

Small Bowel Entrapment Following Pelvic Fracture: A Case Report

Hadi Ravanbod¹, Saeed Hatami², Mohammad Shahsavan², Hossein Naderi Boldaji^{2,*}, Fateme Zand³

¹Associate Professor, Department of Orthopedic Surgery, Al-Zahra Hospital, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

²Resident, Department of Orthopedics, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

³General Practitioner, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

*Corresponding author: Hossein Naderi Boldaji; Department of Orthopedics, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran. Tel: +98-9137030122.

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Abstract

Background: Due to traumatic events, patients with acetabular fractures are vulnerable to rupture of the peritoneum and abdominal hernia in the fracture site. Infection and thromboembolic events are the two most common complications of this situation.

Case Report: In the current report, we present a 63-year-old woman with a traffic accident that was diagnosed with multiple fractures of the posterior and anterior walls and anterior column of the right acetabulum associated with femoral head protrusion to the fracture site. Furthermore, the right posterior iliac wing fracture and mild subluxation of the right sacroiliac (SI) joint were observed in the pelvic computed tomography (CT) scan. During the Stoppa surgical approach, small intestine penetration and peritoneum were observed and immediately treated by the surgical team. Our case was later diagnosed with pulmonary thromboembolism and recovered successfully, and no infectious complications were observed.

Conclusion: We suggest that bowel entrapment be considered in blunt traumatic events, and antibiotics and anti-coagulants be used in similar cases.

Keywords: Intestines; Wounds and Injuries; Pelvis

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Background

Pelvic fractures are often incurred during high-energy trauma like an accident or low-energy trauma like falling, and they are associated with high morbidity and mortality (1). Psoas and iliacus muscles are the first line to protect against intraabdominal injuries (1, 2). Acetabular fractures are one of the most challenging fractures to manage in orthopedic surgery. The internal fixation of the pelvic ring or acetabulum fractures could be performed via the Stoppa surgical approach, a preferred surgical approach compared to the ilioinguinal approach.

Based on epidemiologic data, 8 to 19% of pelvic fractures are concurrent with intraabdominal injuries (3), and on the other hand, a rare presentation of bowel injuries occurs in 1 to 2% of pelvic fractures (4). Mobile bowel segments such as the intestine are usually entrapped and may remain undiagnosed until they present with an obstruction or even surgical site infection (SSI) if perforations occur (5). The current report presents a 63-year-old case of multiple pelvic fractures that underwent Stoppa surgical approach in who small-bowel protrusion to the surgical approach with bowel entrapment and peritoneum perforation were observed.

Case Report

History: A 63 year-old woman involved in a car accident was referred to our medical trauma center.

Physical Examination: By the time of admission, she was conscious and afebrile and had normal vital signs. Her heart rate, respiratory rate, blood pressure, and blood oxygenation saturation were 88 beats/minute, 14/minute, 116/75 mmHg, and 98%, respectively. The cardio-pulmonary and head and physical neck examinations showed normal results, but after abdominal examinations, reduced

abdominal sounds and mild abdominal tenderness were observed. The examinations of the limbs showed not only severe right hip tenderness, especially by the movements, but also normal neurovascular findings.

The patient underwent computed tomography (CT) imaging of the pelvic that showed multiple fractures of the anterior wall and posterior and anterior columns of the right acetabulum associated with femoral head protrusion to the fracture site. Furthermore, the right posterior iliac wing fracture and mild subluxation of the right sacroiliac (SI) joint were observed in the pelvic CT scan. The preoperative imaging of the patient is shown in figure 1.



Figure 1. Post-surgery pelvic radiograph

The patient underwent orthopedic surgery with the Stoppa approach. Upon opening the abdomen with



Pfannenstiel skin incision with a vertical split in the rectus abdominis through the linea alba, there were signs of contamination and rupture of corona mortis, so we ligated corona mortis. During the surgery, we observed the protrusion of the small intestine and peritoneum to the surgical site. Despite the fact that the small intestine was intact, we found penetration in the peritoneum, and as a result, emergent consultation was made with the abdominal surgical team, and peritoneum irrigation and repair process was conducted by an expert surgeon.

Afterward, we performed the irrigation with 10 l of normal saline and debridement procedure in the surgical site, and the anterior column and wall of the right acetabulum were repaired using open reduction and internal fixation (ORIF). Two other plates were used for ORIF of the right SI joint. It should be noted that we used reconstruction plates in these surgical procedures. [Figure 2](#) indicates the patient's treatment results immediately after the operation.



Figure 2. Pelvic radiograph 3 months after surgery

We left the posterior column without any plate and fixation, and the surgical team decided to operate this site in another session. The patient was admitted to our medical center's intensive care unit (ICU) and received antibiotic therapy (vancomycin 1 g every 12 hours and cefepime 1 g every 12 hours for ten days, then shifted to cephalexin for 15 days) according to consultations with infectious disease specialists. According to the modified Caprini risk assessment, the patient was considered as high risk for venous thromboembolism (VTE) and received enoxaparin with prophylaxis dosage (1 mg/kg daily) after surgery with regular check of blood urea nitrogen (BUN) and creatinine. Within 72 hours after surgery, the patient had symptoms of tachypnea and shortness of breath that required oxygen therapy.

