Subpleural lipoma: Management of a rare intrathoracic tumor

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ABSTRACT

INTRODUCTION: Subpleural lipomas are rare intrathoracic benign tumors. They are often discovered incidentally on plain chest radiographs and the diagnosis is usually established by computed tomography.

PRESENTATION OF CASE: We report a case of subpleural lipoma, with enlargement during a period of two years. Pathology examination of the specimen confirmed the diagnosis of lipoma.

DISCUSSION: For non-invasive diagnostic investigation, computed tomography enables the identification and quantification of subpleural lipoma due to their characteristic fat attenuation. Surgical resection with thoracotomy or VATS provides more accurate and firm diagnosis, and complete excision.

CONCLUSION: This clinical entity needs attention due to difficult preoperative differentiation. Complete surgical excision of these lesions with the appropriate surgical approach is mandatory, for both diagnosis and treatment.

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1. Introduction

Lipomas are benign tumors that develop at the expense of adipose tissues and distributed ubiquitously in the body. They are considered to be the most frequently and commonly observed mesenchymal neoplasm in adults. Although they account for approximately half of all soft tissue tumors and 80% of all benign fat-containing neoplasms, intrathoracic location is rare. They can arise from the mediastinum, diaphragm, bronchus, lung, or thoracic wall, with pleural localization to be considered extremely rare.1,2

Most patients remain asymptomatic and the lipoma is found incidentally on a chest radiograph or a computed tomography (CT) examination. We report one case of pleural lipoma treated successfully with excision through a limited muscle-sparing thoracotomy and review the pertinent literature.

2. Presentation of case

A 27-year-old Caucasian male was admitted for treatment for a chest wall tumor. It was first discovered fortuitously after chest radiogram two years prior, located intra-thoracic but extrapulmonary in the left hemithorax (Fig. 1a). A computed tomography (CT) of the chest revealed then a well-defined tumor sized approximately 5 × 3 × 5 cm with radiological findings of fat (Hounsfield units –90 HU). The patient did not accept any further diagnostic or therapeutic intervention. Two years later, a new CT scan revealed the known tumor, now sized 15 × 10 × 5 cm (Fig. 1b). The patient accepted surgical intervention for removal due to the enlargement of the tumor.

He underwent a left lateral muscle-sparing thoracotomy and removal of a large subpleural mass, attached to the parietal pleura with macroscopic findings of lipoma (Fig. 2). The patient had an uneventful postoperative course, with no recurrence on one-year follow-up. Histopathological examination of the tumor revealed well-differentiated mature adipocytes, with no presence of pleomorphism or mitotic activity, suggestive of pleural lipoma.

3. Discussion

Lipomas are benign mesenchymatous tumors, composed of mature adipocytes. They account for approximately half of all soft tissue tumors and 80% of all benign fat-containing neoplasms. Conventional lipomas distribute ubiquitously in the body but they are rarely encountered in the thoracic cavity. According to classifications established by Keeley & Vana, and Williams & Parsons, they can be divided into two classes: (i) hourglass or dumbbell lipomas that pass through the thoracic inlet or intercostal space and (ii) purely intrathoracic lipomas.2

According to their origin they are classified to: (i) endobronchial lipoma arising from the subcutaneous fat of the tracheobronchial tree, (ii) parenchymal lipoma located peripherally within the lung parenchyma, (iii) pleural lipoma originating from the submesothelial parietal pleura which may extend into subpleural, pleural or extrapleural spaces, (iv) mediastinal lipoma and finally (v) Cardiac lipoma.1,3,4

They are usually solitary and have no association with other extra-thoracic locations; they involve both sides with the same frequency. They are most commonly detected between the ages of 40 and 60 years, frequently in obese individuals.
The intrathoracic lipoma arises most frequently in the parietal pleura and may exhibit hemispherical sessile or pedunculated forms.4,5

In the majority of cases, they are symptomatic. Symptoms usually are non-specific and due to their ability to develop within the chest cavity and reach a large size, they may provoke compression symptoms such as hacking intermittent cough, mild chest pain, dyspnea or thoracic tightness sensation. Accompanying signs are occasional; bone erosion, cortical thickening and hyperostosis secondary to extrinsic pressure and periosteal irritation have been documented to the literature.2 In 11% of cases as part of Pierre Marie’s syndrome, clubbing was observed that disappeared after tumor surgical removal.1

