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RESEARCH ARTICLE

**FILLING DEFECT IN ABDOMINAL X-RAY POST RECTAL CONTRAST HELPS TO DIAGNOSE
 DESCENDING COLON PERFORATION**

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Abstract

Penetrating trauma to the abdomen is an emergent and life-threatening event which needs immediate surgical attention. Moreover, retroperitoneal penetrating trauma is more challenging when managed based on clinical evaluation alone. We report a case of descending colon perforation due to a pellet gunshot wound. The patient had no clinical manifestations of colonic perforation, e.g. peritonitis. The diagnosis was based solely on the finding of a filling defect on delayed rectal contrast. No similar finding has been described in trauma setting.

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Introduction:-

Penetrating trauma to the back or flank is associated with a lower likelihood of significant injury. However, these injuries can pose a problem because of the difficulty in evaluating the retroperitoneal organs with physical examination and focused assessment with sonography for trauma (FAST). Laparotomy in abdominal gunshot wound can be negative or non-therapeutic procedure in 15% to 25% of cases.¹

Gunshot wounds most commonly injure the small bowel (50%), colon (40%), liver (30%), and abdominal vasculature (25%).²

To the best of our knowledge, we report the first case of a filling defect in post rectal contrast study after penetrating injury of posterior descending colon.

Case report:-

A 19-years old man brought to the emergency department as a victim of pellet gunshot wound to the left flank from two meter distance, eight hours prior to the presentation. He was initially seen in a local hospital where he had a plain abdominal x-ray and referred to our hospital. He had no medical problem and was nonsmoker.

On examination: his vital signs were normal. Abdominal examination was unremarkable apart from a one cm entry wound in the left flank along the posterior axillary line with minimal tenderness at entry side (Figure 1). Bowel sounds were normal. Rest of physical examination was normal.

Laboratory investigation revealed WBCs of 23 k/ul and hemoglobin of 12.3 mg/dl. Abdominal X-ray showed a foreign body in the left flank area with free air around the left kidney (Figure 2). Abdominal computed tomography (CT) scan with IV and rectal contrast showed the foreign body in the left psoas muscle with a large amount of free air around the left kidney (Figure 3). There was no pneumoperitoneum. Delayed abdominal X-ray revealed a filling

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defect in the descending colon (Figure 4). These findings were suggestive of colon perforation although clinically the patient had no signs of peritonitis.

The patient underwent exploratory laparotomy which revealed two perforations in posterior descending colon two cm apart with no gross spillage. Primary repair was done (Figure 5). Foreign body was removed from left psoas muscle (Figure 6). No other injuries were identified.

Hospital course was uneventful and the patient was discharged on 4th post-operative day.



Figure 1:-



Figure 2:-



Figure 3:-



Figure 4:-



Figure 5:-Figure 6:-

Discussion:-

Next to the small bowel, the colon is the second most common organ to be injured in penetrating abdominal trauma. Colon perforation is a life-threatening condition that needs early recognition and intervention.¹ Moreover, penetrating trauma to the back and flanks is associated with increased risk of injuring the retroperitoneal structures including the ascending and descending colon.^{2,3}

Given the higher kinetic energy associated with gunshot wounds, the incidence of injury and therefore laparotomy are significantly higher than with stab wounds. Clinical evaluation is the mainstay to establish the diagnosis of colon injuries despite the availability of advanced imaging. Signs of hemodynamic instability and peritoneal irritation including rebound tenderness and non-voluntary guarding are highly suggestive of intra-abdominal injury.^{4,5} These signs, however, may not be present in retroperitoneal injuries due to the propensity of the retroperitoneal structures to exert tamponade effect and confine the bleeding even in severe injuries.^{6,7}

In addition to clinical examination, diagnostic tools such plain abdominal x-ray, peritoneal lavage, ultrasound, CT scan and laparoscopy have been advocated for determining the need for laparotomy. Plain abdominal radiograph may show air under the diaphragm or retroperitoneal air collection depending on the site of perforation. Other findings in CT scan are inflammatory changes, extraluminal fluid collection, and thickening of bowel wall around the perforation site.⁴

In a stable patient, CT scan is reliable for excluding significant injuries and plan the management.^{8,9} Recently, the necessity of rectal contrast has been questioned. As demonstrated by our case, delayed abdominal films after rectal contrast revealed a filling defect at site of gunshot injury which raised suspicion of colon perforation despite the absence of clinical signs. Ultimately, the surgeon must exercise good clinical judgment in determining the most appropriate course of action.

Hemodynamic instability after penetrating injury should almost always prompt immediate laparotomy. Selective non-operative management is a good approach in hemodynamically stable patients with penetrating injuries. Indeed, this approach is well established in stab wounds. It goes without saying that selective non-operative management of gunshot injuries mandates the presence of experienced trauma surgeons.^{10,11}

The presence of retroperitoneal air should raise suspicion of a perforated retroperitoneal viscus in both blunt and penetrating abdominal trauma.¹² It is still difficult to find a study in current medical literature in which single imaging method is compared directly with laparotomy. However, delayed abdominal films post rectal contrast can be considered in hemodynamically stable patients in cases where diagnosis is still controversial.

Conclusion:-

As demonstrated by our case, the amount of air not explainable by a penetrating track may predict injury to the descending colon. The presence of filling defect due to bowel wall edema and hematoma in post rectal contrast study with delayed imaging helps in locating and establishing the diagnosis.

We recommend routine plain abdominal X-ray four to six hours post CT scan with rectal contrast in case of no leak in CT scan. In addition, prospective studies are needed in future to establish the importance of post rectal contrast imaging studies in trauma setting.

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