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Case Report

The rare mediastinal lipoma: a postmortem case report

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Abstract: Mediastinal lipomas are extremely rare, so there are few reported cases. We report a postmortem case of this rare intrathoracic lipoma in a 79-year old female cadaver. The gross features of the tumor and histopathological findings confirmed the diagnosis of a massive simple benign lipoma. To our knowledge, this is the first case to be reported at such an advanced age and the second postmortem case found during comprehensive review of literature.

Keywords: Mesenchymal tumors, adipose cells, asymptomatic, resection

Introduction

Lipomas are ubiquitous benign tumors and are considered one of the most frequent benign tumors of adult adipose tissue [1]. They are usually located subcutaneous, particularly in the upper back, neck, and shoulder regions [2]. However, they rarely may be deeply seated, where they tend to be larger in size than subcutaneous lipomas [3] since their detection often is relatively late [4]. If asymptomatic, deeply seated lipomas frequently are detected incidentally while performing routine examinations or imaging. Although they usually carry no danger by themselves, deeply seated lipomas are clinically significant since they may resemble malignant tumors [5] or, on rare occasions, transform to a malignant liposarcoma [6].

Lipomas located in the thoracic cavity are extremely rare. To our knowledge, diagnosis of mediastinal tumors in almost all reported cases was done in live, asymptomatic patients during routine examination or during patients' investigations for mild symptoms such as dyspnea, cough, or palpitations [5, 7, 8]. Only one case was reported in an autopsy of a 39-year-old woman who died for a reason unrelated to her intrathoracic lipoma [4].

In this study, we report a rare case of mediastinal lipoma in a female cadaver during Gross Anatomy Laboratory dissection for first-year medical and MSH Program students. Also, we discuss our approach to the final diagnosis with a literature review involving such cases.

Case report

A 79-year-old white female cadaver was among 40 cadavers used for pedagogic dissection for first-year medical students and Master of Health Sciences students at Touro University Nevada. The cause of death of this woman was respiratory arrest, as indicated by her pathology report. Her medical history indicated that she was suffering from heart disease and melanoma. During the Gross Anatomy Laboratory dissection session of the thorax, a massive space occupying lesion was identified inside the left hemithorax.

Methods

The intrathoracic mass was prepared for gross and histopathological examination.

Gross examination

The in-situ examination revealed that the mass occupied the inferior one third of the left hemithoracic cavity just lateral to the vertebral column and at the level of the lower five thoracic vertebrae. The mass was in direct contact with the diaphragmatic surface (base) of the left lung, inferoposterior aspect of the heart, and

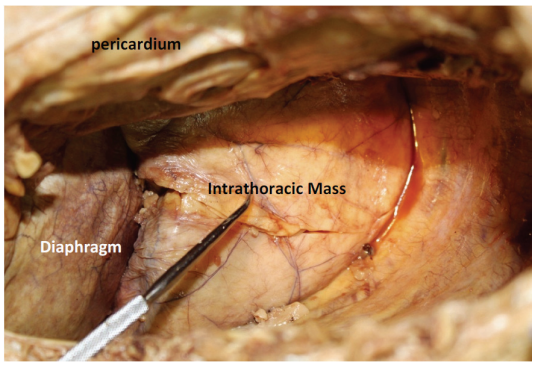

Figure 1. shows in-situ picture of the intrathoracic mass sitting on the left hemidiaphragm in direct contact with the base of left lung (removed) and posteroinferior surface of the heart (removed). The mass slightly pushes the pericardial sac and heart forward (white arrow).

was attached to the thoracic surface of the left hemidiaphragm (**Figure 1**). The mass was of the peduncular type with a very short pedicle attached to the left hemidiaphragm. The mass showed no attachment or adhesions to the left lung, heart, ribs and intercostal muscles, or thoracic vertebrae. The mass was well capsulated and of limited mobility in all directions. It obviously was compressing the base of the left lung, which appeared atelectatic as if it were missing the lower half of the inferior lobe in the embalmed lung (**Figure 2A** and **2B**). Also, the heart and the investing pericardium were slightly pushed forward (**Figure 1**). The mass did not cross the midline and had no extension into the right hemithorax. Examination of the diaphragm showed normal anatomical diaphragmatic openings with no evidence of abdominothoracic herniation. Abdominal examination revealed no connection or continuity of the mass with any of the abdominal viscera or other abdominal structures.