In asymptomatic patients, they are usually detected accidentally on plain chest radiographs as smooth, rounded nodules/masses. The ability to differentiate between benign and malignant pleural processes as well as distinguishing pleural processes from parenchymal ones on plain radiograph is limited. The diagnosis can be done upon by CT, which provides essential information in order to differentiate between pleural and parenchymal disease, determine the location and extent of disease; and occasionally allows characterization of tissue based on signal attenuation. Moreover, CT allows the study of connections between lipoma and nearby organs. The radiological diagnostic criteria are: presence of a well-defined mass composed of homogeneous fat (−50 to −150 HU), not enhanced by an injected contrast medium, having obtuse angles with the chest wall and displacing adjacent pulmonary parenchyma and vessels.1,2,6,7

However, making the differentiation between well-differentiated, malignant liposarcomas and benign lipomas may be challenging on CT images. The typical characteristics of a malignant tumor include invasive growth, infiltration of surrounding structures, rather than displacement, inhomogeneous enhancement after intravenous contrast medium application, attenuation values greater than −50 HU, poor delineation of the lesion and the occurrence of metastases.1,2,4,6,7

Ultrasound of the thoracic wall may facilitate the diagnosis, confirming the pleural origin of the tumor, providing information if the lesion is cystic or solid and confirming its adipose density and homogeneity.1,8

If there is doubt in radiological diagnosis by CT, then magnetic resonance imaging (MRI) can be useful. It occasionally allows a more refined evaluation of the linkages between both the tumor and the thoracic wall, can differentiate diaphragmatic hernia and localized evantiations from lipomas arising near the diaphragm. Its main valuable is to differentiate between lipoma and liposarcoma. If is enhanced during contrast medium injection, the MRI provides a better analysis of the lipoma fatty density, its heterogeneity and its relationship with contiguous organs.1,7

Definitive diagnosis can be achieved only by pathology examination, which should differentiate between these two tumors. The specimen must be obtained by a less invasive method such as percutaneous fine-needle aspiration.1,2,6,9

The management strategy for pleural lipomas is not well established. An observation policy with clinical and radiological follow-up may be suitable for elderly patients and those in poor
general condition, especially in the presence of small and asymptomatic lesion. However, a surgical radical excision is considered to be the treatment of choice. There are three main reasons for this. It confirms the diagnosis by a histopathological analysis especially in the case of an inhomogeneous mass. It treats the symptomatology, and finally it limits the compression of adjoining organs.

Although lipomas are considered to be slow-growing tumors, experience with our case was that this progression was not slow. In two years the size of the patients’ tumor increased from $5 \times 3 \times 5$ cm to $15 \times 10 \times 5$ cm. The rapid progression of the tumor led us to operate even with adipose density. On the other hand, the secondary transformation of lipoma into liposarcoma has never been reported in the literature. Therefore, excision of the tumor cannot be performed to prevent such a progression. There are reports of infiltrating development of the tumor to the surrounding structures, causing severe symptoms, as for example invasion to intercostal spaces and induce rib destruction. Usually their symptoms arise from adjoining organ compression, with obstructive syndrome, or intratumoral hemorrhage with pain and fever. Finally, some authors have reported cases of patients who were operated on not only because of diagnosed radiologic certainty but also because of patient’s anxiety, which may be worsened in patients with a previous history of treated neoplasia.

Surgical resection can easily be performed via an open typical or muscle-sparing thoracotomy, as in our case, to provide relief of the symptoms and firm diagnosis. Complete excision also prevents local recurrence, although there are reports of either inhibition of tumor growing after incomplete resection, or recurrences. Video-assisted thoracoscopic surgery (VATS) has become a more common technique for thoracic tumor operations. It consists to an appropriate procedure when treating pedunculated forms because of the absence of infiltrating growth in this type. It is an effective, well-tolerated procedure that is associated with less morbidity and mortality than is seen with conventional surgery. Recently, successful extirpation of a pleural lipoma with a single-port VATS has been reported.

4. Conclusion

Although pleural lipomas are considered to be rare, this clinical entity needs attention due to difficult preoperative differentiating between lipomas and liposarcoma and also due to the large size that can occur occupying the thoracic cavity. CT scanning is a very helpful tool in clinical diagnosis, but surgical resection, with thoracotomy or VATS, remains a valuable procedure for establishing a firm diagnosis and complete excision. VATS vs. open thoracotomy, offers reduction of surgical morbidity with less pain, less postoperative hospital stay. We believe that complete surgical excision of these lesions with the appropriate surgical approach is mandatory.

Conflict of interest

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Timothy Sakellaridis: Performed the surgery, acquisition of analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, final approval of the version to be submitted; Ioannis Panagiotou: Performed the surgery, acquisition of analysis and interpretation of data, final approval of the version to be submitted; Stilianos Gaitanakis: Acquisition of data and interpretation of data, drafting the article; Stamatis Katseros: Acquisition of data and interpretation of data, drafting the article.

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