Mirror-image confusion: successful giant hiatus hernia repair in situs inversus totalis

Cheyaanthan Haran, Nicholas Fischer, Thomas Oliver, Mark Grant

We report a laparoscopic giant hiatus hernia repair for intermittent episodic central abdominal pain and vomiting in a patient with situs inversus totalis (SIT). A 72-year-old gentleman with a known diagnosis of SIT initially presented to his general practitioner with abdominal pain and vomiting. His symptomatology progressed to coffee ground vomit and a weight loss of 22 kilograms. A chest x-ray and CT scan demonstrated SIT (Figure 1), and a gastroscopy demonstrated a large mixed, sliding and paraoesophageal hiatus hernia with associated Grade A oesophagitis and partial gastric outflow obstruction. He proceeded to elective laparoscopic giant hiatus hernia repair with Nissen fundoplication. The laparoscopic procedure was performed using five ports placed in a mirror-image configuration to the conventional procedure, with the patient in the modified lithotomy position. Careful consideration was given to the oesophageal hiatus as this was formed by the right and left pillars of the left crus of the diaphragm. A Nathonsons liver retractor was placed to the patient’s left shoulder. The mirror image repair was successful and without complication (Figure 3).

The gentleman commenced on free fluids immediately post-operatively and was successfully discharged on the second post-operative day with no early post-operative complications. At four weeks he progressed to a soft diet, and at the three-month follow up he was symptom-free of his initial central abdominal pain or vomiting and reported no dysphagia. He was subsequently discharged from General Surgery.

Figure 1: CT scan demonstrating SIT.

Note: “Right” ventricle is analogous to the left ventricle.
Situs inversus totalis is a rare autosomal recessive condition affecting approximately 0.003% of the population. The condition involves complete transposition of the heart and the intra-abdominal organs. The relationship between the organs is unchanged, thus the condition is commonly diagnosed incidentally after a thorough clinical examination or radiological imaging. It is not uncommon for delayed diagnosis of SIT in patients with abdominal pain. The gentleman presented in this case report experienced symptoms for three years until diagnosis.

Laparoscopic procedures are considered more difficult in patients with SIT because of the mirror-image anatomy. The current literature describing giant hiatus hernia in SIT is minimal but has been successfully reported. Laparoscopic cholecystectomy is well-described via published case reports given the incidence of gallbladder pathology requiring laparoscopic surgery is greater than that of a hiatus hernia. Other examples of published reports include laparoscopic gastric resections, laparoscopic Roux-en-Y gastric bypass, colorectal resections and nephrectomy.

Figure 2: Laparoscopic caudal view.

Note: “Right” triangular ligament of liver and “right” lobe of liver are analogous to left triangular ligament of liver and left lobe of liver respectively.

Figure 3: Laparoscopic view of the completed giant hiatus hernia repair and Nissen fundoplication.
The current literature does not describe the naming convention used for the anatomical variations in SIT. For example, Figure 2 depicts the “right” triangular ligament of liver and “right” lobe of liver, which are in fact analogous to the left triangular ligament of liver and the left lobe of liver respectively. To ensure safe operating and effective intraoperative communication between all theatre staff it is imperative that the operation, as a team, is carefully planned pre-operatively by using the correct referred anatomical terms. The aim is to avoid intraoperative confusion during a difficult stage.

Further, it is essential the primary surgeon and their assistants mentally rehearse the procedure pre-operatively. Other pre-operative preparations and considerations should be given to port placement and operative ergonomics, which is essential for safe and effective surgery in SIT.

After careful pre-operative consideration of mirror image anatomy, set up changes, surgeon and port positioning, a laparoscopic repair and Nissen fundoplication of a giant hiatus hernia in SIT is safe, and should still be regarded as the gold standard.

Competing interests:
Nil.

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Author information:
Cheyaanthan Haran, PGY2 House Officer, Department of General Surgery, Wellington Regional Hospital, Wellington; Nicholas Fischer, Senior General Surgery Registrar, Department of General Surgery, Wellington Regional Hospital, Wellington; Thomas Oliver, Junior General Surgery Registrar, Department of General Surgery, Wellington Regional Hospital, Wellington; Mark Grant, Consultant General Surgeon, Department of General Surgery, Wellington Regional Hospital, Wellington.

Corresponding author:
Cheyaanthan Haran, Department of General Surgery, Wellington Regional Hospital, Riddiford Street, Newtown, Wellington 6021.
cheyaanthan.haran@ccdhb.org.nz

URL:

REFERENCES: