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## Small bowel obstruction with situs inversus abdominalis: A case report

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## ABSTRACT

**INTRODUCTION:** Situs inversus abdominalis (SIA) is an uncommon condition that causes intestinal malrotation in the paediatric population as its primary complication (Brown, 2017). Presentations of acute surgical emergencies in adults secondary to SIA are extremely rare (Brown, 2017).

**PRESENTATION OF CASE:** A 38-year-old female with situs inversus abdominalis (SIA) presented with small bowel obstruction (SBO). The patient had a history of a paediatric omphalocele repair.

The patient failed conservative management and required surgical intervention including a laparotomy and adhesiolysis without intestinal resection for resolution of her symptoms.

**DISCUSSION:** Only 2 cases of SBO secondary to SIA have been documented in the literature; both resulting in bowel resection with a 50 % mortality rate (Mallick, 2006). This is the third reported case and the only case to avoid bowel ischemia. We attribute this to early presentation by the patient, prompt imaging, careful surgical planning with consultant led surgical intervention and a multidisciplinary team approach to recovery.

**CONCLUSION:** Acute surgical emergencies in patients with congenital anomalies should have a low threshold for imaging and intervention with detailed pre-operative planning and a senior surgeon led approach.

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## 1. Introduction

Situs inversus abdominalis (SIA) is a rare condition occurring in 1 in 4000 to 1 in 20,000 live births [3]. SIA is a recognized cause of obstruction in the paediatric population due to intestinal malrotation [1–3]. Despite this, causation of acute surgical emergencies in the adult demographic is extremely rare [1–3]. This case describes small bowel obstruction in an adult patient with SIA.

This case report has been reported in line with SCARE criteria [4].

## 2. Patient information

A 38-year-old Caucasian female self-presented to the Emergency Department at a secondary hospital in metropolitan Western Australia. Her symptoms included a two day history of generalised abdominal pain, abdominal distension and vomiting.

The patient's past medical history included the congenital anomalies of situs inversus abdominalis and an omphalocele. The omphalocele required delayed staged closure with subsequent,

complete operative repair at age two. She had no other significant medical history and took no regular medications. She was a non-smoker, drank alcohol irregularly and had no documented allergies.

## 3. Clinical findings

On presentation the patient was hemodynamically stable with observations within normal limits. Abdominal examination revealed tenderness in the right, lateral abdomen without guarding or rigidity. There was no rebound or percussion tenderness.

The patient's small bowel obstruction progressed, her symptoms worsened, with ongoing abdominal pain, nausea and profuse vomiting. Her abdomen became more distended and tender to palpation. There were clinical concerns of compromised bowel in the setting of high grade obstruction.

## 4. Diagnostic assessment

A clinical diagnosis of bowel obstruction in the setting of the patient's congenital anomalies was cause for concern and a computed tomography (CT) of the abdomen was performed.

Her CT demonstrated abdominal situs inversus, with mirrored anatomic location of the intra-abdominal viscera, with a left sided liver, gallbladder, caecum, appendix and a right sided spleen, ileum and sigmoid colon. There was evidence of small bowel obstruction

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**Fig. 1.** Pre-operative computer tomography demonstrating small bowel obstruction and situs inversus abdominalis.

predominantly involving the proximal jejunum with collapse of the ileal bowel loops. A sharp transition point was noted in the mid abdomen just to the right of the midline (Fig. 1).

The patient's initial blood tests on presentation demonstrated a mildly raised white cell count  $12.95 (4.00-11.00 \times 10^9/L)$  with normal lactate  $0.80 (<2.0 \text{ mmol/L})$ , urea  $6.8 (3.0-8.0 \text{ mmol/L})$ , electrolytes (sodium  $130 [135-145 \text{ mmol/L}]$  and potassium  $4.2 [3.5-5.2 \text{ mmol/L}]$ ), creatine  $51 (45-90 \mu\text{mol/L})$ , liver function tests (bilirubin  $13 [<40 \text{ U/L}]$ , ALT  $32 [<35 \text{ U/L}]$ , ALP  $66 [30-110 \text{ U/L}]$ , GGT  $13 [<40 \text{ U/L}]$ , albumin  $48 [35-50 \text{ g/L}]$  and lipase  $50 (20-210 \text{ U/L})$ .

