

Benign but Terminal: Cardiopulmonary Collapse from a Massive Chest Wall Lipoma

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Abstract

Lipomas are the most common benign soft tissue tumor. Yet, strikingly simple tumors can become problematic when compounded by odd characteristics such as size and location. We report the case of a 53-year-old male who developed complete right lung collapse secondary to a large right-sided chest wall lipoma with accelerated growth in the past 6 months. Bronchoscopy revealed extrinsic compression of the right mainstem bronchus. Histopathology of the soft tissue mass was suggestive of a lipoma. The mass was not amenable to surgery due to a high risk of mortality from his underlying comorbidities. His hospital stay was complicated by progressive end-stage restrictive lung disease necessitating intubation and eventually a tracheostomy, recurrent pneumonias, multiorgan dysfunction, and his eventual demise. We highlight a rare presentation of an unchecked lipoma, which ultimately led to the death of our patient. Simple lipomas show insidious growth and can remain asymptomatic until they reach a large size. Chest wall tumors should be considered malignant until proven otherwise by excisional biopsy. This reiterates the need to treat all chest wall tumors with wide resection in order to provide the best chance for cure.

Keywords

lipoma, lung collapse, respiratory failure, chest wall lipoma, benign chest wall mass

Introduction

Lipomas are the most common benign soft tissue tumor with an estimated prevalence of 2.1%.¹ Yet, strikingly simple tumors can become problematic when compounded by odd characteristics such as size and location. Benign chest wall tumors are relatively uncommon and can originate from any of the chest wall components such as blood vessels, nerves, fat, bone, or cartilage. Lipomas are one such form of chest wall tumors.² Lipomas are usually characterized by insidious growth and are mostly asymptomatic. However, locations such as the chest wall or intramediastinal can predispose to symptoms owing to the compression of underlying tissues with progressive growth.³ We report a case of complete unilateral lung collapse secondary to a large right-sided chest wall mass found to be a lipoma, mandating care in the intensive care unit for persistent hypercapneic and hypoxic respiratory failure. Due to its inoperability, the mass progressed, causing end-stage restrictive lung disease and ultimately contributed to patient demise.

Case Report

A 53-year-old male presented to the hospital with shortness of breath. His past medical history was significant for poor baseline functional status, obesity hypoventilation syndrome, and obstructive sleep apnea on bilevel positive airway pressure ventilation nightly and with naps, chronic obstructive pulmonary disease on 4 L supplemental oxygen at home, chronic diastolic heart failure, paroxysmal atrial fibrillation, chronic kidney disease, history of pulmonary embolism, morbid obesity with a body mass index of 72 kg/m², and a large right chest wall mass (Figure 1). He had multiple admissions in the past year for dyspnea secondary to heart

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Figure 1. Lipoma on right chest wall.



Figure 2. Ultrasound of the chest wall showing an echogenic lobulated soft tissue mass with extensive subcutaneous edema.

failure exacerbation. Prior pulmonary function testing for dyspnea evaluation was suggestive of a restrictive disease process with a functional vital capacity (FVC) of 17% of predicted with a normal forced expiratory volume in one second (FEV1)/FVC. His chest wall mass had been present for about 15 years, gradually increasing in size with accelerated growth in the preceding 6 months. It had previously been estimated to be 10 cm × 20 cm × 15 cm in maximum dimensions but had increased to about 55 cm in the largest diameter at the time of presentation. He reported the mass to have been diagnosed as a lipoma by biopsy several years ago and had opted against surgery at that time as it was benign.

He underwent further evaluation of his dyspnea in the hospital and his chest radiograph was suggestive of compressive atelectasis of the right lung with a large right-sided pleural effusion. An ultrasound of the chest wall revealed a nonspecific echogenic lobulated soft tissue mass with extensive subcutaneous edema and interdigitating hypoechoic septations in the right chest wall (Figure 2). He was initially treated with diuretics for suspected exacerbation of heart failure due to his anasarca and elevated proBNP

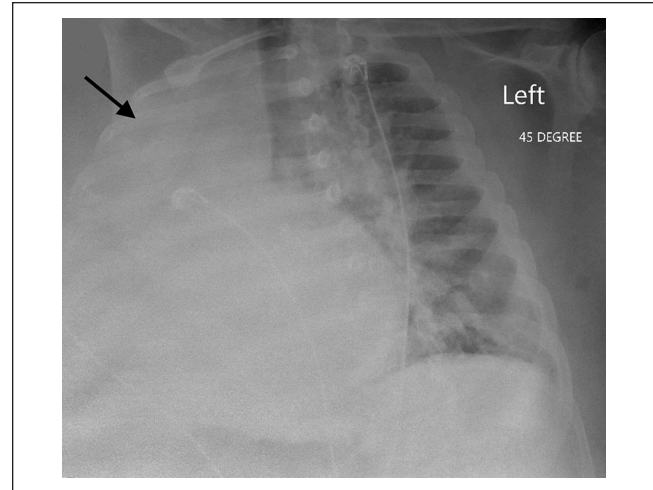


Figure 3. X-ray of the chest showing right hemithorax opacification (arrow).

