Novel treatment (new drug/intervention; established drug/procedure in new situation)

Laparoscopic cholecystectomy in situs inversus: points of technique

Harvinder Singh Pahwa, Awanish Kumar, Rohit Srivastava

Department of Surgery, CSMMU, Lucknow, Uttar Pradesh, India

Correspondence to Dr Harvinder Singh Pahwa, pahwakgmu@yahoo.co.in

Summary

Laparoscopic cholecystectomy is one of the most common surgical procedures carried out in the world today. Rarely do patients present with undiagnosed situs inversus with cholecystitis. Symptomatic gallstones in patients with situs inversus pose diagnostic and therapeutic challenges. We had one such patient who presented with episodes of pain in the left upper abdomen. She was found to be suffering from situs inversus with gallstones in a left-sided gall bladder. After thorough preoperative evaluation, we performed laparoscopic cholecystectomy by modifying the operative technique adopting a mirror image of port placement on the left side using the left subcostal port (5 mm) for dissection with the right hand and the subxiphoid port for retraction of Hartmann's pouch by the left hand of the surgeon. We can summarise that laparoscopic cholecystectomy in patients of situs inversus can be safely performed by an experienced surgeon.

BACKGROUND

Situs inversus is a congenital developmental anomaly of the positioning of internal viscera wherein there is a reversal of the usual 'handedness' of visceral topography. The reversal may be thoracic, abdominal or both. It is estimated to occur in 1 in 5000–20 000 births.^{1 2} Although situs inversus on its own is not pathological, it may be associated with cardio-respiratory, hepatopancreaticobiliary, gastrointestinal, neurological, orthopaedic and urological anomalies, some of which may be life-threatening.^{1 3} In the literature, there have been only about 40 reports of open cholecystectomy in the prelaparoscopic era and 20 reports of laparoscopic cholecystectomy in patients with situs inversus.^{2 4 5} The variation from the norm of the sidedness of the gall bladder is attended by differences in presentation, difficulties in diagnosis and the need for modifications in operative technique as reported below.

CASE PRESENTATION

A 46-year-old woman presented to the outpatient department with a few months' history of intermittent left upper quadrant abdominal pain aggravated by fatty meals. On examination, mild tenderness was present in the left hypochondrium.

INVESTIGATIONS

Imaging by an ultrasound scan showed gall stones in a left-sided gall bladder. The liver was oriented in a mirror image of its usual anatomical lie, with the larger anatomical lobe lying on the left side while the smaller lobe crosses the midline to the right. A CT scan revealed situs inversus totalis (involvement of both thoracic and abdominal viscera) (figure 1). She had no comorbidities or anomalies. A preoperative chest x-ray showed dextrocardia consistent with situs inversus.

DIFFERENTIAL DIAGNOSIS

No differential diagnosis was considered in the present case report.

TREATMENT

She was scheduled to undergo laparoscopic cholecystectomy. The approach in the operating room required modification. The surgeon and the assistant were positioned on

Figure 1 Contrast-enhanced CT showing situs inversus totalis.

the right side of the patient and the scrub nurse on the left. A head-end-up and left-side-up positioning of the patient was adopted to optimise views of the gall bladder and Calot's triangle. The port placement and positioning of the monitor was a mirror image of that observed in conventional laparoscopic cholecystectomy (figure 2). A four-port technique was used. A supraumbilical (10 mm) port was placed as was done in conventional laparoscopic cholecystectomy.

Initial inspection confirmed a left-sided liver and gall bladder. The spleen was on the right side, the greater curve of the stomach to the right and the caecum to the left.

The subxiphoid port (10 mm) was placed in the midline in the subxiphoid position with the tip on the peritoneal aspect to the left of the falciform ligament. This port was one of the two main operating ports and the instruments used were controlled by the left hand of the surgeon (contrary to conventional laparoscopic cholecystectomy where this is controlled by the right hand of the surgeon). It was initially used for retraction of Hartmann's pouch of the gall bladder and later for applying the clips by the left hand.

The third port (5 mm) was placed about 5 cm subcostally in the left midclavicular line. This was the second of the two main operating ports and was used for passing the dissector, scissors, hook diathermy and the suction-irrigation apparatus as necessary. This port and its instruments were controlled by the right hand of the surgeon (contrary to conventional laparoscopic cholecystectomy where this port is controlled by the left hand of the surgeon). The fourth port (5 mm) was placed close to the anterior axillary line at the level of umbilicus and was used by the assistant to retract the fundus of the gall bladder superolaterally. Dissection of Calot's triangle was done by the right hand by retracting Hartmann's pouch by the left hand. Anterior fold dissection required crossing of instruments by the surgeon (figure 3) contrary to conventional laparoscopic cholecystectomy where crossing of instruments is required during posterior fold dissection. This was followed by dissection of the posterior fold (figure 4). Clips were applied by the left hand with ease. The gall bladder was delivered through the subxiphoid port.

