LAPAROSCOPIC CHOLECYSTECTOMY IN A PATIENT WITH TOTAL SITUS INVERSUS – CASE REPORT

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For many years, laparoscopic cholecystectomy remains the method of choice for both the treatment of symptomatic cholelithiasis, and chronic and acute cholecystitis (1). The experience of the surgeon grows with each laparoscopic procedure, which enables to operate in case of difficult anatomical conditions and associated anatomical variants. The aim of the study was to present a case of a 47-year old male patient with total situs inversus and several months history of recurrent left epigastric pain, radiating to the left scapula, being accompanied by nausea and vomiting. The study presented the operative technique of laparoscopic cholecystectomy and postoperative period data. In conclusion, laparoscopic cholecystectomy in a patient with total situs inversus is possible and safe, providing relevant precautions. The main issues certainly include a good and feasible plan of the operation, discussion concerning the possible intraoperative and postoperative complications, a good plan concerning the localization of the trocars, as well as an experienced surgical team. One should also not forget that early conversion to classical cholecystectomy is not considered as failure, but might prevent accidental damage of the biliary ducts and long-term complications.

Key words: total situs inversus, cholecystectomy, laparoscopy, operative technique

For many years, laparoscopic cholecystectomy remains the method of choice for both the treatment of symptomatic cholelithiasis, and chronic and acute cholecystitis (1). The experience of the surgeon grows with each laparoscopic procedure, which enables to operate in case of difficult anatomical conditions and associated anatomical variants. Amongst the anatomical variants one may consider the atypical branching of the cystic duct, a bicystic duct, additional biliary ducts, atypical vascularization, as well as partial or total situs inversus (2). Total situs inversus is a congenital anatomical variant with an incidence of 0.1 %. The above-mentioned involves the rotation of all abdominal and chest organs along the vertical axis (the so-called chiral symmetry-180\(^\circ\)). Partial situs inversus is less frequently observed involving the rotation of all visceral and chest organs, the heart excluded, which is positioned typically on the left side (3, 4). Total situs inversus is associated with a higher incidence of congenital heart defects, mainly the transposition of large vessels (5).

Marco Severino in the XVII century was the first who described situs inversus, followed by Matthew Baillie in the XVIII century. Situs inversus is early recognized, often accidentally during the physical examination or by means of imaging techniques. Sporadically, diagnosis is established by the radiologist or surgeon during hospitalization associated with an acute pathology requiring surgical intervention (6).

In both types of situs inversus (partial and total) the right hepatic lobe, gall-bladder, and cecum are located on the left side, while the stomach and spleen on the right. In case of abdominal cavity disorders one may observe the “mirror reflection” localization of symptoms. In case of patients with situs inversus, typical
cholelithiasis and cholecystitis symptoms, such as pain, usually located in the right epigastrium, are observed on the left side (6).

Gall-bladder and biliary duct operations require special attention and care during the preparation of Calot’s triangle structures, in order to avoid iatrogenic damage to the common bile duct and vesicular artery (7).

The aim of this study was to present a case of a 47-year old male patient diagnosed with total situs inversus and the operative technique of laparoscopic cholecystectomy under different anatomical conditions.

CASE REPORT

A 47-year old male patient was admitted to the Department of General Surgery, Specialist Hospital in Słupsk. The patient complained of recurrent left epigastric pain lasting several months, radiating to the left scapula, accompanied by nausea and vomiting. Symptoms usually resolved spontaneously or after the administration of spasmolytic drugs. Interestingly, the patient was diagnosed with total situs inversus during childhood, being subject to appendectomy from the left para-rectal muscle incision.

On admission, the patient exhibited no symptoms of acute cholelithiasis, and laboratory results were within normal limits. Abdominal ultrasound confirmed the presence of the liver under the left costal arch with an enlarged gall-bladder comprising gall-stones.

Surgery

Before the operation the patient received antibiotic prophylaxis (Cefazolin 1g iv) and anticoagulation, according to hospital recommendations. The patient was operated in the supine position with the surgeon on the right side, and assistant on the left. Pneumoperitoneum was performed (12 mm Hg) using Veress’s needle. A 10 mm trocar with 30° optics was introduced by means of an incision located in the lower edge of the naval. Another 10 mm trocar was introduced in the vicinity of the substernal angle, slightly to the left of the midline. Two 5 mm trocars were introduced into the left mesogastrium, at the umbilical level (fig. 1).

