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Research Paper

Ossified Thyroid Cartilage: A Tool for Determining Age and Sex of an Individual

Medical Science

KEYWORDS : Ossified Thyroid cartilage, Estimation of age, Determination of sex

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ABSTRACT

The thyroid cartilage forms a major framework of the larynx. It is made up of hyaline cartilage which undergoes ossification as part of the aging process. During routine osteology demonstration classes in the department of anatomy for undergraduate students, RVS dental college Coimbatore, an ossified thyroid cartilage was observed. An attempt was made to study the age and sex of the individual with the ossified thyroid cartilage. The knowledge of cartilage ossification in relation to age and sex may help forensic investigators to make accurate identification of unknown individuals.

Introduction:

The thyroid cartilage is a major cartilage of the larynx. It consists of two laminae of hyaline cartilage that meet in the midline in the prominent V angle called adam's apple or laryngeal prominences. The posterior border of each lamina is drawn upward into a superior cornu and downward into an inferior cornu. On the outer surface of each lamina is an oblique line for the attachment of the sternohyoid, the thyrohyoid and the thyropharyngeus muscles (1). The thyroid cartilage consists of hyaline cartilage that undergoes ossification with advancing age (2). The term ossification indicates the transformation of cartilage into bone (3). A good understanding of the anatomy and the knowledge of cartilage ossification will be helpful to identify the age and sex of an individual.

A case presentation:

In the department of anatomy, RVS dental college Coimbatore, an ossified thyroid cartilage was observed. The bone was examined for its age and sex. The posterior border, the lower margin, the inferior horn, superior horn and the laminae of the thyroid cartilage were completely ossified. This complete ossification of the cartilage occurs in male with advanced age. Therefore the ossified cartilage observed in this study may belong to a male around sixty years of age (Fig 1).

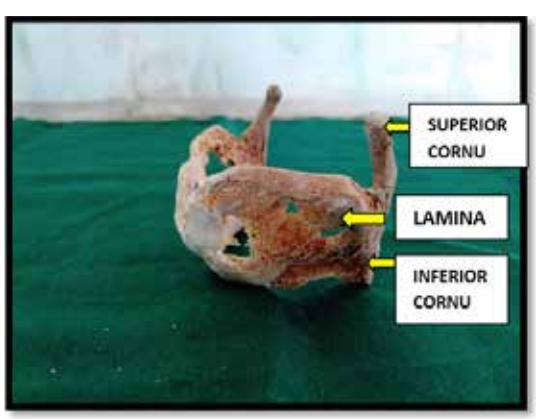

Fig 1: Ossified thyroid cartilage

Discussion:

The thyroid cartilage is the largest of the laryngeal cartilages. It consists of two quadrilateral laminae whose anterior borders fuse along their inferior two-thirds at a median angle, forming the subcutaneous laryngeal prominence called adam's apple. This projection is most distinct at its upper end, and is well marked in men but scarcely visible in women. The anterior border of each thyroid lamina fuses with its partner at an angle of 90^{O} in men and 120^{O} in women. The shallower angle in men is associated with the larger laryngeal prominence, the greater length of the vocal cords, and the resultant deeper pitch of the voice (4).

The mineralization of human thyroid cartilage occurs usually after the end of adolescence. In both the sexes the ossification of thyroid cartilage begins at the posterior border, the lower margin and the inferior horn (5). The ossification of thyroid cartilage commences about the 25^{th} year and by the 65th year the cartilage may be completely converted into bone in males. In females thyroid cartilage never ossifies completely and it leaves the ventral half has cartilaginous part (6). Vleck showed that estimation of an individual's age can be done by taking degree of progression of thyroid calcification(7).Jurik found that the degree and frequency of ossification of the thyroid and cricoids cartilages were lower in the females than in the males, especially in the anterior parts of the cartilages(8). Another author stated that males have more frequency of ossified thyroid cartilage than female. The frequency of male thyroid cartilage ossification was significantly higher in the third decade compared with the first 2 decades. Males showed more increase in the rate of ossification as compared with females (9). In the present study it was concluded that the ossified thyroid cartilage observed, may belong to a male of 60 years of age.

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