S Afr J Surg. 2024;62:236-238. Online first
https://doi.org/10.36303/SAJS.00252

S Afr J Surg
ISSN 038-2361

CASE REPORT

The conundrum of intestinal malrotation in an irreducible inguinal hernia

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Summary
Intestinal malrotation is a rare embryological abnormality, with an estimated incidence of 0.2–1%. Adult cases of intestinal malrotation often present a diagnostic dilemma and in many instances are usually discovered incidentally intraoperatively or during routine investigation. In this case report, we highlight one such case of an incidental finding of incomplete intestinal malrotation in a patient presenting with an irreducible left inguinal hernia.
Keywords: adult malrotation; inguinal hernia; irreducible

Case summary

A 26-year-old male with no known comorbidities was referred from a district hospital with a one-week history of a left scrotal swelling associated with bilious vomiting and constipation. The patient looked acutely ill, had a tachycardia, abdominal distension and a large, irreducible left scrotal swelling. The remainder of the systemic examination was unremarkable. Initial clinical suspicion was that of an irreducible left inguinal hernia with intestinal obstruction. Arterial blood gas analysis revealed no significant metabolic derangements. A point of care abdominal and pelvic ultrasound demonstrated a left-sided hydrocoele, with ultrasonic features suggestive of an inguinoscrotal hernia. The admission blood results revealed a hyponatraemia of 129 mmol/L (reference range 136–145 mmol/L) with a mildly elevated C-reactive protein of 16 mg/L (reference range 8–10 mg/L). The remainder of the laboratory investigations performed, i.e. full blood count, international normalised ratio, calcium levels, magnesium levels, phosphate levels, urea and electrolytes, were all within the normal range. Plain abdominal and chest radiographs were done on admission, which revealed multiple air-fluid levels on erect abdominal radiograph and an unremarkable chest radiograph.

Based on the clinical assessment, the patient was admitted, commenced on an intravenous modified Ringer's lactate solution, given intravenous Co-amoxiclav 1.2 g 8-hourly and prepared for emergency exploratory laparotomy under general anaesthesia. A modified rapid sequence induction with propofol, fentanyl and suxamethonium was performed.

The findings at laparotomy were that of an indirect hernial sac in the left scrotum, containing omentum and a loop of ileum, which was 70 cm from the ileocaecal valve, and an associated communicating hydrocele. Initially, the loop of bowel appeared ischaemic, but ischaemia resolved following reduction of the hernial sac contents and intraoperative resuscitation by means of increasing oxygen fraction and warm compresses. There was evidence of small bowel obstruction, evidenced by small bowel oedema and distension, with an associated incomplete malrotation of the small bowel and multiple adhesive bands on the small bowel, small bowel mesentery and mesocolon of the transverse colon (Figure 1).

The small bowel and omentum were released from the abdominal defect and the hydrocoele drained intraperitoneally. The patent processus vaginalis was closed intraperitoneally with loop nylon. Despite reduction of small bowel, the small bowel still remained distended, but viable, with no flow of intestinal contents upon manual decompression. A Ladd's procedure and an appendicectomy

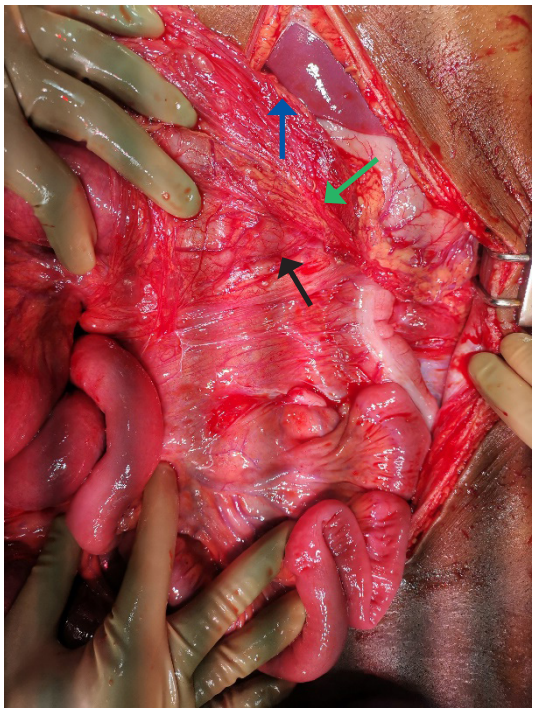

Figure 1: A: black arrow showing DJ flexure arising from the right; B: Green arrow showing adhesions; C: Blue arrow indicates the left lobe of the liver

