

# Extra-luminal Air Fluid Level on Abdominal X-ray of a Patient with Isolated Jejunal Blow Out Case report

\*Khalid Munir Bhatti, Mohammed Zulfiqar Ali, Afshan Khalid, Umar Mushtaq, Mohammed Idrees Anwar

## مستوى الهواء - السائل خارج الأمعاء في الأشعة السينية لبطن مريض مصاب بانفجار معزول للمعي الصائم تقرير حالة

روناً سيردا نمم، قباتشم رمع، دلاخ ناسقأ، يلع راقفلا و ذ نمم، ي تاهب يرذم دلاخ

الخلاصة: المرضى الذين يعانون من إصابة كلية بسيطة في البطن قد تظهر على شكل انفجار معزول للمعي الصائم. ينبغي توخي الحذر الشديد للاشتباه بتلك الحالة لأن تأخر العرض أو التشخيص يزيد معدل الإصابة بالأمراض. ويمكن تشخيص عرض التهاب الصفاق الناتج عن ثقب صريح بواسطة الأشعة السينية للبطن. ندرج هنا تقريراً عن حالة مريض قدم مع ملامح التهاب الصفاق بعد 10 أيام من تعرضه بركلة ركبة بعشرة أيام. أظهرت الأشعة السينية للبطن بوضع الوقوف مستويات هواء - سائل، مما يشير إلى إصابة عضو مجوف والتي تبين بعد التنقيب أنها ثقب المعى الصائم.

مفتاح الكلمات: صدمة كلية، تأخر التشخيص، ثقب الأمعاء، الصائم، التهاب الصفاق، تقرير حالة، باكستان.

**ABSTRACT:** Patients with trivial blunt abdominal trauma may present with isolated jejunal blow out (IJBO). A high index of suspicion is required as delayed presentation or delayed diagnosis may increase morbidity. Presentation with frank perforation peritonitis can be diagnosed by abdominal X-rays. We report the case of a patient who presented with features of peritonitis 10 days after being injured by a knee kick trauma. An erect abdominal X-ray showed extraluminal air-fluid levels, suggesting a hollow viscous injury which on exploration was found to be IJBO.

**Keywords:** Blunt trauma; Delayed diagnosis; Intestinal perforation; Jejunum; Peritonitis; Case report; Pakistan.

**B**LUNT TRAUMA CAN CAUSE INJURIES TO a variety of intra-abdominal organs. Solid organ injuries are more common than intestinal perforations<sup>1</sup> and are usually evident on presentation as these may be associated with varying degrees of shock or clinical signs of peritonitis. While perforation of the gastrointestinal tract is reported in 5–15% of patients,<sup>2,3</sup> it may be difficult to diagnose at initial presentation, especially if signs of peritonitis are minimal. Studies vary regarding the most common site of intestinal perforation; however, there is a consensus that isolated jejunal blow out (IJBO) is extremely rare.<sup>4</sup> Clinical presentation is usually delayed if the nature of the

trauma is trivial. We report the case of a patient who presented with features of peritonitis 10 days after being injured by a knee kick trauma. An erect abdominal X-ray showed extraluminal air-fluid levels, suggesting a hollow viscous injury which on exploration was found to be IJBO.

## Case Report

An 18-year-old male with no significant past medical or surgical history was brought to the emergency department 10 days after an incident of blunt trauma to the abdomen. The injury occurred when the patient swung from a great height and

landed on his friend's knee. This caused trauma to the epigastrium. The patient experienced sudden, severe abdominal pain, which settled after a while. No medical advice was sought for the problem; instead, for one week, the patient took over-the-counter medications for pain, including paracetamol 1 g PO (*per os* = by mouth) every 6 hours, and diclofenac sodium 50 mg PO b.i.d. (*bis die* = twice daily). After a few days, the pain became continuous. Over the following week, the patient started vomiting, and developed abdominal distension and absolute constipation. The patient's condition worsened and he was brought to hospital, after experiencing altered mental states, with an unremitting fever, and decreased urine output.

