

BILATERAL ABNORMAL RELATIONSHIP OF THE VAGUS NERVE  
IN ITS CERVICAL PORTION. By ALEXANDER GIBSON, M.A.,  
M.B. (Edin.), F.R.C.S. (Eng.), *Professor of Anatomy, Medical College,  
Winnipeg.*

THE presence, on both sides of the body, of the vagus nerve lying anterior to the common carotid artery, instead of posterior to it, seems to be an abnormality sufficiently rare to be worthy of record.

From the operative standpoint, the possibility of this relationship of vagus to carotid is of some importance. In ligaturing the common carotid artery, inclusion of the vagus in the ligature is, to say the least, undesirable, and might possibly lead to serious consequences.

The earliest reference to the subject is made by Dubreuil, 1847: "I ought to mention a variation occurring in the relations of this trunk (common carotid) with the pneumogastric nerve, a variation which I have seen twice, but only on the right side, viz., the nerve was placed in front of the carotid and the internal jugular."

Malgaigne, 1859, makes mention of two cases of this abnormal relationship, but does not say on which side the abnormality occurred.

Macalister, 1868, reported a case occurring in an old female subject on the right side: "The carotid was flexed sharply about half an inch below its bifurcation; across the flexure the pneumogastric nerve coursed, at first from without inwards, and then again, completely to the outside." The nerve was connected to the artery by a process of the sheath, and could not be replaced in its usual position until the connecting bands of the sheath had been divided.

Cruveilhier makes reference to a case where a candidate was asked to ligature the left common carotid artery. A large nerve trunk was found lying anterior to the artery. Further dissection proved this to be the vagus.

Poirier and Charpy, referring to abnormalities of the vagus, say: "Il peut cheminer en avant des gros vaisseaux."

Quain says: "The pneumogastric nerve has been observed to descend in front of the artery."

Morris says: "The pneumogastric nerve may run in front of the artery instead of behind it."

Sappey makes no reference to the abnormality.

Testut also omits to describe it, either in reference to the common carotid artery or the vagus nerve.

The subject of this nerve artery relationship is discussed by Argaud and Cochet, 1908. They find that at the third month, on transverse section, the left vagus is anterior to the left common carotid at the level of the cricoid cartilage. Apparently only one specimen was examined. From examination of fifty adults, they conclude that, "in the majority of cases, the left vagus is situated in front of and a little to the outer side of the common carotid artery, and is frequently found in the anterior angle which this artery forms with the internal jugular vein." In the majority of their cases, the left vagus came in front of the left common carotid artery at the level of the upper border of the thyroid cartilage.

The latest reference to the subject is by Casali, in the *Anatomischer Anzeiger*, 12th July 1911. This investigator examined thirty subjects: in eleven of these he found the left vagus nerve anterior to the left common carotid artery. Of these thirty subjects, eight belonged to early infancy or to foetal life. In all of these eight the left vagus lay anterior to the left common carotid. From this, Casali concludes that in all foetuses the left vagus lies anterior to the left common carotid, the artery at that stage of life being of smaller diameter than the nerve. He suggests that after birth the greatly increased diameter of the common carotid pushes the nerve into the position usually described, *i.e.* lateral and posterior to the artery. In support of this theory, he found that in an infant one year old the nerve was placed lateral, but not posterior, to the artery, a position which may be regarded as intermediate.

That this relationship exists only on the left side, he explains by the statement that the left common carotid artery is of smaller diameter, and is situated more deeply than is the right common carotid, although the two vagi occupy the same coronal plane.

Casali refers to the results obtained by Argaud and Cochet. He adds to their findings his own results, omitting data obtained from foetuses and very young children. The result is that of seventy-two subjects examined, eight presented the left vagus anterior to the left common carotid, *i.e.* 11 per cent. of cases; none presented the right vagus anterior to the right common carotid artery.

It would seem, therefore, that only three cases of the abnormality on the right side have been recorded, two of these by Dubreuil in 1847, and one by Macalister in 1868. In Dubreuil's cases we may infer that the relationship on the left side was as usually described. Macalister makes no reference to the left side, and the abnormal relationship on the right

side was associated with a flexure of the common carotid. The latest paper by Casali states specifically that in seventy-two subjects specially examined, the abnormality was not found on the right side. In this paper, also, an explanation is suggested which would require modification to make it explain the occurrence on the right side.