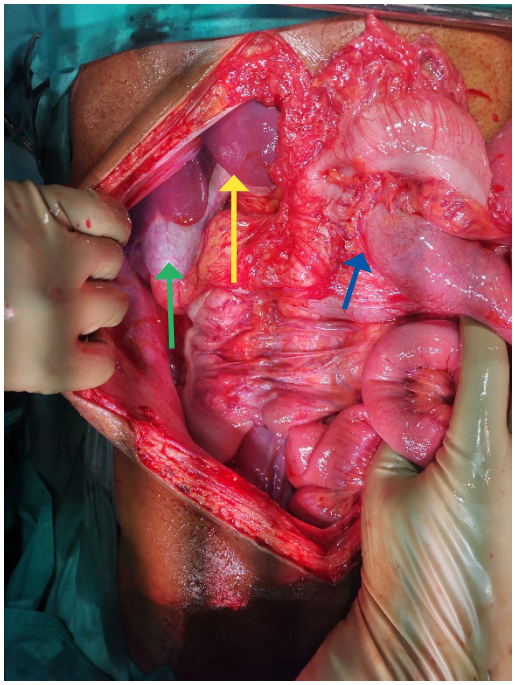

Figure 2: A: Blue arrow showing DJ flexure following division of Ladds Bands; B: Green arrow indicated the gallbladder; C: Orange arrow indicates the liver

were done. The small bowel and DJ flexure were placed on the right side of the abdomen following adhesiolysis and detorsion (Figure 2). The bowel was decompressed successfully via a nasogastric tube following Ladd's procedure and the abdominal sheath was closed continuously with loop nylon and staples to skin.

Figure 1 and Figure 2 were taken intraoperatively

The patient progressed well postoperatively, tolerating a full ward diet and mobilising independently. He was discharged from hospital 72 hours post laparotomy.

Discussion

This case presentation highlights a common presenting problem to most surgical units, namely an indirect inguinal hernia. However, in this case there was also an incidentally detected incomplete intestinal malrotation. Although a rare phenomenon, with an estimated 1 in 500 births, intestinal malrotation is often undiagnosed or often an incidental finding intraoperatively as in this case.[1]

The symptomatology associated with adult presentation of malrotation may be acute and often life-threatening, with small bowel obstruction the most common presentation.[2] Small bowel obstruction occurs as a result of closed-loop obstruction, intussusception or compression from Ladd's bands. The commonest symptoms associated with adults presenting acutely with malrotation include abdominal pain followed by nausea.[3] Chronic and non-specific symptoms may occur in adults with malrotation and, coupled with its low prevalence, often results in delayed or missed diagnosis.[4] Chronic symptoms of intestinal malrotation are a common occurrence in contrast to acute symptoms, with Neville et al. describing 90% of presentations in their study being as a result of chronic symptoms.[3] Chronic symptoms are often more subtle and include intermittent abdominal pain, bloating and food intolerance.[3]

Computerised tomography (CT) has been described as one of the most reliable radiological adjuncts to aid the diagnosis of intestinal malrotation, along with ultrasonography and CT colonography.[3,5] However, in an already resource-constrained environment, such as in the abovementioned case, one often has to rely on clinical judgement and basic radiological investigations such as plain radiographs. Although point-of-care ultrasound was performed preoperatively, the classical feature of a whirlpool sign could not be identified.[3] CT colonography has proven to be a highly sensitive screening tool in the recognition of intestinal malrotation, as demonstrated by Perez and Pickhardt in 2021.[5] However, the lack of resources in our current environment makes exploring this option impossible.

The abovementioned patient underwent a Ladd's procedure and appendicectomy as a part of the intraoperative management, which proved to be a vital step in alleviating the intestinal obstruction. A Ladd's procedure involves four primary steps, namely, counterclockwise detorsion of the small intestine, dissection of Ladd's bands, broadening of small intestine mesentery and incidental appendicectomy.[6]

Our patient presented with an irreducible inguinal hernia and features of a small bowel obstruction (SBO). It is conceivable that the SBO was as a result of both the irreducible hernia as well as the incidentally detected incomplete intestinal malrotation. Although it is unknown whether there is a correlation between inguinal hernias and intestinal malrotation, the association has only been reported in three case reports.

The first report was described in 2008 by Shariff et al. during a laparoscopy of an infant with an irreducible inguinal hernia. Poor visualisation of the transverse colon and appendix prompted further contrasted gastrointestinal studies, which confirmed the diagnosis of intestinal malrotation and intestinal obstruction.[7] While this case may differ from our case due to the age of presentation, there are similarities in the presentation and diagnostic findings. Since 2008, two further cases have been described, both in the adult population. In 2012, Lee reported an adult patient presenting with a giant inguinal hernia and an incidental finding of intestinal malrotation.[8] The second case was reported by Singh et al. in 2021, where a 59-year-old male presented with an irreducible right inguinal hernia and incidental midgut malrotation at laparotomy.[9]

This case report, along with the few published case reports, highlights the need for further research to be conducted to evaluate the incidence of intestinal malrotation in patients presenting with inguinal hernias, particularly indirect defects. This case report further highlights the importance of appropriate surgical approaches in dealing with complicated presentations of inguinal hernias, namely a laparotomy as opposed to a local procedure.

Conflict of interest

The author declares no conflict of interest.

Funding source

No funding was required.

Ethical approval

Ethical approval was exempted by my institution.

Consent

Consent provided and available on request from author.

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