H142 Agenesis of the Thyroid Cartilage Superior Cornua: Implications for Autopsy

Sharon M. Derrick, PhD, Harris County Institute of Forensic Sciences, 1885 Old Spanish Trail, Houston, TX 77054; Kathryn C. Pinneri, MD, Montgomery County Forensic Services Department, 205 Hilbig Road, Conroe, TX 77301; and Deborrah C. Pinto, PhD, Harris County Institute of Forensic Science, 1885 Old Spanish Trail, Houston, TX 77054*

After attending this presentation, attendees will better understand the prevalence of thyroid cartilage superior cornu agenesis in forensic autopsy cases.

This presentation will impact the forensic science community by illustrating the appearance of this variant at autopsy and describing the potential challenges of assessing trauma to the neck structures when one or both cornua are absent.

Examination of the neck for evidence of trauma or disease is a fundamental part of the forensic autopsy. The neck structures are assessed *in situ*, then removed from the body for a more detailed inspection and additional photography. Soft tissue hemorrhage and/or fractures of the hyoid bone or the thyroid and cricoid cartilages suspicious for inflicted trauma may be noted by the forensic pathologist during this portion of the examination. In some cases, developmental variants of the laryngohyoid complex may make it difficult to distinguish between injury, normal morphology, or postmortem artifact. For example, palpation of unilaterally or bilaterally unfused greater hyoid cornua may suggest fracture until further examination reveals the variant. The thyroid cartilage is known anecdotally to present with multiple developmental variants. The prevalence of all thyroid cartilage variants has been estimated to range from 4.8%-29.5% of the population[1]. Yet the literature is lacking in both descriptive and quantitative studies of individual variants, especially as they relate to autopsy cases. One variant observed at autopsy is agenesis of the thyroid cartilage cornua.

The Harris County Institute of Forensic Sciences (HCIFS) Pathology Services Division covers a large jurisdiction, employing 18 forensic pathologists and four doctoral-level forensic anthropologists. As an example of the caseload, in 2015, the HCIFS received 4,644 cases. Of these, 705 received an external examination and 3,939 received a full autopsy. From January 1, 2010, to July 31, 2016, one pathologist performed or supervised 1,230 full autopsies, excluding fetal deaths. A minimal number of these autopsies were of skeletonized remains without preservation of the cartilaginous neck structures. The anthropologists routinely perform laboratory analysis on neck structures when requested by the pathologist of record. The anthropologists examined 209 thyroid cartilage cases between January 1, 2010, and July 31, 2016. A total of 26 cases of thyroid cartilage cornu agenesis were recorded, 19 by the pathologist, and seven by the anthropologists (submitted by five different pathologists).

The majority (15: 58%) of the 26 cases display agenesis of the left cornu, suggesting that the left side may be predilected for an as-yet undetermined reason. Six right cornua were absent and five cases exhibited bilateral agenesis. The sex distribution was 77% male and 23% female. The race/ethnicity distribution was 46% White, 42% Black, and 12% Hispanic. Importantly, males and White and Black individuals are overrepresented within the HCIFS caseload when compared with the demographic composition of Harris County. The manner of death distribution in the 26 cases was 42% natural, 19% homicide, 19% suicide, and 19% accident. Causes of death include strangulation, homicidal violence, asphyxia, blunt force injuries, firearm wounds, toxicity, and cardiovascular disease.

The true incidence of thyroid cartilage superior cornu agenesis in HCIFS cases is not quantified using these data because all cases of agenesis have not yet been collected systematically by the HCIFS pathologists. Additional studies are needed to standardize collection of the data and to examine the possible association of agenesis with variants of the triticeous cartilage.[2] Estimated prevalence of agenesis in this closed cohort of HCIFS cases is 1.8%. Further study may reveal that agenesis of the cornua is not all that rare, and that the left cornu may be absent more frequently. Awareness of the distribution of this normal variant is useful for the internal neck examination at autopsy.

Reference(s):

1. Hejna Petr; Janik, Martin; Urbanova Petra. Agensis of the superior cornua of the thyroid cartilage: a rare variant of medicolegal importance. *Am J Forensic Med Pathol*. 36(1) March 2015.
2. Algahtani Eman et al. Triticeous cartilage CT imaging characteristics, prevalence, extent and distribution of ossification. *Otolaryngology-Head and Neck Surgery Foundation.* 2015. DOI: 10.1177/0194599815615350.

Forensic Pathology, Thyroid Cartilage, Neck Structure Variants