Case Report:
Accessory Thymic Lobe: A Complicated Morphological Finding During Dissection

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Citation

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Abstract: The thymus is a primary lymphoid organ of the immune system, that plays a vital role in the development and maturation of the immune system during childhood. During the dissection we encountered an unusual thymus, located in the anterior mediastinum, which had a narrow, L-shaped accessory lobe and was located on the right side of the pericardium, covering the right ventricle from its base to the place of adhesion to the diaphragm. Its length was 6.7 cm, the width of the narrowest segment was 1.1 cm, and at the widest part was 2 cm, with the average segment thickness of 0.4 cm. The presence of accessory thymic lobes that extend till the level of the diaphragm creates difficulties during surgery especially in case of thoracoscopic procedures as the tissue lies on the pericardium in a narrow space thus making the dissection more difficult.

Key Words: Thymus, Dissection, Accessory thymic lobe

Introduction:
The thymus is a primary lymphoid organ of the immune system, that plays a vital role in the development and maturation of the immune system during childhood. It is responsible for the differentiation of T cells, which are key regulators of cellular immunity [1]. It is a lobulated organ that has two lobes which meet and unite approximately at the midline and are located from the level below the thyroid till the 4th rib. The thymus is located behind the sternum and partially lies on the pericardium and is separated from the brachiocephalic vein, aortic arch and their branches by a layer of fascia. In the neck region it lies in front of the trachea behind the sternohyoid and sternothyroid muscles. Superiorly, it is connected to the thyroid gland by the thyrothymic ligament, which contains multiple small blood vessels. Laterally, the thymus runs along the pleura, mediastinal fat and the phrenic nerves. Three principle sources of its blood supply are the superior thymic arteries (from the inferior thyroid artery), the lateral thymic arteries (from the internal mammary artery), the posterior thymic arteries (from the brachiocephalic artery). The venous draining system consists of the thymic posterior veins (grand veins of Keynes) that drain the gland and empty into the brachiocephalic vein, superior thymic veins drain the superior aspect of the gland and empty into the inferior thyroid vein [2, 3]. At birth it weighs approximately 13 g to 15 g and reaches its maximum weight (35-45 g) during puberty and then gradually is replaced by fat tissue [2, 3]. Therefore, its weight is 25 g at the age of 25, 15 g at 60 and only 6 g at 70 years [3]. Abnormalities of the thymus are associated with increased susceptibility to infectious, autoimmune, and neoplastic processes [4].

In any area of surgery, thorough knowledge of the anatomy of the region is the key to a safe and successful procedure. The presence of different variations in size, shape of the thymus and complex regional anatomy (presence of major vessels and nerves) makes the procedures in the mediastinum especially complicated. Therefore, a good understanding of the anatomy and the relationship of the gland to adjacent anatomical structures is essential [3].

Anatomical Case
The anatomical case was encountered during a dissection of an organ complex of a 2-year-old girl which included organs, vessels and nerves of the chest cavity, as well as the liver and spleen. During the dissection we encountered an unusual thymus, located in the anterior mediastinum. The study was carried out at the department of anatomy of the SMPPhU “Nicolae Testemitanu” in accordance with the institutional requirements of medical ethics.
The thymus had an irregular shape, consisting of three separate lobes (left, right, and accessory thoracic lobe), interconnected at their bases only by the connective tissue of the capsule (Fig. 1, Fig. 2). The organs color was light brown, with well-defined lobulation, located in the anterior mediastinum, from the level of the trachea bifurcation (main lobes) and up to the diaphragm (accessory lobe). The left lobe covered the left brachiocephalic vein, the left atrial appendage, the aortic arch, the pulmonary trunk, left pulmonary artery, and also partially adjoined to the left bronchus. The lobe had a pyramidal shape. The height at its base was 2 cm, gradually decreasing to 1 cm in the area of the apex of the lobe. 4.5 cm in width, and 0.6 cm in average thickness. The right lobe had an ovoid shape, with a weakly expressed lobulation. For the most part, it covered the right brachiocephalic vein and superior vena cava. It was 3.5 cm in width and 2.5 in height, with the thickness of 0.7 cm. The accessory thoracic lobe had a narrow, L-shaped form and was located on the right side of the pericardium, covering the right ventricle from its base to the place of adhesion to the diaphragm. Its length was 6.7 cm, the width of the narrowest segment (at the base of the lobe) was 1.1 cm, and at the widest part was 2 cm, the average segment thickness of 0.4 cm. The thymus was supplied with blood by three thymic arteries one for each lobe that entered the parenchyma at the base of each lobe.

**Discussion**

Thymus anomalies are not frequently described in the literature. As a glandular organ it can have different shapes and developmental abnormalities like superior pole variation, accessory thymus, extension above, till or above the thyroid gland, accessory lobes, unusual margins, abnormal localization behind the vascular structures (innominate vein). Nevertheless, removal of all thymic tissue is the goal of the surgical treatment for myasthenia gravis, which is one of the most common reason for thymectomy [7]. Remnant thymic tissue can also be misdiagnosed as tumors and be the reason for unnecessary procedures [8].

Anomalies in number of thymic lobes are not frequent and in a study of 212 full term new borns there were only two cases (0.94%) of cranial accessory lobe, which stretched to the neck [9]. Nevertheless, during surgery for myasthenia gravis up to 82% of patients may have surgically important variations in thymic anatomy in the neck, in the mediastinum, or in both. Accessory lobes in patients with myasthenia gravis are reported frequently and lie adjacent to or distant from the main lobes sometimes posterior to the phrenic nerves, in the aortopulmonary window, or at the level of the diaphragm. In some cases they may be indistinguishable from mediastinal fat [10].

The presence of accessory thymic lobes that extend till the level of the diaphragm creates difficulties during surgery especially in case of thorascopic procedures as the tissue lies on the pericardium in a narrow space thus making the dissection more difficult.

Thymus anomalies are not frequently described in the literature. As a glandular organ it can have different shapes and developmental abnormalities. The complicated embryologic development and individual and age-related variations in the size and shape of the gland make definition of the anatomic features during invasive procedures even more challenging, especially in case of ectopic thymic foci, which are often abundantly present [6]. Nevertheless, related variations in the size and shape of the gland make definition of the anatomic features during invasive procedures even more challenging, especially in case of ectopic thymic foci, which are often abundantly present [6]. Nevertheless, removal of all thymic tissue is the goal of the surgical treatment for myasthenia gravis, which is one of the most common reason for thymectomy [7]. Remnant thymic tissue can also be misdiagnosed as tumors and be the reason for unnecessary procedures [8].

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