Case Report

Trapping of TEE Probe During Transesophageal Echocardiography

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Transesophageal echocardiography is a useful method in cardiovascular diagnosis and preoperative care, being a safe procedure it carries significant complications. This is a report of transesophageal echocardiography complication by possible esophageal spasm in a young cardiac patients.

Introduction

Transesophageal echocardiography (TEE) was introduced in the early 1980s.[1] It has since matured into a crucial element of cardiovascular diagnosis and perioperative care related to cardiac anesthesia and surgery.[2] Although TEE is a safe procedure, significant complications have been reported with an estimated risk of 0.18%.[3] Complications when occur can be catastrophic and have a reported mortality of 0.001%.[3] The majority of TEE-associated gastrointestinal complications reported have been confined to oropharyngeal, esophageal, and gastric trauma secondary to probe insertion or manipulation.

This report presents a case of transesophageal echocardiography complication by possible esophageal spasm in a cardiac patient that highlights the features of early detection and prompt successful management. The patient had no known esophageal risk factors.

Case Report

A 16 year- old girl presented with transient left hemiparesis and admitted to neurology ward with diagnosis of TIA. Her past medical history was significant for atrial septal defect and pulmonic stenosis that was operated 10 years ago with patch closure of ASD and pulmonic valvotomy. TEE was requested for evaluation of potential cardiac source of embolization.

The preparative procedure included, topical oropharyngeal anesthesia applied by using 5% lidocaine paste and 2% lidocaine spray. Also up to 2 mg intravenous midazolam was used for partial sedation. Monitoring included one lead electerocardiogram for detection of arrhythmias and pulse oximetry .

No resistance or difficulty was encountered at any point during the insertion and manipulation of the TEE probe. TEE examination confirmed the enlargement of right heart chambers with moderately depressed right ventricular function and flail pulmonic valve with severe free pulmonic regurgitation. Contrast injection revealed small residual interatrial right to left shunt.

After termination of TEE examination and during pulling out of probe severe resistance was felt in upper esophageal area so probe could not be withdrown from esophagus, while patient was very anxious and restless but her hemodynamic condition was stable with near normal oxygen saturation.

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Forward introduction of probe was uneventfull without any resistance or difficulty but during pull back at 20 cm from incisors the probe was entrapped and could not be pulled out. Buckling of probe was excluded by fluoroscopy, and with suspicion of upper esophageal perforation or spasm the anesthesiologist was consulted,and the patient was intubated and fully anesthesized with fentanyl, midazolam and pancuronium. After full anesthesia, the porbe was pulled out uneventfully, and to ensure exclusion of possible esophageal and oropharyngeal laceration or perforation, gastroenterologist was consulted and upper GI endoscopy revealed normal esophagus and stomach with no congenital anomaly or malformation except mild oropharyngeal ulceration without any perforation. Finally after several days the patient was discharged from hospital with oral anticoagulation without any complain.

Discussion

TEE is an invaluable diagnostic tool which is relatively safe and noninvasive. The incidence of TEE-related complications is 0.01% to 0.04%.[3] In a recent series, early presentation of TEE-related GI complications was 0.38%.[3] However, the overall incidence was considerably higher considering late-presenting cases. The majority of TEE-related complications were caused by oropharyngeal, esophageal, or gastric trauma. However, injuries outside the alimentary tract such as the spleen have also been reported.[4] Table 1 shows classification of upper gastrointestinal complications of TEE with possible underlying mechanism.[4]

Oropharyngeal trauma is one of the most common TEE-associated complications.[5] These include odynophagia occurring in 0.1%, dental injury in 0.03%, and endotracheal tube malpositioning in 0.03%.[5] Hypopharyngeal perforations due to the TEE probe have been reported.[6] Significant swallowing difficulties may reflect oropharyngeal pathology. It has been suggested that patients under TEE monitoring be questioned about swallowing difficulties, even in emergency situations.[6]

Esophageal perforation after TEE is known to occur and is probably underreported. The incidence of post–TEE esophageal perforation

Table 1. Spectrum of injuries related to Transesophageal echocardiography and possible mechanisms

Oropharyngeal & Hypopharyngeal	Anatomic abnormalities (congenital, developmental, acquired) Mechanical causes (physical pressure)
Esophageal	Anatomic abnormalities (congenital, developmental, acquired) Mechanical causes (physical pressure) Pressure and thermal effects exerted by the TEE probe
Gastric	Forceful retrograde flexion in the deep transgastric views Prolonged pressure and thermal effects
Spleen	Force from the probe manipulation transmitted via the attachments
Neurovascular bundles	Compression injuries of branches of the posterior division of the recurrent laryngeal nerve Possible injuries to gastric/gastroepiploic
Lymphatic channels	Possible injuries to the thoracic duct

is 0.01% in a single-center adult series of 7200 TEE examinations.[4] Esophageal perforations can cause significant morbidity and mortality. The overall mortality associated with esophageal perforation can be as high as 20%, and a delay of more than 24 hours in treatment can double the mortality rate.[4]

Esophageal rupture after TEE is a rare life- threatening complication. Risk factors consist of spasm, hypertrophy of the cricopharyngeal sphincter, cervical arthritis, forward or left lateral bending of the distal esophagus, and esophageal disease such as inflammation or neoplasm.[7] Anatomic abnormalities like Zenker's diverticulum present as a challenge to successful and safe performance of TEE. Many authors have attempted to identify the mechanisms leading to esophageal injury. Factors consistently identified were small patient size, prolonged procedure, cardiomegaly, cardiopulmonary bypass, and low cardiac output. Inherent integrity of the esophageal wall and the pressure generated by the probe are additional factors related to this iatrogenic injury.[4] Further risk factors identified were old age, Zenker's diverticulum, long-term steroid use, radiation therapy, candida esophagitis, Schatzki ring, and poor cardiac function requiring inotropic support.[5]

Injuries to the stomach after TEE have also been reported. In a recent series, 1.2% of TEE cases had gastric complications associated with forceful or sustained retrograde flexion of the TEE probe in the deep transgastric view.[4] Injuries to tissue outside the alimentary tract have been attributed to transmission of force caused by the probe manipulation via attachments to organs such as the spleen.[8] Compression injuries by the probe on the branches of the posterior division of the recurrent laryngeal nerve have been postulated.[9] Potential for injury to the gastroepiploic vessels and thoracic duct have yet to be reported.[4]

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