Examination in the emergency department revealed a young adult in a state of shock with a pulse of 120 beats per minute, blood pressure of 90/60 mm Hg, a respiratory rate of 24 breaths per minute, a temperature of 38.8 °C, and an arterial oxygen saturation (SaO<sub>2</sub>) level of 95% at room air. He was not jaundiced but was extremely pale. A chest examination revealed equal air entry with no added sounds and a gallop rhythm on cardiac auscultation. An abdominal examination revealed distended rigid abdomen with guarding and rebound tenderness. Shifting dullness was positive and bowel sounds were absent. A digital rectal examination revealed an empty collapsed rectum.

The patient was immediately resuscitated with supplemental oxygen via a face mask, and intravenous fluids and given antibiotics (metronidazole 500 mg at 8-hourly intervals and ceftriaxone 1 g every 12 hours). A nasogastric tube was inserted and urinary catheterisation was done to monitor output. Once the patient was stable, baseline investigations were undertaken which revealed a white blood count of 16,000 mm<sup>3</sup> with neutrophilia of 75%; Hb levels of 6.206 g/L; blood urea levels of 28.6 mmol/L; serum creatinine levels of 132.6 µmol/L; potassium levels of 3.2 mmol/L, and abnormal liver enzymes and function, with a total bilirubin of 29 µmol/L, alanine transaminase (ALT) 60 µ/L, and aspartate transaminase (AST) 74 IU/L. His serum amylase level was 82 U/L. Radiological investigations yielded a normal chest X-ray, but an erect abdominal X-ray revealed a ground glass appearance, obscured psoas shadows, intraluminal air-fluid levels, free air under the right hemidiaphragm [Figure 1]. A computed tomography

(CT) scan was not done as clinical pictures and X-ray findings were suggestive of perforation of a hollow organ which needed immediate surgical intervention.

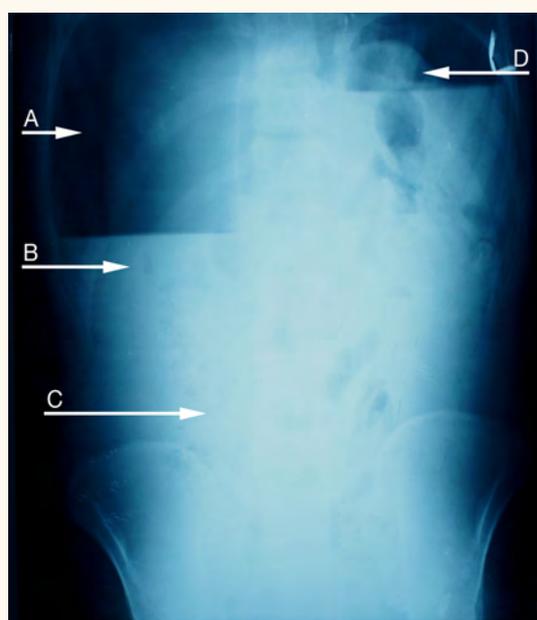
The diagnosis of peritonitis due to a hollow viscous injury was made and an exploratory laparotomy was done. Findings included 3 litres of fluid containing pus and intestinal contents, and a single 1 x 1 cm perforation in the jejunum, 30 cm away from the duodeno-jejunal junction. Although the general condition of the patient was not good, primary repair of the perforation was done, after refreshing the margins, because of its proximal position. Extensive peritoneal lavage was done and the abdomen was closed by retention suturing. Recovery from anaesthesia was delayed and patient required observation in the intensive care unit for one night. Later he was moved to the ward. His progress in the ward was uneventful. He recovered very well and was discharged on day 10.

## Discussion

Since Razali *et al.*<sup>5</sup> published a report on isolated jejunal injury arising from blunt abdominal trauma in 1974, many other authors have reported such injuries.<sup>4,6-11</sup> Even so, the total number of reported cases of IJBO in literature is not very high.<sup>12</sup> The causes of injury include motor vehicle accidents,<sup>4,6,8,10,11</sup> physical assault,<sup>9</sup> falls from stairs, and a dhoti (traditional Indian male garment) being caught in an engine belt.<sup>12</sup> The only reported case of IJBO after knee kick trauma was by Coskun *et al.* in 2007.<sup>7</sup> Our case is only the second reported incident.

