

Variation in the course of the left phrenic nerve: a case report

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ABSTRACT

Variations in the origin, course and distribution of the phrenic nerve have been reported previously. But in this report, a rare case of formation of an annulus was found in the course of the phrenic nerve near to its origin, during gross anatomy dissection of the left side of the neck of an Indian male cadaver. The annulus was enclosing the origins of suprascapular and internal thoracic arteries. However, such variation was not found on the opposite side of the same cadaver. *Neuroanatomy; 2007; 6: 24–25.*

Key words [phrenic nerve] [variation] [anomaly]

Introduction

The phrenic nerve is formed by the ventral rami of C3, C4 and C5, and passes vertically downwards undercover of the prevertebral fascia in front of the scalenus anterior muscle, and is overlapped by the sternocleidomastoid muscle and internal jugular vein. The omohyoid muscle, thoracic duct, and transverse cervical and supra-scapular arteries cross the nerve. Then it runs in front of the subclavian artery and behind the subclavian vein to enter the thorax by crossing from the lateral to medial side, and in front or behind the internal thoracic artery. In the thorax it passes in front of the root of the lung, between the fibrous pericardium and the mediastinal pleura to the diaphragm [1,2].

Case Report

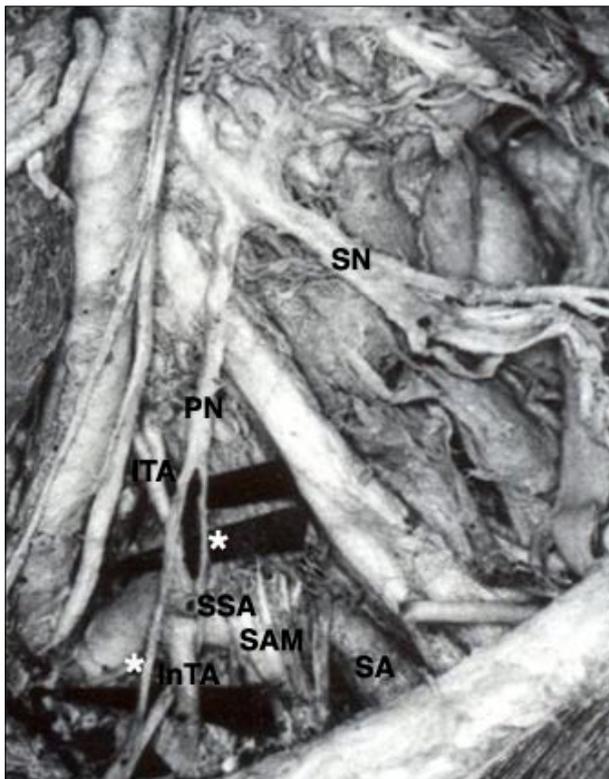
During routine dissection, in the Department of Anatomy, Kasturba Medical College, Manipal, with the purpose of preparation of the teaching anatomical specimens, in a male cadaver we observed a rare case of annulus formation in the course of the left phrenic nerve near to its origin. The annulus was enclosing the origins of suprascapular and internal thoracic arteries. The left root of the annulus was passing in front of the origin of inferior thyroid artery to cross the subclavian artery, whereas the right root of the annulus after crossing the subclavian artery was passing behind the origin of the internal thoracic artery to join the left root of the annulus (Fig. 1). The rest of the course of the nerve was normal.

Discussion

Variations in the origin, course and distribution of phrenic nerve have been reported previously. Phrenic nerve may receive fibers from nerve to subclavius, nerve to sternohyoid, second or sixth cervical spinal nerve, descendens cervicalis, ansa cervicalis, hypoglossal nerve and spinal accessory nerve [3]. The phrenic nerve roots may not unite to form a single trunk until it enters the thorax [3,4].

The phrenic nerve at the root of the neck runs on the anterior border of the scalenus anterior muscle to descends anterior to the first part of the subclavian artery and the pleura immediately below that artery; each nerve passes dorsal to the terminal part of the subclavian vein, crosses either anterior or dorsal to the internal thoracic artery, and gains the medial surface of the pleural sac [2]. However, it is claimed that both right and left phrenic nerves are symmetrical in their cervical course and at the thoracic inlet the left phrenic nerve crosses anterior to the second part of the subclavian artery, and thereafter it runs anterior to the left internal thoracic artery [1].

The roots contributing to the phrenic nerve may unite after only a short course, or they may be long. In some instances, therefore, two parts of the phrenic nerve run parallel to each other for a variable distance on the scalenus anterior muscle, in which case one of them, usually is called accessory phrenic nerve. They join either low in the neck or in the thorax [4]. In one case,



the right phrenic nerve was found passing through an annulus of the subclavian vein [3].

In conclusion, the relation of the phrenic nerve loop to the supraclavicular artery and internal thoracic artery is very essential for surgeons. These variations may be asymptomatic but when requiring some surgical intervention to the neck or in the interscalene and supraclavicular phrenic nerve block, it cannot be overlooked, and an extra care must be taken during head and neck surgeries and during phrenic nerve block.

Figure 1. Left side of the neck showing anomalous phrenic nerve. (SN: supraclavicular nerve; PN: phrenic nerve; ITA: inferior thyroid artery; SSA: supraclavicular artery; SAM: scalenus anterior muscle; InTA: internal thoracic artery; SA: subclavian artery. Asterisks are showing the annulus formed by the phrenic nerve.)

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