Further evaluations with pulmonary CT scan with pulmonary thromboembolism (PTE) protocol and sonography of lower limb veins revealed a massive pulmonary embolism and deep vein thrombosis (DVT) of the right lower limb. In consultation with the internal medicine physicians, the patient was admitted to the ICU again and underwent heparin treatments with the therapeutic protocol (80 IU/kg stat with infusion 18 IU/kg/hr) with the goal of partial thromboplastin time (PTT) between 50 and 85. She was then discharged 25 days after the surgery without any sign of neurological

impairment or SSI. She received enoxaparin with prophylaxis protocol (1 mg/kg daily) and antibiotics by the time of discharge.

In the follow-up visits, limb physiotherapy was conducted within 6 weeks after discharge, and within 12 weeks after discharge, the patient could perform partially weight-bearing training, and performed complete weight-bearing within 16 weeks. In 3 months after surgery, laboratory results for erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were normal, and a pelvic radiograph was taken as follow-up.

Discussion

Bowel entrapment and abdominal wall hernia following pelvic fractures is a rare complication of traumatic events that could be associated with gastrointestinal symptoms, including nausea, vomiting, and ileus. Previous case reports have been made on the entrapment or laceration of the small bowel by a pelvic fracture and colonic perforation (6). Great emphasis has been placed on the immediate diagnosis and treatment of bowel entrapment, abdominal wall hernia, and antibiotics. Based on former reports, disrupted musculature and fascia associated with adequate trauma without skin penetration and without preexisting hernia at the injury site could have high diagnostic values for this issue (7). In the present report, we presented a 63 year-old woman that experienced a traumatic event with multiple right pelvic fractures. Our case underwent Stoppa surgical approach, and a small intestine hernia with perforated peritoneum was observed by the time of surgery.

Abdominal wall hernias may occur following blunt abdominal trauma, and its risk may increase by the time of associated pelvic fractures. Stoppa surgical approach was introduced in 1994 for internal fixation of fractures of the pelvic ring or acetabulum (8). A systematic review and meta-analysis in 2017 stated that anterior acetabular fractures were found to have a better reduction and lower complications when compared to the ilioinguinal approach (9). In the present study, we used the Stoppa approach for the patient.

An important point that should be considered in similar cases is the risk of infection associated with risks of thrombosis. In 2017, a case report that was conducted by Tanaka et al., reported a 65-year-old female with an abdominal wall hernia due to trauma at the pelvic fracture site. Based on their reports, their patient developed a residual abscess in the pouch of Douglas. Based on their review of former cases, almost all previous similar cases have been caused due to traffic accidents, and almost all cases had sepsis, SSI, or organ failure (10). Recently, Delaune et al. presented two cases of high energy trauma with pelvic fractures and acute wall herniation. They showed that these patients were at high risk of infection and postoperative complications, and immediate surgical treatments had to be performed (11).

Along with increased risk of infection following bowel herniation in the surgical sites, ORIF itself could increase the risk of infectious complications in patients (12). An important point of our case was that no infectious complications were observed in the present case that could be due to the initiation of antibiotic therapies immediately after diagnosis of bowel entrapment.

Our case also had DVT and PTE despite prophylactic anti-coagulant treatments after the surgery. Reports also claim that DVT and PTE could occur in up to 40% of patients undergoing massive surgical procedures if

inadequate anti-coagulant treatments are performed (13, 14), and the risks of these complications are significantly increased when associated with infections (15). Our case was vulnerable to both thrombosis and infectious events, but proper management was conducted following DVT and PTE, and within 3 months of follow-up, no significant complications were observed.

In 2020, a study was performed by Velazquez et al. that assessed the prevalence of blunt trauma pelvic fractures causing genitourinary and lower gastrointestinal injury. By assessing 180931 patients, it was reported that 3.30% of patients might have genitourinary and 0.15% could have genitourinary and lower gastrointestinal injuries after traumatic events, and pelvic fractures with genitourinary and lower gastrointestinal injury represented < 1.00% of pelvic fractures (16). Another case was reported by Westberg et al. that had a pelvic fracture and bowel entrapment due to a traumatic event. It was emphasized that immediate diagnosis and treatment of this complication is the key point in this procedure (17). According to the American College of Surgeons, trauma patients need an anteroposterior (AP) pelvic radiograph, and if there is an acetabular or pelvic fracture, inlet and outlet views are needed for a better assessment; also, a pelvis CT scan is needed for preoperative planning of surgery.

We believe that orthopedic surgeons should pay more attention to the possibility of bowel entrapment following abdominal wall trauma and pelvic fractures, and these cases should be operated in medical centers where an abdominal surgeon is present. We should note that we did not fix the posterior wall of the acetabulum and suggest that minimal internal devices should be used in patients with bowel entrapment to reduce the risks of infection.

Conclusion

Patients with acetabular fractures due to traumatic events are vulnerable to rupture of peritoneum and abdominal hernia in the fracture site, but no infectious complications were found in the presented case. We recommended a multidisciplinary radiological and surgical team collaboration for correct diagnoses and minimized morbidity. Prophylactic antibiotic and anti-coagulant therapies should also be considered in these patients.

Limitations: We could not investigate other causes that could be involved in the occurrence of intestinal entrapment.

Conflict of Interest

The authors declare no conflict of interest in this study.

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