Case report - Thoracic non-oncologic
A sternotomy too far

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Abstract
Median sternotomy has been used for a long time as a standard approach for many cardiothoracic procedures in children. Many complications have been reported to result from this approach with different incidences. Iatrogenic diaphragmatic hernia has not been reported as a definite complication of such approach. This paper presents a case report for a 14-month-old boy with iatrogenic diaphragmatic hernia following median sternotomy.

Keywords: Sternotomy; Diaphragmatic hernia; Children

1. Introduction

Median sternotomy is a well-known classical approach for most cardiac procedures in children [1]. Mediastinitis [2], persistent chest pain [3], wound infection [4], and hypertrophic scars [5] are amongst the commonly reported complications for this approach in paediatric age group.

Iatrogenic diaphragmatic hernia is a recognized complication following upper gastrointestinal surgery [6]. However, iatrogenic diaphragmatic hernia following median sternotomy is not a well-recognized entity.

We present a case of iatrogenic diaphragmatic hernia following median sternotomy for cardiac surgery.

2. Case report

Patient KTH was born at 36 weeks via elective caesarean section, in good condition. At postnatal examination he was noted to have a murmur and weak femoral pulses – CT angiography subsequently confirmed an interrupted aortic arch (type A) and large aorto-pulmonary window that were repaired via left thoracotomy and median sternotomy approaches, respectively, with no significant immediate complications. Two drains were left postoperatively: a left-sided chest drain and mediastinal drain (12Fr), brought out at the level of the lower end of the incision through the upper abdominal musculature via an extraperitoneal route. These were removed after 24 h with no immediate complications.

At clinic review six months postoperatively he was noted to display some respiratory symptoms and his parents reported a history of progressively increasing cough and feeding difficulties. A chest X-ray was carried out which suggested a left-sided diaphragmatic hernia (subsequently confirmed on ultrasound examination) (Fig. 1a). At operation a 4-cm retrosternal, diaphragmatic defect was found, just below and to the left of the sternal scar. This was repaired via a left-sided subcostal incision, with reduction of the bowel from the hernial sac, adhesiolysis, and transverse closure with interrupted sutures under no tension and using no synthetic patches. His postoperative course was uncomplicated and repeat chest X-ray confirmed complete resolution of the hernia (Fig. 1b).

Review of the patient’s earlier X-rays (Fig. 2), revealed no evidence of a diaphragmatic hernia prior to his cardiac surgery and it is thus postulated that the origin of this was iatrogenic, secondary to either the long sternal incision or sternal drain site.

3. Discussion

Median sternotomy approach has been reported to be associated with a variety of complications in the literature; wound infection and dehiscence being the most common complication especially with repeat sternotomy [4]. Other reported complications include scar complications, mediastinitis and injury to nearby vital structures [7]. However, iatrogenic diaphragmatic hernia is not a well-known complication for this approach. A study describing a series of children with diaphragmatic herniae repaired laparoscopically, included one case suspected to complicate median sternotomy; however, this was not confirmed [8]. In our patient, we have based the diagnosis as iatrogenic diaphragmatic hernia on three facts: first, chest X-ray taken prior to the cardiac surgery showed no evidence of diaphragmatic hernia; second, the site of the defect was not

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consistent with a congenital diaphragmatic hernia; finally, the pattern of adhesions between the omentum and bowel to the edge of defect did not resemble congenital diaphragmatic hernia.

The extent of sternotomy incision, minimal access vs. classical approach, has an impact on the cosmetic outcome and incidence of complications [9]. In this case, the sternotomy incision extended about 4 cm below the Xiphisternum. We believe that carrying out the incision this far down below the Xiphoid process is an important factor in the development of such complication. Mini sternotomy approaches seem, therefore, to provide a safer albeit more restricted access with respect to this kind of complication.

References