The mass was resected en-bloc for gross examination. The mass weighed 3.334 lbs. and measured 6x5x5 inches. It was relatively soft in consistency and surrounded by a true smooth and gleaming capsule traversed by abundant blood vessels of the mass, causing a pinkish yellow surface discoloration of the mass. The mass had a pyramidal shape with a concave base molded by the upper surface of the left hemidiaphragm (**Figure 3A**). The base of the mass had a dark brown color as it had the pedicle stump traversed by blood vessels of the mass (**Figure 3A** and **3B**). The cut section of the mass showed multiple pale yellow lobules of different sizes separated from each other by fine septa of connective tissue (**Figure 3B**).

Histopathological examination

The mass was processed for histopathological study. Multiple paraffin blocks were prepared from selected areas of the mass. The paraffin blocks were sectioned into a series of 6μm thin slices. The slices were mounted on glass slides and processed for conventional hematoxylin and eosin staining as described by Lillie [9]. Microscopic examination revealed an encapsulated tumor composed of mature adipose cells with eccentric, small, regular nuclei throughout the sections (**Figure 4A**). The adipose cells were almost regular and more or less of similar size. However, limited areas of small-size adipose cells were sporadically located towards the center of the mass (**Figure 4B**). The cells were arranged in lobules that were separated from each other by thin connective tissue septa invaded by small blood vessels feeding the lobules. The capsule of the tumor was thick and full of abundant bigger blood vessels that fed the entire mass. Very limited small areas of hemorrhage were sporadically scattered in the histologic sections (**Figure 4B**). Pleomorphism, atypia, and mitotic figures were absent from the fields of all slides. A few lymphocytic inflammatory cell infiltrations were detected in some of the sections (**Figure 4B**).

Results and discussion

The gross features and microscopic observations are consistent with the diagnosis of simple benign lipoma that, unusually, was located inside the thoracic cavity. Generally speaking, the first impression of the pathologists encountering such mediastinal lesions is that they are neoplasms and cysts [4]. It is extremely unusual to think about tumors of mesenchymal origin inside the thoracic cavity, as mesenchymal tumors constitute only 6% of all mediastinal masses [1]. Mediastinal lipomas typically arise within the anterior mediastinum, which is not the case in this study, and represent 1.6-2.3% of all primary mediastinal tumors [5].

The primary appearance of the mass in the thoracic cavity raised multiple possibilities about its nature. Although the gross examination and absence of any record of the reported mass in

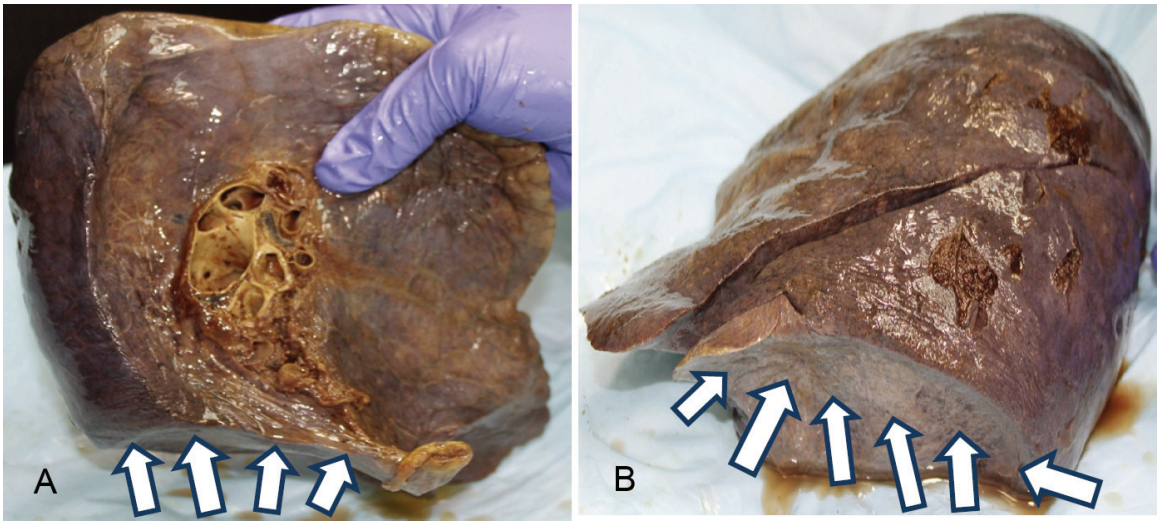

Figure 2. A: shows the removed left lung viewed from its mediastinal surface where the inferior lobe is massively impressed (white arrows) by the intrathoracic lipoma (resected); B: shows the same left lung viewed from its diaphragmatic surface where the inferior lobe is massively impressed (white arrows) by the intrathoracic lipoma (resected).

