



Accessory Foramen Transversarium in Cervical Vertebrae – An Osteological Study

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Abstract

Aim: To find the incidence and clinical correlation of accessory foramen transversarium in cervical vertebrae.

Objective: To understand the variations of foramen transversarium and presence of accessory foramen as an anatomic entity for the knowledge of clinicians and surgeons.

Material and Method: Seventy two human adult dried cervical vertebra were obtained from the department of Anatomy for the study.

Results: We found the incidence of accessory foramen to be 12.5%. Accessory foramen resulting from complete septation of for a men transversarium were found bilaterally in 2.77%, unilaterally in 4.1% on the right, in 2.77% on the left. Incomplete septation with bony spicules were found in 5.5%.

Conclusion: This study is of importance for the surgeons and radiologists for their clinical importance.

Keywords: Cervical vertebrae, foramen transversarium, accessory foramen transversarium.

Introduction

The seven cervical vertebrae are the smallest movable vertebrae and identified by their transverse processes which are perforated by a foramen called foramen transversarium (FT). The transverse process displays anterior and posterior roots which are connected lateral to the foramen by a cost transverse bar. Developmentally, the costal element grows backwards to join the transverse element thereby enclosing a foramen called FT. In all but the seventh cervical vertebra, the transverse foramen transmits the vertebral artery and its accompanying venous and sympathetic plexuses. The aim of this study is to

analyse any extra foramen and correlate it with clinical importance.

Material and Methods

72 adult human cervical vertebra were examined from the department of Anatomy, RIMS, Ranchi. Presence of any extra foramen on both transverse process of each vertebrae was noted.

Observations

Out of 72 cervical vertebra, 7 vertebra were found to have accessory foramen unilaterally or bilaterally. 4 foramina had partial septation in the form of bony spicules.

Total number of cervical vertebra	Vertebra with complete septation of FT found unilaterally		Vertebra with complete septation of FT found bilaterally	Vertebra with partial septation		Number of vertebra with complete and/or partial septation	% of incidence
	Rt	Lt		Rt	Lt		
72	3	2	2	3	1	9	12.5%



Figure 1. Cervical Vertebrae with Bilateral Accessory Foramen



Figure 5. Cervical Vertebrae with Unilateral Accessory Foramen on Right Side



Figure 1. Cervical Vertebrae with Bilateral Accessory Foramen



Figure 3. Cervical Vertebrae with unilateral Accessory Foramen on Left and Partial Septation on Right



Figure 4. Cervical Vertebrae with Unilateral Accessory Foramen on Right and Partial Septation on Left

Discussion

Gray's Anatomy mentions that the foramen transversarium may be divided into two in any of the cervical vertebra. In our study, on examination of the cervical vertebra, it became apparent that one extreme of normality consisted of a large foramen with no evidence of complete bony septation. The other extreme of normal variation was complete septation of the part of the foramen transmitting vertebral artery. We found the incidence to be 12.5% in a total of 72 cervical vertebra. Partial septation in the form of bony spicules were found in 5.5%, complete septation were found bilaterally in 2.77%, unilaterally in 4.1% on right side and 2.77% on left side.

The foramen transversarium is described to be divided by a fibrous or bony bridge, separating the artery and the vein, the smaller posterior part enclosing vertebral vein and a branch of vertebral nerve, is called accessory vertebral foramen. Accessory vertebral foramen may be correlated with duplicate origin of vertebral artery which follow a parallel course for a variable distance.

Incidence of accessory foramen have been reported in earlier studies. Archana Sharma et al reported 8% incidence in 200 cervical vertebra⁽³⁾. Out of 16, 9 were bilateral and 7 were unilateral. Pushpa Potaliya et al reported 13.33% incidence in 120 atlas vertebra with 6 being bilateral, 10 unilateral foramen⁽⁴⁾. Pretty Rathnakar et al reported 5.7% incidence in 140 cervical vertebra. Taitz et al reported the incidence of 7% in 480 vertebra⁽⁵⁾. Das Srijit et al reported 1.5% incidence in 132 cervical vertebra⁽⁶⁾. Lakshmi

Chandravadiya et al reported 4.76% incidence in 210 cervical vertebra, among them 8 were unilateral and 2 were bilateral⁽⁷⁾. El Shaarawy reported that accessory foramen transversarium is most common in lower cervical vertebrae (C5, C6, C7). Murlimanju B. V et al reported unilateral presence to be more common than bilateral. Our study has reported similar incidence of accessory foramen transversarium and also presence of unilateral accessory foramen to be more common than bilateral as reported in previous studies.

Conclusion

In the present study, variations were observed in the foramen transversarium of 9 cervical vertebra out of the 72 vertebra that were studied. An accessory foramen was observed in 7 vertebra while partial septation was seen in 2. The reasons for these variations could be developmental or vascular. The anatomical knowledge of the variations in the foramen transversarium of cervical vertebra can be of importance to the neurologists and surgeons operating in the cervical region. The variations are important for the clinicians and radiologists for proper interpretation of X-rays and CT scans.

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