## 5. Therapeutic intervention

The patient was kept nil by mouth, sustained on maintenance intravenous hydration, monitored with a fluid balance and bowel chart, in addition to receiving analgesia and deep vein thrombosis prophylaxis.

She was given Gastrografin (Schering AG, Berlin, Germany) following the first day of her admission. Post administration, the

patient's nausea and vomiting worsened and the Gastrografin did not display transit through the small intestine into the colon on progress abdominal X-ray. Subsequently, the patient was taken to the operating theatre for an exploratory laparotomy. This was for concerns of a possible closed loop bowel obstruction due to either intra-abdominal adhesions or an internal hernia. The surgery was performed by a general surgery consultant as the primary operator and a general surgery trainee registrar as the first assistant.

The patient was positioned supine, received a general anaesthetic, prepped with chlorhexidine wash and square draped. A midline laparotomy was performed and intra-operative findings were of situs inversus abdominalis with a left sided liver, spleen and caecum. The proximal jejunum was arising from the right upper quadrant and with distal ileum entering the caecum on the left lower quadrant. The descending and sigmoid colon were on the right. Extensive small bowel to small bowel adhesions involving the proximal to distal ileum were identified. The proximal jejunum was distended with oedema seen in the mesentery, likely due to extensive small bowel to small bowel adhesions in the

mid small bowel region. This resulted in sharp angulation and a subsequent mid-small bowel obstruction. The procedure involved further mobilisation of adherent viscera from the anterior abdominal wall and complete adhesiolysis of the proximal small bowel adhesions to mid small bowel. The patient received warm saline wash, two transverse abdominis plane blocks, closure with 1-0 polydioxanone sutures (PDS) and staples to skin. She returned to the general surgery ward post appropriate recovery.

## 6. Follow up and outcomes

Post-operatively, the patient was managed with naso-gastric tube decompression, intra-venous fluid therapy, analgesia, deep vein thrombosis prophylaxis and Allied Health input for improved mobilisation and return to independent activity. The patient recovered well, opening her bowels on the fourth post-operative day with resumption of normal diet. She was discharged home five days following her operation.

On review in the general surgery outpatient clinic one month post-operative, the patient had made a full recovery with ongoing compliance to no heavy lifting.

## 7. Discussion

Two cases of small bowel obstruction in adult patients with situs inversus abdominalis have been documented in the literature. One case by Brown et al. was of a 54-year-old female who had ischaemic small bowel obstruction secondary to herniation of the intestine through a congenital mesenteric defect [1]. This patient was managed with two stage intervention including laparotomy, resection and stoma formation then subsequent reversal. The second was by Mallick et al. detailing intestinal ischemia secondary to malrotation with Ladd's band [2]. This patient received an initial laparotomy with division of Ladd's band. The entire small bowel was of doubtful viability, the patient went into endotoxic shock, multiorgan failure and on re-look laparotomy at 12 h had entire small and large bowel infarction.

To our knowledge, this is the third reported case of small bowel obstruction in situs inversus abdominalis in an adult patient and the only case to avoid bowel ischemia. This was due to a combination of factors including:

- 1 The patient's early presentation.
- 2 The surgical team's low threshold for superior radiological investigation. A clinical diagnosis of bowel obstruction would usually receive an abdominal X-ray in the emergency department. In the setting of the patient's congenital anomalies, the surgical team proceeded straight to an abdominal CT. This facilitated both early diagnosis and pre-operative surgical planning to adapt for the patient's altered anatomy.
- 3 Early intervention. Risk of intestinal strangulation and ischaemia was significant and is associated with increased morbidity in a patient with congenital anomaly presenting with bowel obstruction [5].
- 4 Surgical intervention led by an experienced general surgery consultant.
- 5 A multidisciplinary team approach to the patient's recovery.

With the patient's history of omphalocele repair, it is likely that this has contributed to adhesion formation that, in addition to her altered anatomy, caused the rotation and obstruction of her small bowel.

## Declaration of Competing Interest

The authors declare no conflicts of interest.

## Funding

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## Ethical approval

Nil ethical approval was required as this study was a retrospective case report and is exempt from ethical approval at the detailed institution.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Author contribution

- 1 Dr Danika Jurat: study concept, writing the paper.
- 2 Mr Adrian Teo: study concept, editing the paper, supervising consultant.

## Registration of research studies

N/A for this study design (case report).

## Guarantor

Dr Danika Jurat.  
Mr Adrian Teo.

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