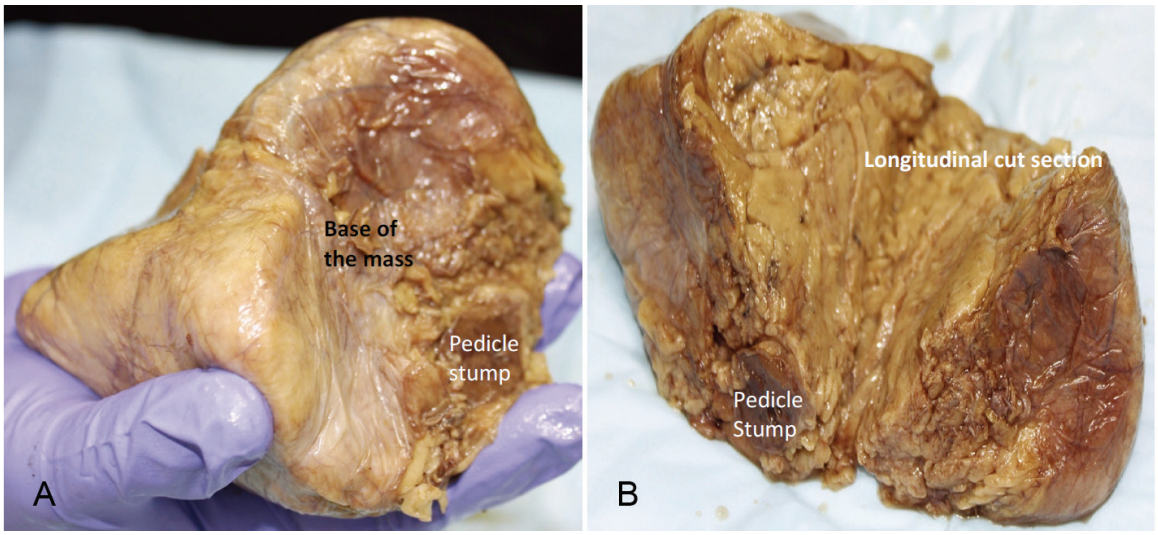

Figure 3. A: shows the resected intrathoracic lipoma, which is a pyramidal shape. Its brown-colored base has the pedicle stump where the tumor was resected. The tumor base is concave due to its molding by the upper surface of the left hemidiaphragm. Notice the true glistening capsule surrounding the entire lipomatous mass; B: shows a longitudinal cut section of the lipoma. Notice the pale yellow discoloration of the cut section compared to the brown discoloration of the tumor base and the tumor's subdivision into multiple lobules.

the medical history of this case suggested that the tumor was benign, other differential diagnoses could not be ignored. Cysts, hiatal hernia, intrathoracic visceral or omental herniation, liposarcoma, and hibernoma are among the large list of differential diagnoses that should be considered at this level of investigation. The non-cystic consistency and absence of any cystic degeneration in the cross section of this case's mass ruled out the diagnosis of intrathoracic cyst. The absence of any abdominal visceral tissues in the mass excluded the possibility of hiatal hernia or intrathoracic visceral herniation. Considering the location of this mass, which extends from the posterior (retrocardial) mediastinum to the diaphragm, and its fat content, distinguishing this mass from intrathoracic omental herniation was troublesome

