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Accessory Thymic Tissue in the Neck – an Incidental Finding during Anatomical Dissection

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Herewith, we report a rare case of an accessory thymic remnant in the infrahyoid region. During routine anatomical dissection of the neck muscles of a 65-year-old Caucasian male cadaver, we discovered four small aberrant oval bodies. Histologically, the two lower bodies were composed of thyroid gland tissue. The upper left body was composed of uni- and multilocular adipocytes. The routine histology of the upper right aberrant structure showed adipose tissue and hypercellular areas of small cells with fine chromatin texture, arranged in nests. In some parts, they showed gradual transition into spindle-shaped elements resembling immature squamous epithelium. Further examination was provided by automated immunohistochemistry. CD45 was found to be expressed on all small cells, corresponding to lymphocytes, while Cytokeratin 5/6 decorated the Hassall's bodies-like structures, confirming their squamous nature. The final histological diagnosis was thymic tissue with immature Hassall's corpuscles.

Key words: accessory thymus, neck, immunohistochemistry, clinical significance, human

Introduction

The thymus is usually composed of two loosely connected lobes of variable shape, situated just behind the manubrium and body of the sternum and occupying parts of the superior and anterior mediastina [7]. Not infrequently, the upper parts of the thymic lobes extend into the base of the neck just behind the infrahyoid (strap) muscles and even higher reaching the thyroid gland [7]. This cervical location can be explained by migration downwards of the thymic epithelial cords during the development [4], remnants of which can persist in the neck as either accessory or ectopic thymus [10]. The aberrant thymic tissue may suffer from the same pathological conditions as the usual thymus, and has a clinical importance in thymoma and myasthenia gravis surgery [2, 13].

Materials and Methods

The gross anatomy observations were done in a formalin-fixed adult male cadaver. For routine histological observations, the tissue samples were paraffin embedded, cut into 7µm thin slices and stained with H&E according to a standard laboratory protocol. The immunohistochemistry was performed on paraffin embedded tissue slices by using Autostainer Link 48 (Dako, Agilent, USA) after antigen retrieval in PTLink in low pH buffer. EnVision Flex protocol was followed with 20 min incubation with pre-diluted primary antibodies: CD45 (LCA, clones 2B11+PD7/26), Cytokeratin 5/6 (CK 5/6) (clone D5/16 B4), CD56 (clone 123C3; Dako, Agilent).

Results

Herewith, we report a rare case of an aberrant thymic tissue found in the anterior cervical region of a 65-year-old Caucasian male cadaver. Upon dissecting the infrahyoid muscles, we discovered four small oval bodies (long diameter about 10-15 mm), quite flattened (thickness about 4-5 mm), that were grouped in two pairs - upper and lower.The two lower bodies were found under the layer of the sternothyroid muscle at the level of the C6 vertebral body (**Fig. 1a**). They were closely related but separated from the capsule covering the lower parts of the thyroid gland lobes. The two upper bodies were identified at the level of the C4 vertebral body between the sternohyoid and thyrohyoid muscles (**Fig. 1b**), covering the lower half of thyroid cartilage. In gross anatomy inspection, the four bodies looked similar. Hence, we proceed with their microscopic examination.

