

Situs Inversus Totalis and Anesthesia: Challenging aspects

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Abstract

Situs Inversus is a congenital anomaly where most of the internal organs are located in a reverse position. The mirrored position of the visceral organs along with dextrocardia is known as situs inversus totalis. These patients may not present for the co-existing anomalies but can present with common abdominal pathology where diagnosis plays a vital role. In a patient with situs inversus totalis, not only the diagnosis of any abdominal pathology can be difficult due to the reversed position of the thoraco-abdominal organs but also the anesthetic management becomes challenging. Herein we present the challenging aspects of anesthesia in a young female with situs inversus totalis with symptomatic cholelithiasis for cholecystectomy.

Keywords Situs inversus totalis; Dextrocardia; Cholecystectomy

Introduction

Situs inversus totalis is a congenital condition characterized by transposition of abdominal viscera. Majority of thoracic and abdominal visceral organs are reversed or mirrored from their normal position [1]. It is generally an autosomal recessive disorder, and sometimes may be X chromosome-related. The incidence was reported as 1 in 5000-20000 live births [2-4]. Most of the patients with situs inversus totalis remain asymptomatic throughout their lifetime [4]. It is imperative to diagnose the commonly presenting abdominal pathology properly as the reverse position of visceral organs may mask the classical clinical findings. Radiological diagnosis (ultrasonography, computerized tomography, chest radiograph) plays the key role for confirmation of situs inversus totalis. We report the anesthetic management of situs inversus totalis in a 26 years old female who presented with symptomatic cholelithiasis for laparoscopic cholecystectomy.

Case Report

26 years, 58 kg, young female presented with pain abdomen over left hypochondrium associated with nausea, vomiting, and dyspepsia for 3 months. Apart from this, there were no other symptoms. On ultrasonography abdomen and Computerized Tomography (CT) of the chest and abdomen, the patient was found to have dextrocardia with situs inversus totalis and left-sided cholelithiasis. The patient was posted for laparoscopic cholecystectomy.

On preoperative check-up, the patient's vital parameters and biochemical parameters were within the normal limits. On auscultation, heart sounds were heard on right 5th intercostal space. A 12 lead Electrocardiograph (ECG) showed inverted T-wave in lead V1 to V6 chest leads (Figure 1). A chest X-ray confirmed the presence of dextrocardia (Figure 2). Echocardiography revealed dextrocardia with mild aortic regurgitation and normal left ventricular ejection fraction. Pulmonary function test was within normal limits. On airway examination, she had anticipated difficult airway with Mallampati

grade IV and short neck. The patient was premedicated with tablet ranitidine and alprazolam.

In the operation theatre, all standard monitors were connected and intravenous access was secured with the 18G cannula. For ECG monitoring, the electrodes were placed in a reversed position. Induction of anesthesia was achieved with Fentanyl 2 µg/kg, Propofol 2 mg/kg and Succinylcholine 1 mg/kg followed by tracheal intubation with 7.5 mm internal diameter endotracheal tube, and the position were confirmed. Mechanical ventilation maintained with volume-controlled mode with oxygen: nitrous oxide and isoflurane to maintain minimum alveolar concentration 0.8-1.0. We noticed a prolonged effect of muscle relaxant for 35 minutes after succinylcholine administration which was confirmed with Neuromuscular Transmission (NMT) Monitoring. Further, during surgery, relaxation was maintained with Atracurium. Peak airway pressures were closely monitored throughout surgery. At the end of the surgery, residual neuromuscular blockade was reversed with Neostigmine and Glycopyrrolate and the trachea was extubated. The procedure was uneventful, the patient recovered satisfactorily and shifted to the Post-Anesthesia Care Unit (PACU).

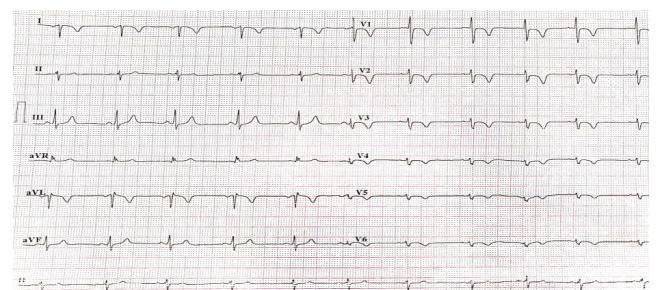


Figure 1: Electrocardiograph showing an inverted T- wave in V1-6 chest leads.



Figure 2: Chest radiograph showing dextrocardia.

Discussion

We presented safe and successful anesthetic management of laparoscopic cholecystectomy with situs inversus totalis. However, prolonged duration of muscle relaxation occurred after succinylcholine use which may signify increased sensitivity to depolarizing muscle relaxant. The plasma butyrylcholinesterase activity level could not be measured in the indexed patient in the postoperative period due to the patient and relative refusal. There are few case reports documenting prolong the effect of succinylcholine in a situs inversus totalis patient [5].

Co-existing anomalies of other vital organs also have to be taken under consideration like cardiovascular anomalies, e.g. Tetralogy of Fallot, Atrial septal defect, ventricular septal defect; digestive system anomalies e.g. duodenal stenosis, anal atresia; respiratory system anomalies e.g. sinusitis, bronchiectasis [4]. The triad of situs inversus totalis, sinusitis, and bronchiectasis is called Kartagener's syndrome [6]. Dwarakanath S, et al. [7] has described an association of adult-onset occult spinal dysraphism along with situs inversus totalis. Although co-existing abnormalities of other organs are more common than in general population, most patients with situs inversus have no symptoms and complications [4] The most important challenging aspects of anesthesia in such cases has been discussed in following table (Table 1).

Anesthetic concerns	Reasons	Precautions
Left endobronchial intubation	• Left main bronchus in line with the trachea	• Tube position confirmation before and after patient positioning
Pulmonary complications (intraoperative and postoperative)	• Kartagener syndrome	• Pulmonary function test • Incentive spirometry • Chest physiotherapy • Bronchodilators • Antibiotic prophylaxis • Postural drainage • Humidified oxygen • Adequate suctioning
Perioperative myocardial ischemic findings	• Dextrocardia	• Reverse placement of ECG electrodes
Inadequate delivery of defibrillation shock	• Dextrocardia • Associated atrioventricular discordance with spontaneous progression to complete atrioventricular block	• Reverse placement of defibrillation paddles in right anterolateral position
Thoracic duct injury during central venous cannulation	• Inversion of great vessels	• USG guided left internal jugular vein cannulation
Nasal intubation	• Associated sinusitis	• Avoid it
Neuraxial anesthesia	• Associated spina bifida, split cord, meningomyelocele,	• Can be considered after exclusion
Masseter spasm, Prolonged apnoea	• Decreased pseudochoolinesterase level	• Avoid it
Decrease immunity	• Defective chemotaxis, impaired phagocytosis	• Aseptic technique use

Table 1: The most important challenging aspects of anesthesia.

Conclusion

To conclude, patient with situs inversus totalis posted for non-cardiac surgery makes the anesthetic management challenges. Though proper history taking, general examination, and preoperative preparation are imperative for safe anesthesia conduction, an undue prolong the effect of depolarizing muscle relaxant should always be taken under consideration.

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