The proposed mechanism of a blow-out injury is the sudden transient rise in the intraluminal pressure of the hollow viscous because of compression force.<sup>12</sup> In our case, the patient fell from a height of about 10 feet onto the knee of his friend, leading to trauma to the upper abdomen. External compression probably caused a sudden rise in the intraluminal pressure and eventually led to jejunal blow out. The patient initially felt pain, but it faded after some time. The initial pain was because of the trauma, but later the pain worsened because of spillage of the intestinal contents. Full blown peritonitis and septic shock developed over the week following the injury.

In all reported cases, the time of presentation was just after the trauma although in some cases



**Figure 1:** Extraluminal air-fluid level in patient with a post-traumatic isolated jejunal blow out. **A:** Free air under right hemidiaphragm. **B:** Extraluminal air-fluid level **C:** Ground glass appearance/loss of psoas shadows. **D:** Airfluid level in stomach (normal)

diagnosis was delayed for some time because of diagnostic uncertainty. A maximum in-hospital delay of 72 hours was reported by Kouritas in 2009 in a patient with thoracic trauma having occult jejunal perforation.<sup>10</sup> In a community where there is no immediate access to medical services, patients may wait longer before reaching tertiary health care facilities. In our case, the trivial nature of the trauma complicated the picture even more. Presentation was 10 days after the trauma; however, there was only a minimal delay of 4 hours between presentation and surgical exploration.

A physical examination is generally not sensitive enough to make an accurate diagnosis,<sup>13</sup> especially in cases where patients present before the development of peritonitis. In patients who do present with peritonitis, the symptoms may be confused with traumatic pancreatitis. Measurement of serum pancreatic enzymes and X-ray findings suggestive of intestinal perforation may be helpful in distinguishing between the two. However, an abdominal CT scan provides more accurate diagnosis.

The diagnostic accuracy of abdominal X-rays in identifying free air under the diaphragm is very low, and the chances of missing IJBO are very high.<sup>12</sup> However, a delay in presentation allows sufficient

time for the free air and fluid to accumulate in the peritoneal cavity. Moreover, bacteriological activity on the gastrointestinal contents also produces excessive air, which can lead to the formation of extraluminal air-fluid levels detectable through erect abdominal X-rays. In such cases, an X-ray of the abdomen in erect and supine positions can provide valuable information in the form of the identification of free air under the right hemidiaphragm, a ground glass appearance, and multiple intraluminal air-fluid levels. Nevertheless, these findings are not specific to IJBO because a similar picture may be seen in any kind of intestinal perforation presenting late, like peptic ulcer perforations, traumatic ileal perforations, or large gut perforations (caecal/colonic/rectal). Moreover, certain cases of extensive caecal dilatation, which may occur because of distal colonic obstruction,<sup>14</sup> may have intraluminal air-fluid levels, which may be mistaken for extraluminal ones. Careful observation and the absence of free air under the diaphragm may help in distinguishing between the two. The role of the CT scan and laparoscopy in the evaluation of patients with blunt trauma is emerging and has replaced diagnostic peritoneal lavage (DPL).<sup>15</sup> The CT scan has a sensitivity of 92% and a specificity of 94% in the detection of hollow viscous injuries.<sup>16</sup> Laparoscopy has an additional benefit of being therapeutic in a certain percentage of cases;<sup>17</sup> however, in patients who are haemodynamically unstable or present late with features suggestive of peritonitis, laparotomy will be required and peritoneal lavage will be necessary for the primary closure of the perforation.

The morbidity and mortality in small bowel perforation is lower than in colonic perforations. Delayed presentation, perforation with shock, and associated organ injuries are the factors which lead to higher morbidity and mortality in such cases.

## Conclusion

IJBO is a very rare clinical entity. It may occur even after minimal abdominal trauma. In cases presenting with minimal abdominal signs, diagnosis is very difficult and a high index of suspicion is required where the mode of injury is suggestive of the possibility of IJBO. In such cases, radiological investigations like an abdominal CT scan may be helpful. Laparoscopy has an additional benefit, as an isolated perforation can be repaired by minimal

access surgery. If presentation is delayed, signs of perforation peritonitis and systemic signs of toxicity may be evident. In such cases, abdominal X-rays may show free air under the diaphragm or, rarely, extra-luminal air-fluid levels. Such patients should undergo exploratory laparotomy and surgical repair of the perforation. Early diagnosis with the help of radiological investigations like abdominal CT scans or laparoscopy is helpful in reducing the morbidity and mortality in cases of IJBO.

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