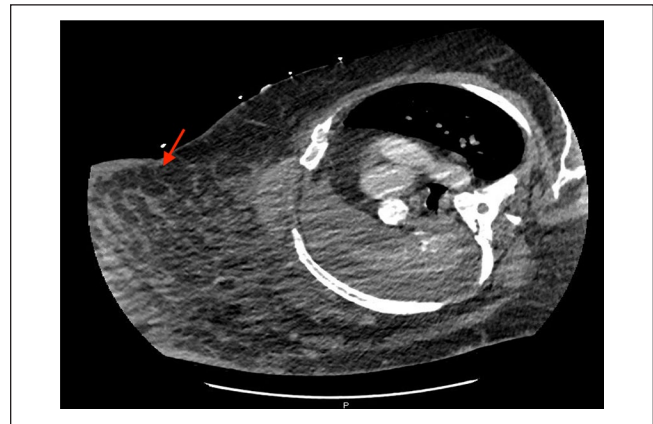


Figure 4. CT thorax showing a right chest wall mass (arrow) with diffuse edema and collapse of the right lung.

of 3391 pg/mL, but subsequently became hypotensive. He was progressively more lethargic during his hospital stay and a venous blood gas analysis revealed hypercapnia with $p\text{CO}_2 > 102$ mm Hg. A repeat chest radiograph showed complete opacification of the right hemithorax with nonvisualization beyond the right main bronchus (Figure 3). He was initially supported with noninvasive positive pressure ventilation on the medical floor but persistent hypercapnic and hypoxemic respiratory failure led him to the medical intensive care unit.

Further investigation with a computed tomography (CT) scan (Figure 4) of the thorax, showed complete collapse of the right lung, extensive nonspecific soft tissue edema in the right anterolateral chest wall, right axilla, and right shoulder with a large right pleural effusion. The patient was electively intubated for a bronchoscopy, which revealed mucus plugging and *Pseudomonas* spp. growing in tracheal aspirates,

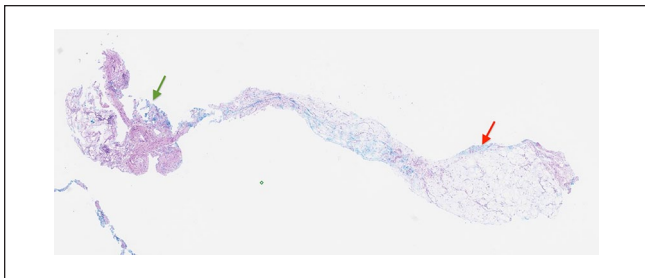


Figure 5. Biopsy sample with hematoxylin and eosin staining showing a fibrous (green arrow) and a lipomatous (red arrow) component.

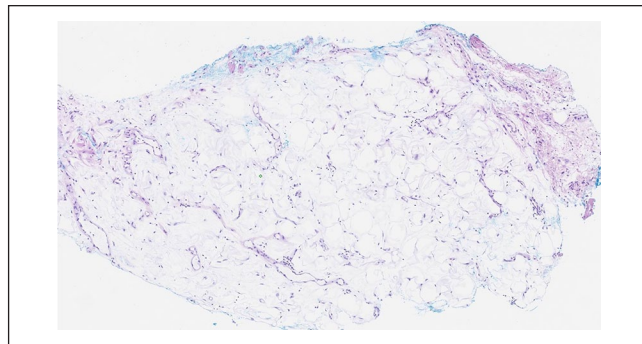


Figure 6. Biopsy sample under 10 \times magnification with hematoxylin and eosin staining showing adipose cells.

