

THE CERVICAL SYMPATHETIC TRUNK AND ITS
RELATIONSHIP WITH THE CERVICAL
FASCIA

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SAMMARY

This paper has attempted to show the relationship of the cervical sympathetic trunk to the cervical fascia. The cervical portion of each sympathetic trunk usually consists of three ganglia, distinguished according to their positions as the superior, middle, and inferior, and connected by an intervening cord. The cervical sympathetics (trunk and ganglia) send grey rami communicantes to all the cervical spinal nerves, but receive no

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white rami communicantes from them; their spinal fibres are derived from the white rami communicantes of the upper thoracic nerves, which enter the corresponding thoracic ganglia of the sympathetic trunk, through which they ascend into the neck.

Various authors have described different positions within the cervical fascia of the sympathetic trunk regarding its cervical course. We dissected 100 sympathetic trunks. Our dissections have found that it lies within the prevertebral fascia in the majority of cases, thus confirming the work of Rouviere, Paturet and Sinclair.

INTRODUCTION

The cervical portion of the sympathetic trunk is a most important part of the nervous system, because it controls or helps in regulating the activity of the heart, pharynx, larynx, esophagus, thyroid, eye, salivary glands, ... etc. (17, 18, 20). During surgery of the neck it is possible that this sympathetic trunk may be injured (16). The purpose of this paper is to present the relationship of the cervical fascia.

The cervical portion of the sympathetic trunk extends upward along the large vessels of the neck. It receives its preganglionic fibres through the white rami of the upper thoracic spinal nerves and ascends in the

chain. It extends from the subclavian artery to the base of the skull, lying posterior to the large vessels and anterior to the longus colli and longus capitis muscles, which separate the chain from the transverse processes of the cervical vertebrae. In its course there are three ganglia, the superior, middle and inferior. However, there may be more or fewer than three (4).

The superior cervical ganglion, spindle-shaped and 2-3 cm long, lies anterior to the longus capitis muscle at the level of the second and third cervical vertebrae. The variable middle ganglion is often found near the inferior thyroid artery at the level of the sixth cervical vertebra. The inferior cervical ganglion lies anterior to the base of the transverse process of the seventh cervical vertebra, In 82 per cent of specimens it combines with the first or first several thoracic ganglia and makes the cervicothoracic ganglion (11).

The cervical fascia is an areolar tissue derived from that portion of mesoderm which remains after bone formation (2). The fasciae of the body may be divided into two main layers, the superficial and the deep. The superficial fascia encloses the entire neck while the deep fascia torn compartments within the substance of the neck.

In the neck the deep layer is subdivided into: 1) a superficial portion (also called "investing" layer), which is associated with the sternocleidomastoid and trapezius muscles and extends between them, thus forming the roof of the posterior cervical triangle; 2) a middle layer (also called the pretracheal layer), which may be divided into: a) a layer associated with the strap muscles and attached to b) a layer encompassing the great vessels (carotid arteries and internal jugular veins) and the vagus nerves; 3) a third layer (the visceral layer), which is associated with the visceral structures of the neck. Usually considered a separate layer is the 4) prevertebral fascia. Since it is so closely associated with the bony foundation and its muscles, it is regarded in common discussion as separate layer of deep fascia (8, 25).

MATERIALS AND METHODS

Fifty cadavers were examined at the dissection hall of the Loma Linda university school of medicine to determine the relationship of the Cervical sympathetic trunk with the cervical fascia. Thirty two of the cadavers were men and eighteen were women, forty five of them were caucasian (white) and five were black. The average of their age was fifty five years. The sympathetic trunk

from the subclavian artery to the base of the skull was carefully examined and the relationship of the cervical sympathetic trunk to the cervical fascia was noted and recorded.

RESULTS

In fifty cadavers were examined bilaterally and both cervical sympathetic trunks were in each case. The positions of the trunk were as follows: In ninety-eight cases the cervical sympathetic trunks were located entirely within the prevertebral fascia. In two cases (the same cadaver) the lower part of the trunk was bound within the prevertebral fascia, but the upper cervical sympathetic trunk pierced the carotid sheath at the level of the third vertebra and continued its course within the carotid sheath.

DISCUSSION

The sympathetic nervous system is composed of a trunk, ganglia, efferent and afferent fibres. The trunk and ganglia are paravertebral in position. The efferent nerve fibers arise in the grey matter of the spinal cord from the fibres thoracic segment to the second lumbar segment. The cord also possesses lateral horns in which are located the cell bodies of the sympathetic connector neurons. The myelinated axons of these cells leave the

spinal cord in the ventral root and pass to the white rami and ultimately to the paravertebral ganglia of the sympathetic trunk. The connector cell fibres are called preganglionic as they pass to a peripheral ganglion (20, 23).

Afferent myelinated nerve fibres travel from the viscera through sympathetic ganglia without synapsing, enter the spinal nerve via white rami communicantes, and reach their cell bodies in posterior root ganglia of corresponding spinal nerves (11,12).

The cervical sympathetic trunk is an upward continuation of the thoracic sympathetic trunk. It lies in the areolar tissue behind the carotid sheath and in the anterior portion of the prevertebral muscle fascia, but it is occasionally found behind this prevertebral fascia (26) Hollinshead (9) and Romanes (19) believe that the cervical sympathetic trunk lies on the longus capitis and longus cervicis muscles. Francis (4) and Snell (24) report that the cervical sympathetic trunk lies between the carotid sheath and prevertebral fascia, Adams(1), Mitchell (15), and Last (13) believe the trunk is located behind the carotid sheath. Gray (7), Grodinsky and Holyoke (8) note that the cervical sympathetic trunk is within the carotid sheath. Rouviere (21), Paturet (18)

and Sinclair (22) report that it lies within the prevertebral fascia. Our studies support the latter, because out of 100 cases where the cervical sympathetic trunk was studied, 98 were bound within the prevertebral fascia.

The confusion in the description of the sympathetic trunk concerning its relationship to the cervical fascia is due mainly to the following reasons: 1) difficulties exist in dissecting fascial spaces anatomically, as false spaces may be created while true spaces are obliterated; 2) artificial classification or grouping of spaces for descriptive purposes greatly reflects the emphasis of the authors. Both cervical anatomists and surgically oriented clinicians have described the fascia from their own point of view, each one stressing what he feels to be most important from his particular interests, thus creating different opinions on the subject (3,6,14).

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