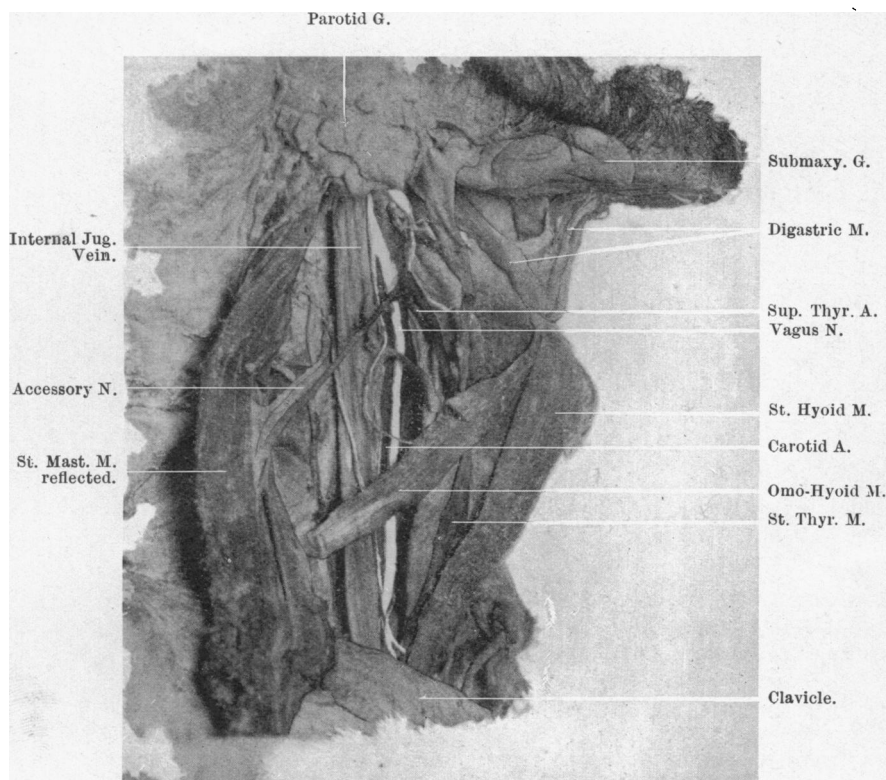


FIG. 1.

In January 1912 there was observed in the Anatomical Rooms of the University of Edinburgh a male subject, aged 59. This presented on both sides an abnormal relation of vagus to carotid.

A large nerve trunk was found lying in front of the right common carotid artery at the level of the upper border of the thyroid cartilage. The carotid artery showed no abnormal flexure. Its bifurcation into external and internal carotids occurred at the level of the hyoid bone. The nerve ran down anteriorly to the vessel until the lower limit of the neck was

reached. There it sheered off to the right, and entered the thorax by crossing the medial portion of the first part of the subclavian artery. The nerve was firmly bound down to the right common carotid artery by a process of the sheath. Not until this was dissected away could the nerve be replaced in its usual position, posterior to the artery.

The left side of the neck was at once examined, and there was found a condition of affairs corresponding precisely to that found on the right side. On both sides the nerve lay not in the angle between the internal jugular vein and the common carotid artery, but actually, for a part of its course, upon the anterior aspect of the common carotid.

In addition to numerous adult subjects, I have examined twenty-four fœtuses. Of these, six were about the sixth month, two about the seventh month, one about the eighth month, and the remainder (fifteen) full time. In no case was the vagus nerve situated anterior to the common carotid artery. My observations thus do not support the findings of Casali or of Argaud and Cochet.

I desire to express my indebtedness to Professor Arthur Robinson, University of Edinburgh, for permission to record this case, and for valued assistance in referring to the literature.

---

#### BIBLIOGRAPHY.

- ARGAUD et COCHET, "Rapports différents des deux pneumogastriques dans la région cervicale," *Compt. rend. Clermont-Ferrand*, 1908, p. 558.  
CASALI, *Anatomischer Anzeiger*, 1911, p. 327.  
CRUVEILHIER, *Traité d'anatomie*, 1867.  
DUBREUIL, *Des anomalies artérielles*, Paris, 1847, p. 65.  
MACALISTER, *The Medical Press and Circular*, 1868, p. 132.  
MALGAIGNE, *Traité d'anatomie chirurgicale*, Paris.  
MORRIS, *Textbook of Anatomy*.  
POIRIER et CHARPY, *Traité d'anatomie humaine*.  
QUAIN, *Anatomy*.  
SAPPEY, *Traité d'anatomie descriptive*.  
TESTUT, *Anatomie*.