

CADAVERIC STUDY ON THE LOCATION OF PHARYNGEAL ORIFICE OF AN EUSTACHIAN TUBE IN RELATION TO THE ANATOMICAL LANDMARKS

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ABSTRACT

Introduction: Eustachian tube is a communication between the nasopharynx and middle ear extending between the lateral wall of the nasopharynx to anterior wall of tympanic cavity. It maintains the equilibrium of air pressure on either side of the tympanic membrane for proper vibration of sound. The pharyngeal orifice of Eustachian tube is an important landmark for endoscopic surgeries and also for transnasal approach to infratemporal fossa.

Materials and Methods: A total of 50 (25 right & 25 left) sagittal section of head and neck specimens from adult formalin fixed cadavers from the department of anatomy, MVJ Medical college and Research Hospital, Bangalore, India, were used for the study. The distance of pharyngeal orifice to posterior border of hard palate, C1 vertebra, posterior choana, tip of uvula, sphenoid sinus were measured with the digital Vernier caliper. The mean and standard deviation of these parameters were calculated.

Conclusion: The knowledge of the relationship of Eustachian tube with anatomical landmarks would be useful to surgeons, otolaryngologists and radiologists.

KEY WORDS: Eustachian tube, Hard palate, C1 vertebra, Posterior choana, Tip of uvula, Sphenoid sinus.

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INTRODUCTION

The Eustachian tube or auditory tube (AT) is a mucous lined osseo-cartilaginous channel which communicate the lateral wall of nasopharynx with the anterior wall of tympanic cavity [1]. It is developed from the medial part of the tubotympanic recess which is formed by the fusion of dorsal part of first and second pharyngeal pouch [2]. Pharyngeal opening of auditory tube is located in the lateral wall of

nasopharynx, 1.25cm behind and slightly below the posterior end of the inferior nasal concha. Upper and posterior margins of the pharyngeal opening is guarded by the tubal elevation which is an aggregation of lymphoid tissue. Tubal elevation act as a guide for the introduction of a catheter into the tube to inflate air in an attempt to get relief from the symptoms of retracted tympanic membrane. Between the AT opening and posterior wall lies the fossa of

Rosenmuller [3]. The knowledge of anatomy of AT is important as it is related to function and developmental anatomy is associated with high rate of otitis media in infants and young children. The pharyngeal orifice of AT being an important landmark for endoscopic evaluation in patients with chronic otitis. It is also used for the transnasal approach to the infratemporal fossa [4]. Hence the present study was undertaken to locate the exact location of auditory tube in relation to anatomical landmarks in cadavers.

MATERIALS AND METHODS

The present study was conducted in the department of anatomy, MVJ Medical College And Research Hospital, Bangalore, India. A total of 50 (25 right & 25 left) sagittal section of head and neck specimens from adult formalin fixed cadavers were used. The location of pharyngeal opening of auditory tube is measured with reference to the anatomical landmarks such as upper border of C1 vertebra, posterior end of hard palate, middle of floor of sphenoid sinus, midpoint of choana, tip of uvula. All measurements were taken with digital calipers.

The mean and standard deviation of distance of auditory tube from the upper border of C1 vertebra, posterior end of hard palate, middle of

floor of sphenoid sinus, midpoint of choana and tip of uvula were calculated on both right and left sides of sagittal cut head and neck specimens.

Table 1: Showing the distance of auditory tube(AT) from different anatomical landmarks.