Figure 2 Port placement.

Figure 3 Anterior fold dissection.

OUTCOME AND FOLLOW-UP

The patient made an uneventful recovery and was discharged home in 48 h.

DISCUSSION

There are several important aspects of the management of gallstones in patients with situs inversus which are worth highlighting. While there is no evidence to suggest that gall stones are more or less common in people with situs inversus, the presentation with left upper quadrant pain may delay the diagnosis of symptomatic gall stones. It has been reported that about a third of patients with situs inversus and symptomatic gall stones may, however, present with epigastric pain and about 10% of patients may present with right-sided pain.⁶ Patients with situs inversus who are scheduled for laparoscopic cholecystectomy should be assessed preoperatively for any potentially serious cardiac or respiratory abnormalities.

As the unusual orientation while operating on a left-sided gall bladder requires mental adaptability and manual

Figure 4 Posterior fold dissection.

dexterity to cope up with any evolving difficult or potentially dangerous intraoperative situation, laparoscopic surgery in patients with situs inversus should be performed by an experienced laparoscopic surgeon. While there is no evidence to suggest that there is an increased risk of bile duct injuries in patients with situs inversus, the orientation and ergonomic challenges may result in an increased operative time.⁷ Our total operating time was 75 min.

Positioning of the surgical team and port placements described in the literature are often a mirror image of the protocols used for conventional laparoscopic cholecystectomy. In our technique, dissection of anterior fold required crossing of instruments contrary to conventional laparoscopic cholecystectomy where posterior fold dissection usually requires crossing of instruments. The ergonomics of a right-handed surgeon standing on the right side of the patient demand that either he crosses hands so as to allow the right hand to operate through the subxiphoid port⁴ or use the assistant to retract Hartmann's pouch from the left side.⁵ Rather, we used the right hand for dissection through the left subcostal port and the left hand for retraction of Hartmann's pouch through the subxiphoid port quite comfortably. One alternative to using the left hand for the application of clips (as we did) is to apply clips by the right hand by asking the assistant to retract Hartmann's pouch. The surgeon standing at the foot end, in between the legs of the patient while the patient is in a Lloyd-Davis position, is another alternative.

Learning points

- ▶ Patients with situs inversus scheduled for laparoscopic cholecystectomy must undergo proper preoperative assessment as they might be suffering from potentially dangerous cardiorespiratory or other congenital problems.
- ▶ Laparoscopic cholecystectomy in patients of situs inversus can be safely performed by an experienced surgeon by making slight changes in the operative technique and the positioning of the surgical team.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Varano NR**, Merkin RJ. Situs inversus: review of the literature. Report of four cases and analysis of the clinical implications. *J Int Coll Surg* 1991;**33**:131–5.
2. **Takei HT**, Maxwell JG, Clancy TV, *et al*. Laparoscopic cholecystectomy in situs inversus totalis. *J Laparoendosc Surg* 1992;**2**:171–6.
3. **Johnson JR**. Situs inversus with associated abnormalities. Review of the literature and report of three cases. *Arch Surg* 1949;**58**:149–54.
4. **Oms LM**, Badia JM. Laparoscopic cholecystectomy in situs inversus totalis —the importance of being left-handed. *Surg Endosc* 2003;**17**:1859–61.
5. **McKay D**, Blake G. Laparoscopic cholecystectomy in situs inversus totalis: a case report. *BMC Surg* 2005;**5**:5.
6. **Rao PG**, Katariya RN, Sood S, *et al*. Situs inversus totalis with calculus cholecystitis and mucinous cystadenomas of ovaries. *J Postgrad Med* 1977;**23**:89–90.
7. **Yaghan RJ**, Gharaibeh KI, Hammori S. Feasibility of laparoscopic cholecystectomy in situs inversus. *J Laparoendosc Adv Surg Tech* 2001;**11**:233–7.

This pdf has been created automatically from the final edited text and images.

Copyright 2012 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Pahwa HS, Kumar A, Srivastava R. Laparoscopic cholecystectomy in situs inversus: points of technique. *BMJ Case Reports* 2012;10.1136/bcr-2012-006170, Published XXX

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow