Bone or pleura? Primary pleural osteosarcoma

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We describe a case of primary pleural osteosarcoma presenting as recurrent bloody pleural effusion and striking pleural calcification encasing the lung.

Clinical Summary
A 76-year-old nonsmoking ex-Royal Navy engineer had a 2-month history of progressive breathlessness and recurrent right-sided bloody effusion. The chest computed tomographic scan showed striking pleural calcification of variable thickness encasing the right lung and a large pleural effusion (Figure 1, A and B). We did not recognize the appearances. Our differential diagnosis included old trauma and tuberculosis, but there was no history of either. Immunohistochemistry of pleural needle biopsy specimens raised suspicion of malignant pleural mesothelioma. He came to us for surgical biopsy. We performed a short (3-cm) rib resection and took a full-thickness pleural biopsy specimen through the bed of the rib. Not to our surprise, pleurodesis was ineffective.

The pleural specimen was so bony that the pathologist initially mistook it for rib. On histologic review the diagnosis of primary pleural osteosarcoma was made (Figure 2). He was referred for specialist oncologic management.

Discussion
Calcification of the pleura is a sequela of intrapleural hemorrhage, infection, tuberculosis, or asbestos-related plaques. Extraskeletal osteosarcoma is a rare malignant mesenchymal neoplasm characterized by production of osteoid. It represents 1% to 2% of all soft tissue sarcomas and 4% of all osteosarcomas.3 Since first described by Wilson2 in 1941, a few series of these tumors have been reported. To qualify as an extraskeletal osteosarcoma, a tumor must arise in soft tissue, have a uniform sarcomatous pattern, and produce osteoid.3 Men are slightly more affected and the peak prevalence occurs in the sixth decade. Symptoms may relate to a slow-growing mass. Common sites of disease include the soft tissues of the extremities or the retroperitoneum, although a variety of pleural cavity sarcomas have been described, including liposarcomas, chondrosarcomas, and osteosarcomas.4

Although pathogenesis of extraskeletal osteosarcoma remains unclear, several possibilities have been suggested. These include trauma with subsequent myositis ossificans, radiation, metaplasia of connective tissue, and malignant degeneration of embryonal somatic remnants.5

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Figure 1. A and B, Chest computed tomographic scans showed striking pleural calcification of variable thickness encasing the right lung and a large pleural effusion, but no significant contraction of the hemithorax. There were no obvious intrathoracic mass lesions.
Metastatic disease is the commonest presentation of osteosarcoma in the chest, and primary pleural involvement without disease elsewhere is rare, although it has been previously reported. The clinical differential difficulties of primary pleural osteosarcoma include malignant pleural mesothelioma (histologic and radiologic), parosteal osteosarcoma of the rib, and osteosarcoma mimicking mesothelioma in pre-existing Paget disease of the bone. Fibrous mesothelioma with osseous metaplasia may represent another differential. It may be difficult to differentiate among these after extensive noninvasive investigations, but histologic examination increases the likelihood of confirming the diagnosis. Extraskeletal osteosarcomas are extremely malignant neoplasms, and recurrence and distant metastasis after resection are early features.

References

Harm from seat belt: Transthoracic lung herniation and pericardial rupture

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Traumatic rib and sternal fractures mostly occur in association with seat belts in car crashes without airbag deployment. Lung herniation and pericardial rupture are rare concomitant injuries. We report a case of traumatic extrathoracic herniation of the lung and pericardial rupture as a consequence of multiple rib fractures and sternal dislocation in a seat belted passenger in a high-velocity car crash.

Clinical Summary
A 79-year-old woman was involved in a severe car crash while sitting in the back seat. Clinical examination in the emergency department showed a left flail chest with subcutaneous emphysema and a massive hematoma left lateral to the sternum. Conventional chest radiography revealed that both lungs were expanded, with bilateral areas of hyperlucency (Figure 1, A). Multislice computed tomography revealed pneumomediastinum (Figure 1, B), bilateral lung contusion, hemothorax, and a herniation of segment 3 of the left lung through a large anterior apical chest wall defect (Figure 1, C), caused by segmented fractures of ribs 1 to 5 and a sternal body fracture. The endotracheal tube was switched to a double-lumen tube, and the patient was moved to the operating room, where left posterolateral thoracotomy was performed. The left lung was deflated for adequate exploration. At inspection, the lung had spontaneously retracted to the pleural cavity, and ribs 1 through 5 were fractured multiply at the chondrosternal junctions and along the anterior axillary line. A pericardial rupture was seen at the apical portion as a result of sternal dislocation without luxation of the heart. The pericardium was left open to reduce the risk of constrictive cardiogenic shock by pericardial effusion. The ruptured internal thoracic artery was ligated. A polytetrafluoroethylene mesh (Dualmesh; W. L. Gore & Associates, Inc, Flagstaff, Ariz) was fixed to the pleura between the intact parts of the ribs lateral...