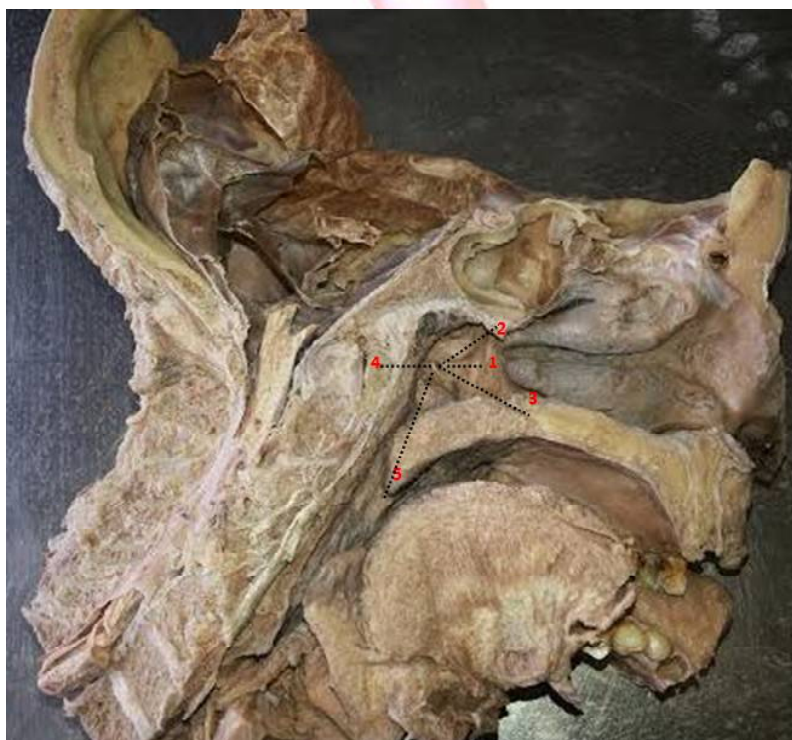
Parameters	Right side (25 nos) (cm)	Left side (25 nos) (cm)
AT-C1 Vertebra	2.54+/-0.41	2.24+/-0.41
AT-posterior border of hard palate	1.71+/-0.42	1.69+/-0.45
AT-sphenoid sinus	1.45+/-0.33	1.41+/-0.30
AT-Choana	0.88+/-0.29	0.84+/-0.25
AT-tip of Uvula	2.66+/-0.42	2.62+/-0.47

DISCUSSION

The auditory tube is a part of contiguous organs including the nose, pharynx, palate, middle ear and mastoid air cells. It is usually divided into an osseous infratemporal portion and cartilaginous portion. Respiratory mucosa lines the entire system. Thus effects of infection or obstruction such as inflammation in one area are likely to be reflected in other areas. A detailed knowledge of the anatomy of AT is a necessary prerequisite for the proper diagnosis of the symptoms of these regions [5].

Knowledge of the anatomical relationships of the auditory tube with other surgical and radiological landmark is definitively useful for

Fig. 1: Showing the distance of auditory tube(AT) from different anatomical landmarks.



1. Distance between AT and choana.
2. Distance between AT and sphenoid sinus.
3. Distance between AT and hard palate.
4. Distance between AT and C1 vertebra.
5. Distance between AT and tip of uvula.

endoscopic endonasal procedures and cranial base surgery. Ozturk et al 2012 studied the anatomical relation between the Eustachian tube and petrous portion of internal carotid artery. They found that junction part of Eustachian tube may be a safe landmark to identify and protect internal carotid artery [6]. Urbantschitsch found that distance from anterior nasal spine to pharyngeal orifice of auditory tube ranged from 5.3-7.5cm. The nasopharyngeal terminus of the eustachian tube lies about 20 mm above the plane of the hard palate (Graves and Edwards, 1944) [5].

Between the auditory tube and posterior wall of the pharynx lies the Fossa of Rosenmuller which is the common site of nasopharyngeal carcinoma. Endoscopic examination of the nasopharynx can provide valuable information on mucosal involvement and local tumor extension [7,8].

Ankolenkar et al 2013 done a morphometric study of location of eustachian tube in relation to anatomical landmarks both in adults and fetal cadavers. It showed all the measured distances were higher on left side except AT to SP in fetuses, whereas in adults all the distances were higher on left side except for AT to U [4]. In the present study the measured data on the right side is slightly higher on the right side compared to the left side. The differences were not statistically significant.

CONCLUSION

A search of the literature revealed that there is not much established data on the morphometry of eustachian tube. So the results of present study could be used as a reference for identifying the location of pharyngeal orifice of eustachian tube in relation to anatomical landmarks as it is important for endoscopic evaluation in patients with chronic otitis. Hence the present study has determined the location of eustachian tube in relation to anatomical landmarks which might be used as a reference by the clinicians.

Conflicts of Interests: None

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