Removal of migrating pectus bars by video-assisted thoracoscopy

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Abstract

Surgical correction of pectus excavatum deformity with the use of a metal bar strut provides a good cosmetic result with a low complication rate. Reports of pectus bar migration are rare but we report three cases of bar migration which required thoracoscopic removal.

Keywords: Pectus excavatum; Pectus bar migration

1. Introduction

Pectus excavatum is a common deformity of the anterior chest wall arising as a consequence of costal cartilage overgrowth. Numerous repair techniques have been developed including sternal turnover [1], Dacron graft [2], and poly-1-lactide bioabsorbable strut implantation [3]. Many centres advocate transverse sternotomy and resection of costal cartilage followed by the insertion of a metal pectus bar fashioned into a seagull wing [4,5]. Over the past 18 years we have employed varying policies regarding removal of the pectus bars. Initially the bar was routinely removed at 6 months post operation. With time it appeared that there was little risk in leaving the bar in situ which then became our practice. However, anecdotal and published evidence of severe migration [6,7] has led to our practice now of removing the bars at 6 months.

In this report we present the unusual complication of pectus bar migration in three patients and their subsequent management.

2. Case reports

2.1. Patient 1

A 14-year-old boy was referred for correction of his pectus excavatum deformity. He complained of intermittent dyspnoea well-controlled with regular inhalers, and had undergone a right lower lobectomy for unresolving lobar consolidation when aged 2 years. Other than sternal depression clinical examination was entirely unremarkable.

He subsequently underwent repair with subperiosteal rib resection of the costal cartilages from the 3rd rib downwards and partial transverse sternotomy. A pectus bar was positioned deep to the sternum in its median part, with its distal ends superficial to the chest wall. The bar, which is a simple strut, has a hole and notch at either end was then secured by means of a non-absorbable stitch to the underlying ribs.

He was readmitted 14 months later for bar removal. On examination the bar was not palpable and chest X-ray suggested displacement of the metal strut. Subsequent computed tomography (CT) scanning showed the lateral end of the bar lay deep to the sixth rib. Bar removal was undertaken with on-table X-ray imaging. A 1-inch incision was made below the 6th rib and video-assisted thoracoscopy revealed the metal strut partially buried in newly formed bone of the sixth rib. It was removed without difficulty through the same incision, using grasping forceps alongside the thoroscope (Fig. 1).

2.2. Patient 2

A 19-year-old male presented for pectus excavatum repair. Surgical correction had been performed when aged 17 years at another centre but the deformity had recurred shortly afterwards.

Examination demonstrated a transverse anterior thoracic scar and severe pectus deformity. He underwent redo-correction at which a metal pectus bar was inserted following sternal osteotomy at the level of the 5th costal cartilage and sub-periosteal resection of the 3rd costal cartilages downwards.
Ten months later he was readmitted for removal of the bar. An initial incision was made over the 5th intercostal space on the left side and extended in an attempt to locate the prosthesis. However the bar was not apparent and a second incision made on the right side. On-table X-ray guidance was then employed to facilitate localisation of the bar but the procedure was eventually abandoned.

A CT scan was subsequently performed which confirmed bar migration into the thoracic cavity. A right two port video-assisted thoracoscopy was performed and the bar located and removed. Removal was hindered by considerable granulation tissue overlying the prosthesis.

2.3. Patient 3

A 17-year-old male was referred for correction of his pectus deformity. He complained of dyspnoea on mild exertion and examination revealed a severe excavatum deformity.

Surgical correction was performed as already described, however two pectus bars were required in order to maintain sternal elevation.

He was admitted after 2 years for elective pectus bar removal. He was entirely asymptomatic and pleased with the cosmetic result of surgery. Clinical examination and initial chest X-ray suggested bar migration and he subsequently underwent CT scanning in order to localise the bars. The prostheses had migrated into the thoracic cavity and two port video-assisted thoracoscopy was performed. Both bars were easily identified and removed.

3. Discussion

Surgical correction of pectus excavatum with the use of a metal pectus bar is a popular method of reconstruction of the anterior thoracic wall, offering excellent cosmetic results. Complications commonly reported include local infection and atelectasis [4,5]. A single case of bar fracture and laceration of the right atrium in a 7-year-old boy has been reported [6].

Pectus bar migration is an uncommon complication and movement into the thoracic cavity has never been reported. A single case of bar migration into the peritoneal cavity requiring video-laparoscopic removal has been described [7]. Migration may be anticipated with continued growth and remodelling in the developing thoracic skeleton, but in adults apparent migration may be the result of a poorly secured prosthesis slipping posteriorly, or due to mechanical stimulation and the formation of excessive granulation tissue surrounding the bar [3].

Addressing the question of what period of time is appropriate before bar removal in excavatum correction, a telephone poll of 12 departments throughout the United Kingdom concluded that of these, 11 units used metal pectus bars for pectus excavatum reconstruction and of those 10 removed the prosthesis between 6 and 12 months. Only one unit did not routinely remove the bar.

Pectus bar position is not routinely determined by CT scanning at this centre. All patients undergoing bar removal have routine AP chest X-rays performed; In the case of patient 1 preoperative chest X-ray did not suggest bar movement. Patients may have benefited from lateral chest films.
although CT scanning provided accurate bar localisation, and proved essential in planning extraction, including port insertion. On-table X-ray screening aided but by no means guaranteed successful bar removal. Once the bar had been identified and blunt dissection performed, the perforation at either end of the strut could be grasped using Lanes forceps and the bar withdrawn.

In summary, we report three cases of pectus bar migration, and suggest that patients may benefit from preoperative CT scanning if the suspicion of bar migration arises. However, we now avoid the problem of bar migration by electively removing bars at 6 months.

References