was tender. After imaging, it was found to be a fecal collection retroperitoneally. Retroperitoneal air on flim is a rare finding in colonic lacerations but, if present, is an indication for exploration. Retroperitoneal colonic lacerations by blunt trauma are uncommon.[6]

Hence, even with the increasing diagnostic armamentarium available to the trauma surgeon, a high degree of suspicion for colon injury must be maintained, even with negative evaluation and testing. Initial physical examination will demonstrate peritonitis in a small number of patients who clearly require operative exploration; however, this finding is not specific for colonic injury. Of patients with intestinal injury, 87% to 97% have an abnormal examination including tenderness, distension, pain, or abdominal wall ecchymosis. These findings, however, are nonspecific and may also be found in patients without intra-abdominal injury. Overall, only about 20% of patients with colon injury proceed to operative intervention on the basis of physical examination alone.[4] Similar condition with our patient, initial imaging was negative for any bowel perforation and was only found after 2 weeks of the incident.

Serial abdominal examinations are very accurate in the diagnosis of bowel injury. Any patient with initially concerning findings, even with normal radiographic evaluation, should be admitted and evaluated with serial abdominal exams to reduce the risk of a long delay in diagnosis of colonic injury. A delay in diagnosis of blunt colon injury is not uncommon, occurring in 7% of patients in one large series, despite the majority (67%) of these patients having previously negative diagnostic testing (diagnostic peritoneal lavage [DPL] or computed tomography [CT] scan). This is particularly true in the rare patient with an isolated colon injury. Delayed perforations may occur because of intramural hematomas releasing, abscess formation that bursts, vascular compression from mesenteric hematoma with infarction, and initial walling off of a perforation by omentum or small bowel. These findings are most common with injury to the retroperitoneal portions of the colon because there is no peritoneal irritation to provide early warning signs.[4] Our patient had retroperitoneal perforation and didn't showed any signs of peritonitis initially and later showed signs of deterioration, the colon might have been intact initially and later perforation occurred as a result of devascularization injury to that portion.

Computed tomographic findings of intestinal rupture include pneumoperitoneum (without an intrathoracic source or previous peritoneal lavage); gas in the mesentry, bowel wall, or retroperitoneum; and extra luminal extravasations of contrast material. Other findings suggestive of bowel rupture include thickening of the bowel wall, anterior para-renal fluid, or free intraperitoneal fluid without a known source. Notwithstanding the value of these findings when they are detected, CT is considerably less reliable in detecting hollow organ injury than solid organ

injury. Diagnostic peritoneal lavage done soon after blunt abdominal trauma may also miss a perforated hollow viscus. Presumably, this is related to an initial absence of an inflammatory response. The presence of excessive leukocytes (>500/mm^3) in the effluent is highly suggestive of bowel injury. The presence of vegetable matter is also suggestive. The cell count ratio was defined as the ratio between white blood cell count and red blood cell count in the lavage fluid, divided by the ration of the same parameters in the peripheral blood. A cell count ratio ≥ predicted hollow organ perforation with specificity of 97% and sensitivity of 100%.[5]

Treatment

Comparable to patients with other general trauma, patients with traumatic colorectal injury should be first evaluated and treated for injury that may threaten life, sufficient resuscitation by fluid and transfusion is required, and efforts should be made to reduce hypothermia, hypotension, shock, and acidosis, all of which can influence the morbidity and the mortality rates. To select treatment methods for colon injury, first, colon injury grading scales that evaluate the level of colon injury should be accurately understood. As grading scales limited to colon injury, two systems, the Flint scale prepared by Flint et al. and the colon injury scale (CIS) of the American Association for the Surgery of Trauma (AAST), are frequently applied. Based on them, the level of colon injury can be objectified by classifying colon injuries as destructive colon injuries or non-destructive colon injuries.[7]

Blow out injuries by seat belts and wheels are the most common, ischemia is developed due to vascular injuries, and delayed colon perforation may occur. Therefore, the possibility of delayed colon perforation should be kept in mind. In blunt traumatic colon injuries, delayed perforations may found a few days later, and in case of severe fecal contamination during the operation and septic conditions, resection and diverting colostomy are preferred rather than the primary repair. In cases with destructive colon injuries, hypovolemic shock, severe intra-abdominal fecal contamination, old age, associated severe underlying medical disease and less experienced trauma centers, the proximal diversion is performed more frequently for blunt-trauma colon injuries.[7] As the patient had severe contamination in the retroperitoneal space, resection of the injured colon was resected and a diversion colostomy was created. As the there was devascularization injury the colostomy edges appeared black/necrosed in postoperative period and refashioning of the colostomy was done.

Conclusion

The colon is the second most commonly injured organ in penetrating trauma, but injury is rare in blunt trauma (2-5%). Maintaining a high degree of suspicion is vital to avoid missing these injuries. Retroperitoneal perforation of colon may not be discovered until they have led to complications such as retroperitoneal abscess or phlegmon. Retroperitoneal colonic lacerations by blunt trauma are uncommon.

Conflict of Interest

None

References

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