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DIVIDED FORAMEN TRANSVERSARIUM

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INTRODUCTION: The cervical vertebrae are seven in number. They are the smallest of the vertebrae and can be identified by the presence of a foramen in each transverse process. The dorsal and ventral roots terminate laterally as dorsal and ventral tubercles. The roots are connected lateral to the foramen by an intertubercular lamella. The vertebral artery which arises from the superoposterior aspect of the first part of the subclavian artery, passes through the foramina in the transverse processes of all of the cervical vertebrae except the seventh. It then curves medially behind the lateral mass of the atlas and enters the cranium through the foramen magnum¹. The vertebral vein begins in suboccipital venous plexus and descends in foramen transversarium (FT). At the lower end the plexus unites into a single vein, which lies in front of the vertebral artery and terminates into the posterior surface of the first part of Brachiocephalic vein, or lower end of internal jugular vein². Thus FT transmits the second part of vertebral artery with its accompanying veins and a sympathetic plexus from the lower cervical ganglion. The seventh foramen transmits a vein and a grey ramus from the lower ganglion running up to join the seventh nerve. The ganglion is situated beside the vertebral artery below the level of the seventh costal process, so that its filament to the eighth nerve reaches it directly, but that for the seventh must ascend through the foramen³.

MATERIALS AND METHODS: During inspection of 72 cervical vertebrae housed in the Department of Anatomy, Meenakshi Medical College and Research Institute, divided foramen transversarium was noticed in four vertebrae, which were photographed. The length of bony bars and the diameters of the foramina were measured by digital vernier caliper.

RESULTS: A bony bar divided the FT into a larger anterior part for artery and a small posterior part for a vein. Divided FT was present in three typical cervical vertebrae (C4, C5, and C6) and in a seventh cervical vertebra (C7) (Fig.1). This division was observed only on the left side of C4 & C5 vertebrae and was present bilaterally in C6 & C7 vertebrae. The measurements of the bony bar (Table.1) and the diameters of FT with divided FT (Table.2) were tabulated.

DISCUSSION: Divided FT is also reported as Double FT or Accessory FT. Divided FT was seen only in the seventh cervical vertebra¹. According to Breathnach, the subdivision is usually in the sixth segment, small posterior part being for a vein and the subdivision may be present in the seventh and in the third, fourth and fifth occasionally³. The vertebralarterial foramen, in the sixth cervical vertebra occasionally shows a notch or second smaller foramen for the vertebral vein⁴. Taitz et al. reported the mean length and breadth of the FT of C4 was 6.21mm and 4.9mm and of C5 was 6.14mm and 5.15mm. They have reported the presence of double foramina in 34 vertebrae and triple foramina in one case⁵. The incidence of Divided FT in our study is 5.5% and the divided FT ranges between 2.09mm to 3.43mm with the largest divided FT in C5. The Length and breadth of FT were maximum in C5 and was 7.23 and 5.78mm respectively. Das Srijit et al⁶ in 2005 reported two cases of Double

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FT out of 132 cervical vertebrae whereas Archana et al⁷ in 2010 reported a 8 % incidence of divided FT. Normal extension and rotation of the head may impair blood flow in the vertebral artery, with constriction occurring in the vessel contralateral to the side of rotation. There is a 10 % change in length of the artery on the side contralateral to the direction of rotation⁵. When bony bar is present the space for the vertebral artery may be limited. This bony bar can be seen in CT and Radiologist and orthopaedic surgeons should be aware of such bony bars which may produce hindrance to the flow when the artery is anomalous.

REFERENCE:

1. Susan Standring. Gray's Anatomy, 40th Ed. Churchill LivingstoneElsevier, New York, 2008, p 449 & 721.
2. Hollinshead W.H, Anatomy for Surgeons, The Head and Neck, Vol I, 2nded, Harper & Row publishers, New York, London, 1968 p 532.
3. Breathnach A.S, Frazer's Anatomy of the human skeleton, 5thed, J and A Churchill Ltd, London, 1958, p 22.
4. Bryce T.H. Quains elements of Anatomy, Osteology and Arthrology, Vol IV, Part I, 11th Ed, Longmans, Green and Co, London 1915 p 12.
5. Taitz C, Nathan H and Arensburg B, Anatomical observations of the foramen transversaria, J Neurol Neurosurg Psychiatry, 1978; 41 (2): p170- 176.
6. Das Srijit, Suri R, Vijay K, Double Foramen Transversaria: An osteological study with clinical implications. Int Med J, 2005; 12, p311-313.
7. Archana S, Kuldeep S, Vishnu G, Shubha S, Double foramen transversarium in cervical vertebra an osteological study,J Anat. Soc. India, 2010; 59 (2) p229- 232.

TABLES:

Vertebra	Side of the Bar	Length (mm)	Thickness (mm)
C4	LT	3.67	0.72
C5	LT	4.32	1.36
C6	RT	5.08	1.89
C6	LT	4.02	1.75
C7	RT	4.92	1.03
C7	LT	4.54	0.87

Table 1: Measurements of length and thickness of the bony bar dividing Foramen Transversarium

Vertebra	Right FT and divided FT (mm)		Left FT and divided FT (mm)	
C4	6.51x6.22		4.62x4.51	2.09
C5	7.23x5.78		6.23x4.88	2.42
C6	6.09x4.24	2.57	7.16x5.77	2.95
C7	6.85x5.25	2.79	6.59x5.47	3.43

Table2: Measurements of length and breadth of normal FT and maximal length of divided FT.

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Fig. 1: Yellow arrows pointing the divided Foramen Transversarium, Red arrow show

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