The Thyrothymic Trunk – A Collateral Vessel to the Thyroid and the Thymus

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Abstract:
An anomalous arterial trunk was seen arising from the brachiocephalic artery, which divided into five branches supplying the isthmus and the right lobe of the thyroid gland; remnants of the thymus gland; the sternoclavicular joints and the anterior and posterior aspects of the pericardium. Broadly speaking this artery fitted into the description of the thyroidea ima artery, but on defining its proper area of distribution, it was more appropriate to call it the Thyrothymic Trunk or the anterior mediastinal artery.

Key Words: Thyroid, Blood supply, Thyroidea ima artery, Thyrothymic trunk.

Introduction:
Apart from the usual blood supply of the thyroid by the superior and the inferior thyroid artery sometimes another artery also supplies it and is called as the thyroidea ima artery. Krudy et al (1980) cited that an additional midline artery to the thyroid posing a threat in cervico surgical operations was first described by Neubauer in 1772 and so was named Neubauer's artery. Hollinshead (1962), also described an accessory to or replacing the inferior thyroid artery as the thyroidea ima artery. However, an artery from internal mammary reaching midline and then bifurcating into ascending branch supplying the thyroid and a descending branch supplying the thymus and pericardium was described by Kimmel (1949) and was named the thyrothymic trunk.

Brief Report:
A routine dissection of the Head & Neck and the thorax region of a female cadaver (formalin, phenol preserved), aged 40 to 50 years, was undertaken. During dissection of neck an anomalous arterial trunk, measuring 6mm in length and 4 mm in diameter, was found originating from the upper border of the brachiocephalic artery, about 1.7 cm from the origin of right common carotid and 2.2 cm from the origin of left common carotid artery. This trunk coursed anteriorly for 6mm and then divided into following five branches (fig. I):

1. This branch ascended cranially and medially behind the right brachio-cephalic vein for 1.4 cm then continued cranially in the midline for 1.7 cm lying on ventral aspect of trachea to reach the isthmus of the thyroid gland.
2. It made a loop anterior to the first branch and ascended obliquely towards the right lobe of the thyroid gland, divided in multiple branches, to supply it.
3. A left lateral branch passed to the left and supplied the left sternoclavicular joint.
4. A right lateral branch after supplying the remnants of the thymus gland (which were shifted to the right...
instead of their midline position), continued towards right to supply the right sternoclavicular joint.
5. A descending branch coursed behind the manubrium sterni almost to the midline, bifurcated to supply the anterior and posterior aspects of pericardium.

The right inferior thyroid artery arising directly from the right subclavian artery was found to be very thin. Rest of the usual feeding vessels of the thyroid gland (both the superior and inferior thyroid arteries) were normal.

**Discussion:**

The thyroid gland, a highly vascular organ, is supplied by a pair of superior thyroid, inferior thyroid and occasionally a thyroidea ima artery, either accessory to or replacing the inferior thyroid artery (Hollinshead 1962).

The thyroidea ima artery enjoys a varied description but by and large any anomalous vessel, arising from the innominate, common carotid, aortic arch or internal mammary artery to supply the thyroid, is considered as the thyroidea ima artery.

Kimmel (1949) described the anterior mediastinal artery named as thyrothymic trunk which bifurcated to supply the thyroid the thymus and the pericardium. The present case showed almost the similar branching pattern meriting it to be named as the thyrothymic trunk. However, Krudy et al (1980) reported some cases showing similar course of the artery but adhered to the more common nomenclature of the thyroidea ima artery.

A review of literature shows marked degree of variability in the frequency, the site of origin and the size of the thyroidea ima artery. The incidence varies from 1.5 to 12.2% (Faller & Scharer, 1947). The commonest site of origin of the thyroidea ima artery is from the innominate artery (1.9% to 10.6%) followed by right common carotid artery in 1.4% to 1.7% (Gruber, 1872); from the Arch of aorta on left side in 0.36% (Hollinshed, 1962). Bilateral thyroidea ima arteries have been reported by Gruber (1872).

In the present case the artery is of sufficient calibre without hypertrophy or any evidence of neoplasia of the thyroid gland. This is in contrast to the findings of Wolpert (1969) who reported that the size of the artery is not definable angiographically until disease causes its enlargement.

This artery may be present as an accessory artery along with the normal blood supply of the gland or the inferior thyroid artery may be reciprocally reduced in size or missing on the same or both sides. In the present case the inferior thyroid artery was reciprocally reduced in size but arising normally from the right subclavian artery matching well with the observations of Wangensteen (1929).

**Phylogeny:**

The origin of such an anomalous artery (thyrothymic trunk) has been explained by the origin of the blood supply of this region of the neck. The thyroid gland has a rich network of nutrient vessels. During later development many vessels disappear with superior and inferior thyroid arteries persisting as the regular supply. Occasionally a part of the original vascular network connecting the brachiocephalic, the aortic arch and the carotids may persist and by fusion may either supplement or substitute for the regular arteries as the thyroidea ima artery.

**Conclusion:**

Above description and discussion concludes that however rare the thyrothymic trunk may be, its immense importance cannot be undermined in clinical practice as per its vulnerability to be accidently cut or injured during diagnostic or surgical procedures involving the suprasternal fossa particularly the tracheostomy, mediastinography or mediastinoscopy, leading to an extensive and uncontrollable haemorrhage. The knowledge of this artery is necessary in angiography done as a pre-operative requisite in the thyroid and the parathyroid tumour surgeries, which could be missed if this artery is not selectively injected. A collateral circulation established by such anomalous arteries may foil the treatment of the intracranial aneurysms by occluding the internal carotid artery (Takahashi et al, 1969; Rossi et al,1971).

**Bibliography:**

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