Clinical Spotlight

A Rare Case of Cholesterol Granuloma in the Anterior Mediastinum

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Cholesterol granulomas are reactant lesions that develop in response to cholesterol crystals and foreign body giant cells. They are a commonly described benign condition affecting the middle ear and paranasal sinuses, however have been reported in various sites within the body. We describe a rare case of an incidental cholesterol granuloma in the anterior mediastinum of a cardiac surgical patient.

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Case Presentation

A 65 year-old gentleman with symptoms suggestive of exertional angina was referred for further evaluation. An exercise tolerance test was positive at Stage II with a subsequent coronary angiogram revealing triple vessel disease with a 75% ostial left main stenosis. Significant medical history included hypertension, permanent pacemaker implantation for third degree heart block and medically managed pericarditis.

The patient underwent an elective coronary artery bypass graft surgery. An incidental finding of a firm, circumscribed anterior mediastinal mass overlaying the innominate vein was noted following median sternotomy. There was no suggestion of a granuloma on pre-operative chest X-ray or coronary angiogram. A specimen 20 × 19 × 10 mm with a grey brown discoloration was sent for histopathological analysis, to exclude a malignant process. Sections revealed fibroadipose tissue containing a cholesterol granuloma composed predominantly of cholesterol clefs, some of which were surrounded by multinucleated giant cells. The periphery showed hemosiderin-laden macrophages and chronic inflammatory infiltrate.

Since the mass was completely excised with a good margin it was sent for a formal histology as a frozen section would not have altered the surgical management. No intraoperative complications were noted with postoperative recovery uneventful (Fig. 1).

Discussion

Cholesterol granuloma is a benign entity which forms in response to foreign-body giant cell reaction to cholesterol crystals [1–3]. Cholesterol granuloma can develop in any region of the body where cholesterol crystal deposition may occur, and is a well-recognised lesion affecting the facial skeleton, skull and middle ear [4]. They have been described with less frequency in the kidneys, breast, peritoneum, mediastinum, parotid gland, testis, lung, liver and spleen [1,2,5]. The clinical presentation is variable and may be encountered incidentally or present due to space occupying effects on surrounding structures [1,4].

Several theories have been proposed in the pathogenesis of cholesterol granuloma, however it is still not clearly understood. Three major factors have been implicated in the development of these lesions within the middle ear and paranasal sinuses; local haemorrhage which may occur as a result of trauma or during an inflammatory response, disrupted ventilation and impaired drainage of the cavities [1–5]. It has been suggested that the source of cholesterol can be derived from degenerated cells during the inflammatory process and haemolysis or as a transudate from serum [1,2]. The cholesterol crystals stimulate a foreign-body type giant cell reaction that is responsible for the granuloma formation [2,4,5]. The pathophysiological mechanisms leading to cholesterol granuloma formation in the mediastinum is largely unknown, however it is has been thought to be a consequence of chronic inflammation [1,2].

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Histologically cholesterol granuloma consists of extensive granulation tissue with dense masses of cholesterol clefts surrounded by multinucleated giant cells, hemosiderin-laden macrophages, lymphocytes and plasma cells [1,2,5]. This characteristic appearance has been described to be diagnostic of cholesterol granuloma [5].

Computed tomography scanning and magnetic resonance imaging are both useful tools in the evaluation of cholesterol granuloma, and can be utilised in both pre-operative and postoperative settings [1,3,5]. Cholesterol granuloma appears as a sharply marginated lesion, and may be associated with thin, calcified rim [3,5]. No significant contrast enhancement is noted with CT imaging, as the lesions are avascular [3,5]. MRI is the favoured mode of imaging as cholesterol granuloma demonstrates unique high signal intensity in both T1 and T2 weighted films [1,3,5]. It is postulated that the increased signal intensity is contributed by a combination of cholesterol crystals and peripheral accumulation of free methemoglobin [1,3].

Management of cholesterol granuloma is largely directed by the location, size and presentation of the lesion [1–5]. Surgical excision is necessitated if the cholesterol granuloma produces significant pressure effects in confined cavities, otherwise surveillance with serial scanning may be employed as a conservative approach [3,4].

Conclusion

Cholesterol granuloma is a benign lesion that is rarely described affecting the mediastinum; they often remain asymptomatic and are discovered incidentally on imaging or intra-operatively. It has been postulated that the pathophysiological process leading to granuloma formation is eventuated by chronic inflammation and local haemorrhage. There are characteristic features identified on imaging that may reflect a cholesterol granuloma, however surgical excision is required to enable histopathological analysis and diagnostic confirmation.

Conflicts of Interest

No conflicts of interest.

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References