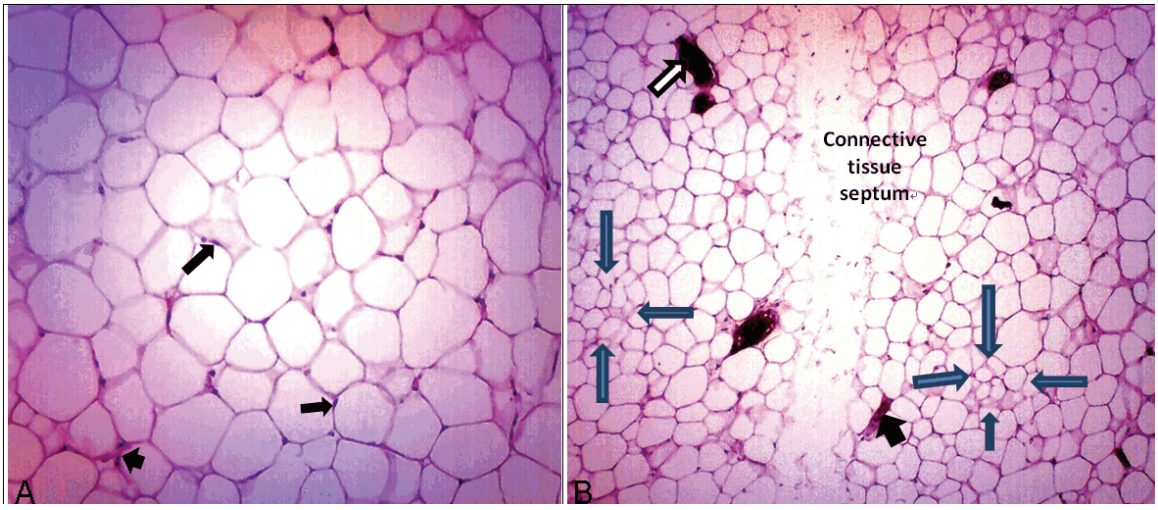

Figure 4. A: Histopathologic examination of the tumor reveals the mature regular adipose cells of almost similar sizes and eccentric normal nuclei (black arrows). X400; B: A histopathologic section of the tumor shows lipomatous lobules separated by a connective tissue septum. The black arrows show one of the rare occasions of lymphocytic infiltration. The white arrows show one of the sporadic hemorrhages scattered in a few sections. The blue arrows surround limited groups of small, however perfectly normal, adipose cells located mostly towards the center of the tumor. The small-sized adipose cells may be due to peripheral compression and probably limited blood supply, X200.

since both have similar characteristics [10]. However, the normal anatomical esophageal hiatus, the distance of the mass pedicle of the current case from the esophageal hiatus, the restriction of the mass to one hemithorax only, and the apparent non-obese body composition of the reported case favor a lipoma rather than an intrathoracic omental herniation. Although the differential histopathological diagnosis of liposarcoma also may be problematic, particularly in tumors with low-grade malignancy [4], the cell uniformity, the absence of cellular atypia, pyknosis, and mitotic figures of the current case would suggest simple benign lipoma with no predilection for malignancy. Also, the absence of invasion of the mass into the surrounding structures as evidenced by true capsulation and complete isolation of the mass strongly supported the benign nature of the mass. Hibernoma was ruled out since the mass described in this report was homogenously formed of a single cell type of mature adipocytes [11].

According to the classification of mediastinal lipomas of Williams and Parsons [12], the mediastinal lipoma of the current case would be classified as pure "intrathoracic" type as it was located completely within the thoracic cavity. It is quite surprising that this massive intrathoracic tumor had not been diagnosed during the life of this individual. If it had, it should have been surgically resected per authors' recommendations in order to avoid a mass effect on adjacent structures, prevent local recurrence, and prevent malignant degeneration that can happen in rare circumstances [6, 13, 14].

Mediastinal lipomas usually are slow growing and may reach a considerable size, usually without producing symptoms. In their review study of intrathoracic lipomas, Sakurai et al. [2] reported only one symptomatic case among a total of 10 cases of intrathoracic lipomas over a 16-year period from 1991 to 2006. That might help explain the absence of symptoms in our case since there was not any mention about the tumor in the medical record. However, the facts that the mass was located in intimate relation to the posterior aspect of the heart and upper surface of the left hemidiaphragm, was significantly compressing the lower lobe of the left lung, and was consistent with the heart condition of this case make it difficult to accept the absolute absence of any manifestations. Whether the intrathoracic lipoma had something to do with the current case's heart condition or her cause of death from respiratory arrest is something that cannot be determined despite the fact that massive mediastinal lipomas may cause cardiac arrhythmias [5], ventricular dysfunction, cardiac arrest [7], and

death due to severe dyspnea [13]. Statistically, this tumor hardly seemed compatible with the case's life-span since she died at the age of 79, which is slightly above average of the overall life expectancy of the American people (78.2 years) according to the United Nations census 2005-2010 (United Nations World Population Prospects: 2006 revision – Table A.17 for 2005-2010) [15].

Conclusion

Simple benign intrathoracic lipoma is an extremely rare disorder. The intrathoracic lipoma of the current postmortem case is the first of its kind to be reported at this advanced age since the previous maximum age of detection for such lesion was in a 60-year-old according to a literature review [2, 16]. To our knowledge, it is only the second postmortem, apparently asymptomatic, case to be reported after the case report of Vougiouklakis and coworkers [4].

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