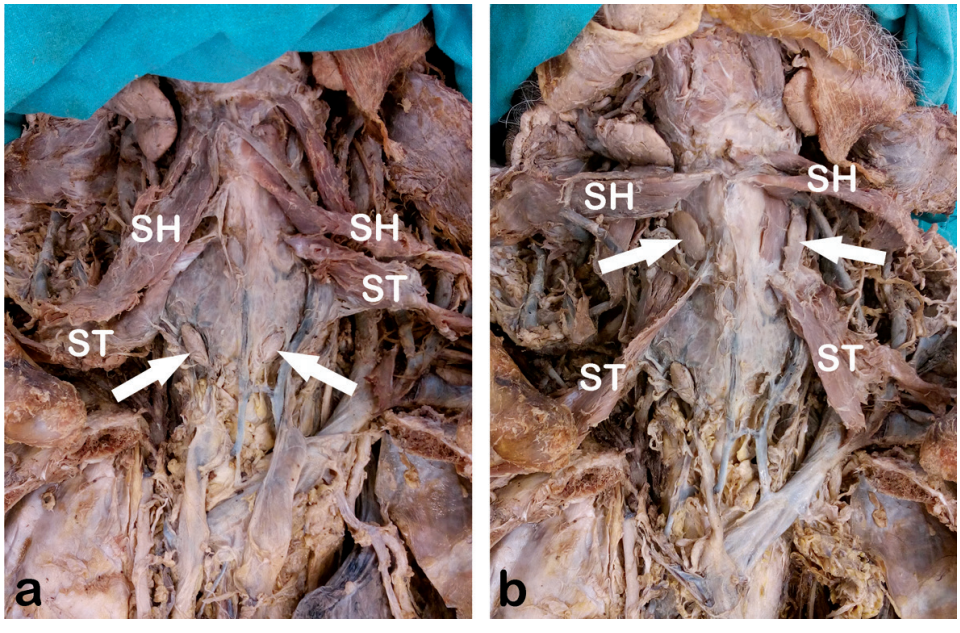

Fig. 1. Photograph of the neck dissection. White arrows showing the lower (a) and upper (b) aberrant bodies. Muscles: SH – sternohyoid; ST – sternothyroid.

The paraffin embedded tissue slices stained routinely with H&E revealed quite a different histology. The two lower structures were composed of thyroid gland tissue (**Fig. 2a**). Adipose tissue was identified in the upper left oval body, containing unilocular and small number of multilocular adipocytes (**Fig. 2b**).

The histological structure of the upper right oval body, however, was more demanding. Based on the first look observations, we were vacillating between thymic tissue and parathyroid gland. Detailed observations on routine histology revealed mature fatty tissue with unevenly distributed hypercellular areas, composed of small cells with fine chromatin texture, pale cytoplasmic rim and well-defined cellular borders (**Fig. 3a, b**). These cells were arranged in small nests, lacking apparent vessels and harbor gradual transition into spindle-shaped elements with incipient formation of structures, resembling immature squamous epithelium (Hassall's corpuscles).This finding was consistent with descriptions of Zielinsky et al. [13], who also did not find Hassall's bodies in 34,4% of accessory thymic tissue examined.

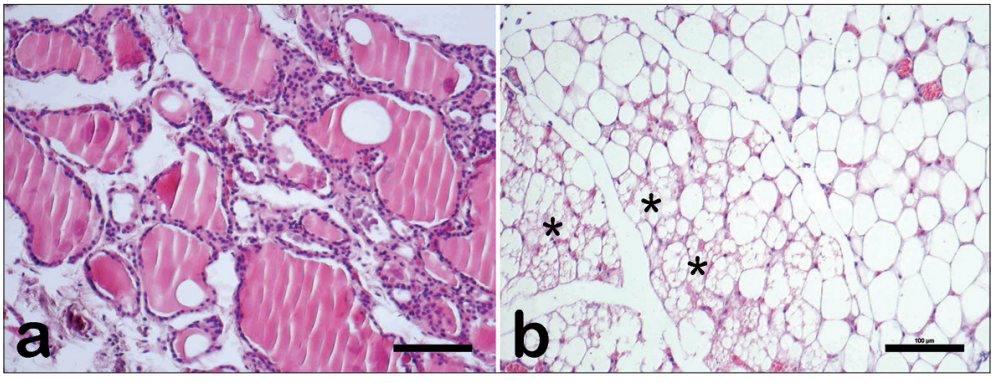

Fig. 2. Photomicrographs of the routine stained slides (H&E) from the lower (a) and upper left (b) aberrant neck structures. In (b), the asterisks indicate small groups of multilocular adipocytes, surrounded by unilocular adipocytes. Objective x20. Scale bar – 100 µm.

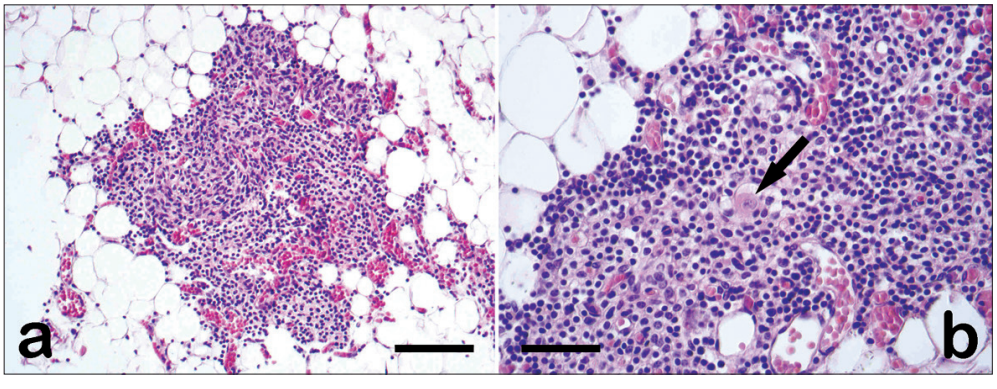

Fig. 3. Photomicrographs of the routine stained slides (H&E) from the upper right aberrant structure. In (a) adipose tissue mixes with hypercellular areas, composed of small cells with fine chromatin texture. Objective x20. Scale bar – 100 µm. In (b) arrow indicates spindle-shaped elements resembling immature Hassall's corpuscle. Objective x40. Scale bar – 50 µm.

