References


Venous Hemangioma Presenting as a Superior Sulcus Tumor

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Non-small cell pulmonary carcinomas represent the majority of tumors located in the superior sulcus. However, only 5% of all non-small cell pulmonary carcinomas present in the superior sulcus. Other causes of superior sulcus tumors include metastatic tumors, hematologic malignancies, infectious causes, and amyloid nodules, as well as other lesions. We report a case in which a venous hemangioma presented as a superior sulcus tumor.

A comprehensive preoperative evaluation is essential in the assessment of a superior sulcus lesion. The clinical presentation of Pancoast syndrome does not necessarily rule out a non-small cell lung carcinoma. Other lesions may present in a similar manner. One of the benefits of the anatomic location of the superior sulcus is the accessibility to percutaneous biopsy to confirm the diagnosis. A noninvasive method to evaluate the depth of invasion can be determined by using magnetic resonance imaging, which has been shown to have a 94% correlation with surgical findings compared with 63% by using computed tomography [1].

A 40-year-old woman with no history of tobacco use presented with atypical left-sided chest pain. The pain was localized to the left breast and anterior thoracic wall with radiation to her left shoulder. The pain was exacerbated by lying on the left side and relieved by sitting and leaning forward. She denied any dyspnea or associated dyspnea with activity. On physical examination, her lung fields were clear to auscultation and percussion. There were no palpable masses. Range of motion of the left shoulder, elbow, and neck was within normal limits and did not elicit pain or deficits. Strength and sensation was intact along her left extremity.

A standard chest roentgenogram revealed an expanded appearance of the left posterior second rib with associated soft tissue density projecting over the left apex. Further evaluation was completed with a computed tomographic scan of the thorax and neck. The left second rib had an expansile appearance with extensive periosteal reaction extending away from the posterior aspect of the rib. A lobulated, soft tissue mass extended inferiorly from the second rib. On coronal images the mass measured approximately 6.4 × 3.2 cm. Magnetic resonance imaging revealed an intermediate to low signal on T1-weighted images and high intensity on T2-weighted images, with avid uniform postcontrast enhancement, suggesting significant vascularity (Fig 1). The mass lay adjacent to the posterolateral margin of the left subclavian artery near its origin to the left first rib at the costovertebral junction, and it was in close proximity to the brachial plexus, which did not appear to be involved. A positron emission tomographic scan revealed intense uptake in the mass without any other site of uptake (Fig 2). A percutaneous biopsy was obtained, which revealed no definitive diagnosis.

The patient was taken to the operating room for resection with a high index of suspicion that the mass...
represented a sarcoma. A posterolateral thoracotomy was performed, and gross inspection revealed a lobulated mass involving the second and third ribs. With further dissection, the mass was easily separated from the subclavian artery as well as the brachial plexus. Eventually, a chest wall resection of ribs 1 to 4 was performed. Pathologic examination demonstrated a venous hemangioma centered on the second rib. Histologic examination with Verhoeff van Gieson elastic tissue stains failed to identify any elastic lamina typical of arteries. It was determined that the entire neoplasm was of venous origin. The mass was dense, spongy, red-brown, partially calcified, and measured to be $6 \times 4 \times 4$ cm. The mass had encased the first rib, but it did not result in any diagnostic bone abnormalities. The patient suffered a transient Horner’s syndrome postoperatively, but otherwise the patient has done well after 9 months of follow-up.

Comment

Anatomically, the superior sulcus is synonymous with the superior portion of the costovertebral gutter. Superior sulcus tumors often invade the second and third ribs, the brachial plexus, the subclavian vessels, the stellate ganglion, and the adjacent vertebral bodies [1]. The term superior sulcus tumor and Pancoast tumor have been used interchangeably throughout the years. A recently proposed definition of Pancoast tumor is that of a lung cancer arising in the apex of the lung and involving structures of the apical chest wall [2]. Involvement only at the level of the second rib or lower is not considered a Pancoast tumor by this definition.