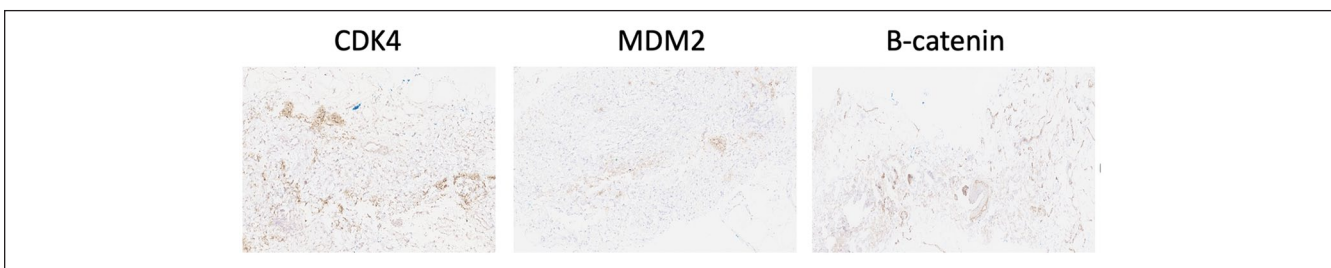


Figure 7. Immunohistochemistry: from the left to the right: (1) CDK4, (2) MDM2, and (3) β -catenin.

treated with frequent suction and antibiotics. There was evidence of extrinsic compression of the right mainstem bronchus on bronchoscopy. The patient was unable to be weaned off the ventilator and thus a tracheostomy was performed. Due to the large chest wall mass compressing vital structures, the patient experienced intermittent episodes of syncope during repositioning and out-of-bed efforts, becoming largely bedbound and ventilator-dependent.

A core needle biopsy with histopathology of the soft tissue chest wall mass showed largely adipose tissue, a fragment of fibrous tissue, edematous changes, and focal chronic inflammation (Figures 5 and 6). Immunohistochemistry for CDK4 and MDM2 were negative to rule out an atypical lipomatous tumor (ALT). Beta-catenin staining to rule out fibromatosis was absent in the fibrous component (Figure 7). Over his approximately 3-month hospitalization, multiple surgeons determined that the patient was a very poor surgical candidate for mass resection given his comorbidities and size of the mass.

He had a prolonged stay in the hospital due to multiple complications associated with lung compression. He experienced multiple episodes of ventilator-associated pneumonia from the tracheostomy and renal failure from repeated courses of high-dose antibiotics and diuresis. The patient was determined to have a poor prognosis, and an informed decision was made to transition to comfort care measures only. He died within a day of being disconnected from the ventilator.

Discussion

Lipomas can be superficial or deep, consisting of mature adipose tissue with varying content of fibrous tissue, muscle fibers, and blood vessels. Long-standing lesions may display areas of infarct, calcification, and/or fat necrosis. Superficial lipomas are usually well encapsulated whereas deep lipomas are less well circumscribed.⁴

There are a very few reported cases of giant chest wall lipomas. They have been observed in obese patients in the age group of 50 to 70 years, which is similar to our patient's demographic characteristics.^{5,6} Most chest wall lipomas are deep and thus tend to be less well circumscribed. Chest radiography helps in evaluation of chest wall tumors, in identifying tissue composition, and delineating the location and extent.

It is often difficult to distinguish benign and malignant chest wall tumors due to overlapping radiologic features. They can contain fat and non-adipose elements in varying proportions. Mature adipose tissue with little to no septation favor a benign process such as lipoma, whereas increased tumor size with fine septation could be suggestive of an ALT. Although lipomas generally appear homogenous on CT images, multiple thin septa can appear enhanced on CT scans.² Diagnostic ambiguity may exist even after use of a complicated scoring system or core needle biopsy, making it difficult to accurately distinguish a lipoma from an ALT. Immunohistochemistry for MDM2 and CDK4 is a relatively insensitive method for

diagnosing ALT in histologically ambiguous tumors, with fluorescence in situ hybridization for amplification of MDM2 being the gold standard.⁷ The absence of MDM2 and CDK4 on immunohistochemistry in our patient favors a benign lipoma. However, it is difficult to rule out a malignant component on core biopsy without more extensive sampling of the mass.^{8,9} Excisional biopsy or wide resection are the preferred methods of treatment and diagnosis for larger tumors. A study by Athanassiadi et al concluded that all chest wall tumors should be considered malignant until proven otherwise, with wide resection in order to provide the best chance for cure in both benign and malignant lesions.¹⁰

Factors that likely complicated our patient's course include his multiple comorbidities along with exacerbation of heart failure. This could have caused third spacing of fluid into his preexisting mass potentiating a rapid increase in size and further compression on his lungs. He eventually succumbed to his multiple medical issues complicated by poor respiratory reserve. Awareness of such potentially catastrophic consequences can help in justifying early intervention even for physiologically benign lesions.

Authors' Note

The case was presented as a poster at the American College of Physicians- New York Chapter, Resident and Medical Student Forum, Albany, New York, on February 29, 2020. All authors had access to the data and a role in writing the manuscript. Consent was obtained from the patient for the use of images.

Declaration of Conflicting Interests

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Ethics Approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed Consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.


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