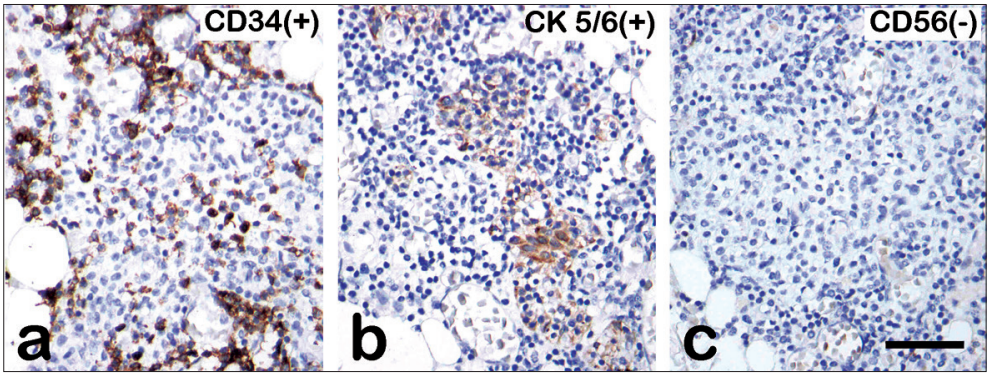

Fig. 4. Immunohistochemistry of upper right aberrant structure, showing CD34 positive reaction of the lymphocytes (a), CK 5/6 positive reaction of the epithelioreticular cells (b) and negative CD56 marker, excluding neuroendocrine cells (c). Objective x40. Scale bar – 50 μm.

For further examination, immunohistochemistry for was performed with pre-diluted primary antibodies: CD45 (LCA, clones 2B11+PD7/26), Cytokeratin 5/6 (CK 5/6)(clone D5/16 B4), CD56 (clone 123C3; Dako, Agilent).CD45 (leukocyte common antigen) was found to be expressed on all small cells, corresponding to lymphocytes (**Fig. 4a**), while CK 5/6 decorated the Hassall's bodies-like structures, confirming their squamous nature (**Fig. 4b**). The neuroendocrine cell marker CD56 was found negative (**Fig. 4c**). The final histological diagnosis was thymic tissue with immature Hassall's corpuscles.

Discussion

In the present literature, there are many reports of aberrant thymic tissue that might be classified as either accessory or ectopic [3, 6, 8, 12]. An "accessory" thymic tissue exists additionally to the normal mediastinal thymus, while the "ectopic" thymus basically means the whole organ in unusual location [10]. In our case, the small thymic remnant was classified as accessory because it was located between the sternohyoid and thyrohyoid and was existing together with the involuted thymus in the superior mediastinum.

Despite different theories proposed, the recent studies suggested the "endoderm-centric" ("endoderm-only") model of thymic development [1]. During 5th-7th week of human development, the thymic epithelial cells, deriving from the endoderm of the paired third pharyngeal pouch, descend along the neck to reach the superior mediastinum and later become populated with lymphoid stem cells [4, 5]. This descensus defines the possible places of ectopic or accessory thymic tissue.

The incidence of cervical accessory thymic tissue in general adult population is not known, because it might remain asymptomatic. In the patient groups, treated for myasthenia gravis with extended thymectomy, an accessory thymus was variably reported from 12.1% [13] to 22% [2]. Another group examined is thyroidectomied patients, who present some accessory thymic tissue in 4.45% of the cases [8]. Additionally, in nearly

50% of the cases of ectopic thymoma, an origin from the accessory cervical thymic tissues might be expected [11].

The reported here accessory thymic tissue should be considered in differential diagnosis of neck tumors, including cervical lymphadenomegaly [3, 11]. The thymic remnants can be found accidentally during different surgical interventions in anterior neck region [9]. The surgeons must be well aware of these possible aberrant thymic focci in order not the miss them during thymectomy for myasthenia gravis thus preventing any reoperations [2, 13].

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