Close examination of the peritoneal cavity confirmed the presence of total situs inversus with an enlarged and inflamed gall-bladder. The most severe inflammatory lesions were located in the neck of the gall-bladder (fig. 2).

The trocars were introduced in such a way as to provide an angle of 90° between the operating tools, which would allow the preparation of the cystic duct and vesicular artery, both from the right and left side. The surgeon used a Maryland type preparator located inside the 5 mm trocar (closer to the midline), and grasper located inside the 10 mm trocar near the substernal angle. Calot’s triangle was located, and prepared from adhesions and inflammatory tissue (fig. 3). The cystic duct and vesicular artery were prepared, and after clipping, severed (fig. 4). The gall-bladder was prepared by means of electrocoagulation. After ensuring hemostasis the gall-bladder was excised by means of an incision near the substernal angle.

Postoperative course

The total operation time amounted to 55 minutes. Perioperative and postoperative complications were not observed. The patient
only required analgesics on demand (Metamizolum Natricum 1 g and a single dose of Pethidine Hydrochloride 100 mg in the evening after surgery). The patient was discharged from the hospital on the second postoperative day with standard recommendations.

DISCUSSION

The laparoscopic approach has been used in surgery for nearly 30 years. It is used in a wide variety of operations, from simple procedures such as laparoscopic cholecystectomy or appendectomy, to more complex gastrointestinal tract procedures, not associated with cancer, as well as in case of carcinoma surgery, trauma surgery, and reoperations. The introduction of minimally invasive procedures, such as SILS or NOTES resulted in further improvement of surgical techniques and increased precision. All above-mentioned factors translate into the ability to operate in atypical situations, or by means of equipment with different ergonomics. This also enables to use laparoscopic techniques in complex cases, such as acute surgery, and in case of anatomical abnormalities (early diagnosed and unexpected) (8).

The incidence of iatrogenic biliary duct injuries during laparoscopic cholecystectomy gradually decreases, reaching in recent years the level of 0.1-0.5% (9). Reasons of iatrogenic biliary duct injuries may be divided into three main groups:

1) dangerous surgery – factors dependent of the surgeon, resulting from negligence or lack of experience,

2) dangerous pathology – when the surgeon has to deal with anatomical changes arising during the course of a pathology or in case of its consequence,

3) dangerous anatomy – when the surgeon has to deal with congenital anatomical abnormalities.

Apart from the above-mentioned factors misinterpretation of the 2D plane image might also play an important role (2, 10, 11).

Total situs inversus is a known risk factor of iatrogenic bile duct injury observed during laparoscopic cholecystectomy, and thus, requires a lot of focus and attention to detail during each stage of the procedure.

An often recognized factor responsible for the success of laparoscopic cholecystectomy under changed anatomical conditions is the detailed discussion concerning the strategy of surgery.

The distribution of trocars plays an important role, being the ‘mirror reflection’ of the standard introduction of the above-mentioned, despite the need for a different approach to the cystic duct and vesicular artery. In selected cases the trocars were introduced into ‘special locations”, which ensured the preparation in standard planes and axes (12-20).

In our opinion, the proposed (mirror) trocar localization was optimal, enabling two-handed surgery. The above-mentioned assured good access, as in case of classical laparoscopic cholecystectomy, enabling to reach Calot’s triangle from the side. The placement of the optics inside the trocar located in the lower naval enables good visualization of the operative field, as in case of standard cholecystectomy, despite the ‘mirror reflection’. This en-
ables the correct identification of all anatomical structures with the same accuracy as in case of typical anatomy.

CONCLUSIONS

Based on our experience and available literature data, laparoscopic cholecystectomy in a patient with total situs inversus is possible and safe, provided relevant precautions are maintained. The main issues certainly include a good and feasible plan of the operation, discussion concerning the possible intraoperative and postoperative complications, a good plan considering the localization of the trocars, as well as an experienced surgical team. One should also not forget that early conversion to classical cholecystectomy is not considered as failure, but might prevent accidental damage of the biliary ducts and long-term complications.

REFERENCES

11. Rembiasz K, Bobrzyński A, Budzyński A et al.: Analysis of complications of laparoscopic manage-