Superior Sulcus Tumors
Do They Really Exist?

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Superior sulcus tumors are a particular entity in thoracic oncology and surgery. These malignant tumors arise in the apical segment of the upper lobes, are locally aggressive, and tend to invade the main anatomical structures around the first rib. When associated with symptoms of neurological involvement they are called Pancoast–Tobias tumors after those physicians who, for the first time, drew attention to the association of shoulder and arm symptoms and tumors arising in the apex of the chest.[1,2] Pancoast introduced the term "superior sulcus" and he presumably referred to the groove of the subclavian artery in the pleural cuff that represents the limit between the thorax and subclavian vessels with surrounding structures.[1] He suggested that a remnant of the fifth pharyngeal pouch was at the origin of the tumor. The same year, however, Tobias described the true origin as being from the lung apex.[2]

But what exactly is the superior sulcus of the lung from a purely anatomical or radiological point of view? Two major textbooks of anatomy have no mention of a superior sulcus at the apex of the lung.[3,4] Anatomically, in the groove of the subclavian artery is the "fossette sus- et rétropleurale de Sébileau," named after the French anatomist who first described it, which contains the stellate or cervicothoracic ganglia (Fig. 1). Tumor infiltrating the stellate ganglion gives rise to the Horner's sign in the Pancoast syndrome.

Radiologically, this anatomic region, "the lung above the clavicle," located at the "edge" of the chest film, is referred to as the supraclavicular region or the lateral aspect of the thoracic inlet.

Taking these factors into account, there is no anatomical or radiological correlation for a "superior sulcus." So, a more correct term is "apical chest tumor" or "apical segmental tumor." When associated with neurological symptoms, the term Pancoast–Tobias syndrome is justified, which mostly indicates a T4 tumor.

Precise management and surgical approach of apical chest tumors remain somewhat controversial, partly because of their infrequent occurrence.[5] Several approaches to resect these tumors have been described depending on the precise localization and involvement of the surrounding organs: posterolateral thoracotomy, hemiclamshell and trapdoor incisions, transsternal, transclavicular, transmanubrial osteomuscular-sparing, and also transscapular approaches.[6] The anterior incisions are especially interesting when the subclavian vessels are involved. Although the posterior approach has been well known in Anglo-Saxon literature for a long time, the anterior incision has been described in the English thoracic surgical literature only from the 1990s onward.[5] Less recognized is the fact that this particular approach has been described much earlier in French scientific literature, more precisely in 1918 in the *Journal de Chirurgie*, as an approach to traumatic lesions of the supra-aortic vessels in a time period when endovascular treatment was nonexistent (Fig. 2).[7]

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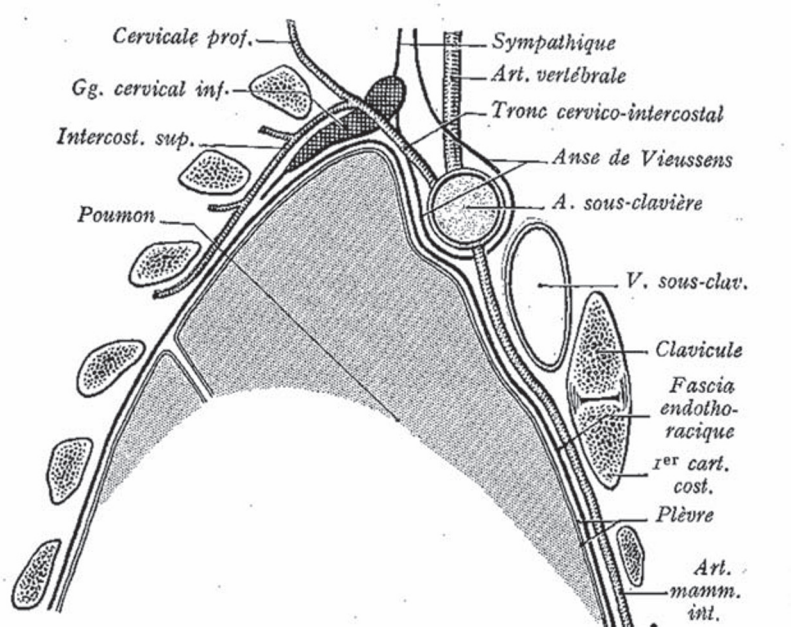

FIGURE 1. Parasagittal view of the apex of the chest as described by Rouvière showing the relation of the subclavian artery (A. sous-clavière) with the lung (Poumon), pleura (Plèvre), and inferior cervical ganglia (Gg cervical inf.)[8] Reproduced with permission from Elsevier Masson, Issy-les-Moulineaux, France.

In conclusion, the "superior sulcus" does not really exist anatomically or radiologically. For precise description of these challenging tumors the term "apical chest tumor" or "apical segmental tumor" is proposed. Precise involvement of the invaded structures should be clearly described. Pancoast–Tobias syndrome is reserved for those patients presenting with symptomatic neurological involvement. Because of the rarity of these tumors further prospective data as collected in the database of the International Association for the Study of Lung Cancer are required to determine optimal treatment and prognosis.

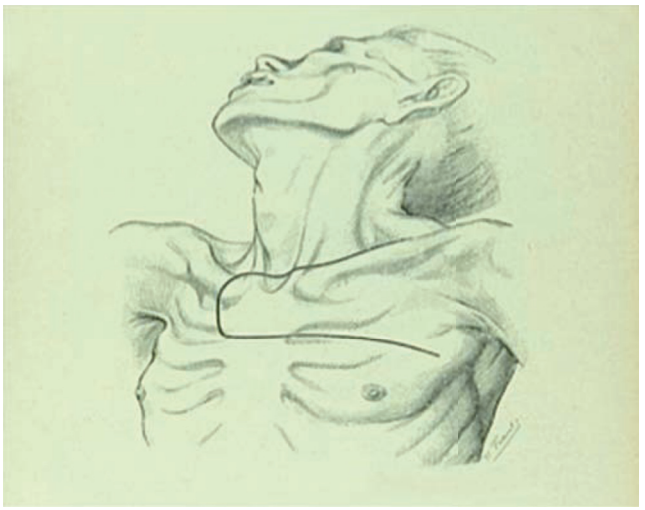

FIGURE 2. Anterior approach to the aortic arch and supra-aortic vessels as described by the vascular surgeon Louis Sencert (1878–1924) in 1918.[7] Reproduced with permission from Elsevier Masson, Issy-les-Moulineaux, France.

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