



CAROTID BIFURCATION AND RELATION OF VAGUS NERVE IN CADAVERIC STUDY.

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ABSTRACT

The aim of present study was to add evidence of the variability found in bifurcation of common carotid artery and surrounding structure mostly vagus nerve relation. This study was performed on 56 common carotid arteries of 28 cadavers. At superior border of thyroid cartilage bifurcation of common carotid artery is found in 33 cases out of 56 cases. Above the thyroid cartilage in 14 cases and below thyroid cartilage is 9 cases. Most common location of Vagus nerve is postero-lateral in 22 cases out of 56 cases. External carotid artery is anterior to internal carotid artery in most of cases except in one case whereas relation is reverse. The finding of study, together with other previously published studies, should taken into consideration by physician and surgeon to avoid clinical complication.

KEYWORDS : Common carotid artery, carotid bifurcation, superior border of thyroid cartilage, vagus nerve, height of bifurcation.

INTRODUCTION:

Bifurcation of common carotid artery and topography of surrounding structure are essential for diagnosis and surgical procedure in neck. External and internal carotid artery are branches of common carotid artery. External carotid artery supplying exterior of the head, face and greater part of neck. Internal carotid supplying to great extent the part within cranial and orbital cavity. Common carotid artery is a branch of brachiocephalic trunk on right side and arch of aorta on left side. It bifurcated into external and internal carotid artery

Superior border of thyroid cartilage was most structural anatomical landmark for predicting common carotid bifurcation, at the level of intervertebral disc of C3 and C4 cervical vertebra.¹ Most important structure are crowded together in the neck such as muscle, gland, artery, vein, nerve, lymphatic's, trachea, esophagus and vertebra. Consequently nerve is a well known region of the vulnerability.²

Atherosclerosis of the carotid arteries is a major cause of stroke and transits ischemic attack.³ Conventional angiography is considered the most accurate technique for diagnosis of carotid bifurcation disease such as stenosis.⁴ Thus accurate evaluation of the carotid bifurcation level with noninvasive technique remain an important goal.⁵ Consequently detail knowledge of various anatomical parameter is of paramount important not only for understanding of the diseases but also for design of surgical treatment especially selection between carotid endarterectomy and carotid stenting.⁶

Present study aim is to add evidence of the variability found in the common carotid bifurcation and location. Also relation of surrounding structure mainly vagus nerve in the studied sample.

MATERIAL AND METHOD:

Present work was done in our anatomy department of GMC Chandrapur and GMC Yavatmal during process of routine dissection year of 2015 to 2017 for 1st MBBS students. 28 cadavers from 20 male and 8 female age range between 35-85 year were studied.

The cadaver specimen that were dry and difficult to dissect and all those were macerated by students before data collection were excluded from study. The dissections were carried out according to the instruction by Cunningham's manual of practical anatomy.⁷

Skin incision from chin to suprasternal notch and along the lower border of the mandible was made. Skin flaps were reflected for exposure of anterior triangle of the neck. Bifurcation of common carotid artery was then exposed.

Parameters studied are:

A. Location of common carotid artery in relation to main landmark of

the neck, thyroid cartilage.

- Localization and relation of vagus nerve and common carotid artery.
- Height of bifurcation of common carotid artery.

Data obtained on the level of bifurcation of common carotid artery in relation to thyroid cartilage and vagus nerve was checked for clarity, accuracy and consistency before analyses. Results were tabulated using SPSS version 19.0 statistical software.

OBSERVATION AND RESULTS:

Table no: 1 Distributions of level of bifurcation according to side.

Level of bifurcation	Right side	Left side	p- value
Standard level	21	12	0.02
Above standard level	4	10	0.1
Below standard level	3	6	0.466
Total	28	28	

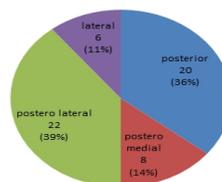
Above table show that bifurcation of carotid artery at standard level is found in 21 on the right side that was more as compared to left side, which is statistically significant and p- value < 0.05. The bifurcation above and below the standard level didn't show statistically significant value.

Table no: 2 Distributions of level of bifurcation according to gender.

Level of bifurcation	Male (40)	Female (16)	p-value
Standard level	27	6	0.03
Above standard level	5	9	0.0006
Below standard level	8	1	0.2
Total	40	16	

Above table show that bifurcation at standard level is more in male as compared to female and this difference is statistically significant. The bifurcation above the standard level is more in female as compared to male and this difference is also statistically significant.

Vagus nerve relation in Carotid Area (n=56)



Above pie chart showing relation of vagus nerve in carotid triangle. Postero-lateral is most common localization 39% (22 cases) and 2nd most common localization is posterior 36%.(20 cases)

DISCUSSION:

- A. Location of external and internal carotid arteries classified in to two types. In the standard type external carotid artery was located anterior to the internal carotid artery, whereas in reversed type position of external carotid artery was reversed namely the internal carotid artery was located anterior to the external carotid artery.⁸ In our study all of external carotid artery located anterior to the internal carotid artery except in 1 case whereas reversal of location occurred in which branches of external carotid artery superior thyroid, lingual, facial arteries run forward and superior to internal carotid artery. According to Jazuta⁹ percentage of reversal of location between external and internal carotid artery was 4.5% in adult and present study show a similar result.
- B. Localization of vagus nerve: Vagus nerve was located posterior in the median line of common carotid artery in 36% of (20)56 case, poster-medial in 13% of (8)56 cases, poster-lateral in 39% of (22)56 cases and lateral in 10% of (6)56 cases.¹⁰ Most common localization of vagus nerve to the carotid artery is postero-lateral. Also on the both side right and left relation is variable in which only 9 cadaver both side same relation whereas remaining this relation changes in to male 11 case on right side posterolateral and left side posteromedial in 9 cases and lateral in 5 case. In female out of 8 cases only one case show same relation of vagus nerve on both side whereas remains 7 cadavers variable similar to previous study.¹¹
- C. Level of bifurcation of common carotid artery: most anatomical text book and reference in the literature describes the upper border of thyroid cartilage as the bifurcation level.¹² Normal level of bifurcation was observed in 21 cases out of 56 on right side and 12 cases out of 56 on left side.¹³

Higher bifurcation (above the upper border of thyroid cartilage) was observed in 4 cases out of 56 on right side and 10 case out of 56 on left sides. Lower bifurcation(below the upper border of thyroid cartilage was observed in 3 cases out of 56 on right side and 6 cases out of 56 on left side.¹⁴

According to result of study standard bifurcation correspond with result of previous most study.^{13,15}

CONCLUSION:

1. Most of study sample shows external carotid artery anterior to internal carotid artery. In reverse type internal carotid artery anterior to external carotid artery.
2. Vagus nerve lies postero-lateral in most of cases and second most localization for vagus nerve is posterior.
3. Left common carotid bifurcation is higher in most of cases.
4. Height of bifurcation tends to be lower in male then female.

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