Of all the tumors that present as a superior sulcus tumor, the vast majority of tumors are non-small cell lung carcinomas. Depending on the study, squamous cell carcinomas or adenocarcinomas may predominate [3]. Other tumors that can exist as a superior sulcus tumor include large cell carcinomas, anaplastic, mixed, or undetermined lesions. A variety of tumors can mimic a superior sulcus tumor both clinically as well as radiologically [4]. Some noted cases include lymphoma, plasmacytoma, infections (tuberculosis, echinococcus, staphylococcus, cryptococcus, and actinomyces), desmoid tumor, and metastatic malignancies from the cervix, larynx, liver, bladder, and thyroid gland. Lymphomatoid granulomatosis, vascular aneurysm, a cervical rib, amyloid nodules, hemangiopericytoma, and mesothelioma may also present as superior sulcus tumors. We believe that this is the first report of venous hemangioma presenting as a superior sulcus tumor. Although we acknowledge that the tumor location does not fit the commonly accepted definition of a superior sulcus tumor, the apical location and clinical presentation of the tumor mimicked a classic superior sulcus tumor.

Based on biologic and pathologic differences of the tumor, all vascular anomalies are assigned to one of two broad categories: (1) hemangiomas and (2) vascular malformations. Hemangiomas exhibit a proliferative phase, rapid neonatal growth, and hypercellularity, followed by an involution phase, fibrosis, and reduction in cellularity [5]; this category includes vascular tumors. In some rare instances, hemangiomas may not involute and persist into adulthood [6]. Osseous hemangiomas may occur in patients of all ages, with a peak in incidence in the fourth and fifth decades. The most common sites of involvement are the vertebrae and skull [7]. Although the majority of osseous hemangiomas are asymptomatic, these tumors may present with symptoms based on compression or hemorrhage. Our patient was a young woman who presented with left-sided chest pain and imaging that suggested a sarcomatous tumor in the superior sulcus. Complete resection led to definitive diagnosis, as well as relief of symptoms. In retrospect, the magnetic resonance imaged appearance of the tumor should have led us to suspect a highly vascularized tumor suggestive of hemangioma. However, the soft tissue component of the mass, as well as the clinical symptomatology, raised our
level of concern regarding a malignant tumor (eg, osteosarcoma). Intraoperative biopsy may have also determined the diagnosis. However, we were reluctant to perform such a biopsy because of the location and gross characteristics of the mass.

References

Transapical Valve Implantation After David Operation and Stenting of the Descending Aorta
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This case report illustrates our experience with transapical minimally invasive aortic valve implantation in a patient with an extended aneurysm of the thoracoabdominal aorta, who had previously undergone a replacement of the ascending aorta with concomitant aortic valve reconstruction (David procedure). Endovascular stent grafting of the descending aorta was also performed. The implantation of a 23-mm SAPIEN valve (Edwards Lifesciences, Irvine, CA) did not interfere with the existing 26-mm aortic Hemashield prosthesis (Boston Scientific, Natick, MA) or the previously implanted endograft in the descending aortic position. No paravalvular leakage with aortic valve regurgitation, prosthesis instability, or coronary malperfusion was seen after valve implementation.

The treatment of choice for patients with aneurysm of the ascending thoracic aorta and aortic valve insufficiency is prosthetic replacement of the ascending aorta with reimplantation of the coronary arteries and a concomitant repair (David or Yacoub) or replacement (Bentall) of the insufficient valve. An aneurysm that extends further also affects the aortic arch, the descending thoracic, and abdominal aorta, and the surgical approach may include a hemiarch or arch replacement or a stepwise replacement of the entire thoracic aorta (elephant trunk procedure) [1].

As a result of the high rate of complications associated with replacement of the descending thoracic and abdominal aorta and the concomitant improvements in endovascular techniques of aneurysm exclusion, these more radical surgical procedures are increasingly avoided. Because of the tremendous development of stent graft procedures, this part of the aneurysm exclusion may be easily done through a transfemoral approach. Owing to the increasing number of elderly patients with severe comorbidities, a second new technique has been developed to avoid cardiopulmonary bypass and median sternotomy using a transapical approach with implantation of the aortic valve through the left ventricular apex using lateral minithoracotomy on a stent-based system [2].

We present a case in which the following procedures were combined: endovascular stent graft procedure for contained rupture of a descending aortic aneurysm, followed by transcatheter aortic valve implantation (TAVI) in a patient who had previously undergone a David procedure and total arch replacement, with severe residual aortic valve insufficiency due to prolapse of the noncoronary cusp.

A 67-year-old woman presented to our hospital with a 4-day history of symptoms 6 months after replacement (26-mm Hemashield, Boston Scientific, Natick, MA) of the ascending aorta with concomitant David reconstruction of the aortic valve for a previously diagnosed aneurysm of the entire thoracic aorta. Computed tomography imaging revealed progressive dilatation of the descending thoracic aorta of between 7.5 cm (adjacent to the Hemashield anastomosis) and 5.4 cm (at the diaphragm-