

MORPHOLOGICAL STUDY OF ACCESSORY FORAMEN TRANSVERSARIUM IN DRY CERVICAL VERTEBRA AND ITS CLINICAL IMPORTANCE

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ABSTRACT

Background: There are seven cervical vertebrae (C1-C7). The Foramen Transversarium present in Transverse Process is the identification feature of cervical vertebrae. Foramen Transversarium of C1 to C6 transmits the second part of vertebral artery, Sympathetic Nerve fibers & vertebral veins

Materials and Methods: Study conducted on total 150 dried Human cervical vertebra, of unknown age & sex. We examine each vertebrae macroscopically for presence of Foramen Transversarium either unilateral or bilateral as well as it is incomplete or complete.

Result: Out of 150 cervical vertebrae we found total 16(10.6%) vertebra had accessory Foramen Transversarium. among 16 vertebrae there is unilateral Foramen Transversarium in 11(7.3%) & bilateral Foramen Transversarium in 5(3.3%).

Conclusion: This type of presence of Accessory Foramen Transversarium may indicate the vertebral arteries have different course variation. This knowledge is useful for Neurosurgeon in cervical surgery, as well for radiologist during CT, MRI like imaging.

KEY WORDS: Cervical Vertebra, Foramen Transversarium, Accessory Foramen Transversarium, Vertebral artery.

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INTRODUCTION

There are seven cervical vertebrae count as C1 to C7 at the Neck region. The Foramen Transversarium present in Transverse Process is the identification feature of cervical vertebrae, because it is not present in any other Thoracic, Lumbar, Sacral or coccygeal Vertebrae. Foramen Transversarium of C1 to C6 transmits the second part of vertebral artery, Sympathetic

Nerve fibres from inferior cervical ganglion & vertebral veins. Seventh Cervical vertebrae(C7) is Transitional because Foramen Transversarium may be absent or duplicate on one or both sides, and it does not transmit the Vertebral artery, it transmits only accessory vertebral vein [1-3].

The morphological anatomy of transverse process of cervical vertebrae is around Foramen Transversarium. It has anterior root, anterior

tubercle, lies anterior to Foramen Transversarium, costotransverse bar lies laterally and posterior root, posterior tubercle dorsal to Foramen Transversarium. The cervical vertebra produce lots of neck movement, so any disorder or change in it may produce remarkable change in lifestyle [4,5].

Foramen Transversarium is developed because of fusion of vestigial costal element & true transverse element to the body of cervical vertebra. The vertebral vessels and sympathetic nerves trap between these two elements & likewise they become the contents of Foramen Transversarium. The development of vertebral artery is from cervical intersegmental artery arising from dorsal aorta. These arteries join with each other and make longitudinal anastomosis. Arteries degenerate & modify to develop an actual vertebral artery. Failure of regression of intersegmental artery may lead to duplication or many variations of vertebral artery. The vertebral artery passes through Foramen Transversarium, so variation in artery may lead to development of accessory Foramen Transversarium, vice versa variation of Foramen Transversarium also to accommodate the variable vertebral artery [6,7].

MATERIALS AND METHODS

This study was carried out in department of anatomy, GMERS medical college, Patan, Gujarat. In this study we count cervical vertebra present in department as well as vertebra present with the students, so we had conducted study on total 150 dried Human cervical vertebrae, of unknown age & sex. We examine each vertebra macroscopically for presence of Foramen Transversarium either unilateral or bilateral as well as it is incomplete or complete. In this study we had excluded defective vertebra, broken vertebra & vertebra with any kind of pathological abnormality. After separating out vertebra with Foramen Transversarium, take a photograph for record. The data were collected and analysed.

RESULTS

Out of 150 cervical vertebrae we found total 16(10.6%) vertebra had accessory Foramen Transversarium. among 16 vertebrae there is

unilateral Foramen Transversarium in 11(7.3%) & bilateral Foramen Transversarium in 5(3.3%). In unilateral Foramen Transversarium 4(2.6%) were incomplete while 7(4.6%) were complete. In Bilateral Foramen Transversarium 2(1.3%) were incomplete while 3(2%) were complete.

Fig. 1: Complete Accessory foramen Transversarium.



Fig. 2: Accessory foramen Transversarium.

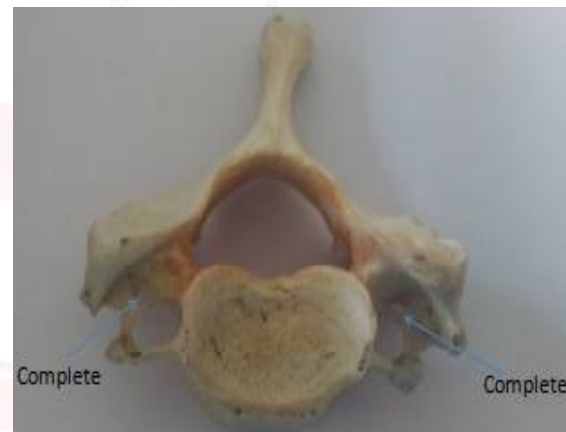


Table 1: Incidence of accessory foramen Transversarium.

| Incidence of accessory Foramen Transversarium | Incomplete | complete | Total |
|---|------------|----------|----------|
| Unilateral | 4(2.6%) | 7(4.6%) | 11(7.3%) |
| Bilateral | 2(1.3%) | 3(2%) | 5(3.3%) |

DISCUSSION

There are many studies conducted on presence of accessory Foramen Transversarium. If we observe the results of different studies and compare with our study, we found that incidence of accessory Foramen Transversarium which is 10.6% is correspondent with most of studies except Katikireddi et al (3%), Chandravadiya et al (4.76%), Ratnakar, Remya et al (5.7%). Another finding in our study there is presence of accessory Foramen Transversarium is more

Table 2: Comparison of present study with different other studies about incidence of accessory foramen Transversarium.

| Sr. No. | Author | No. Of Vertebra | Incidence of accessory Foramen Transversarium | Unilateral accessory Foramen Transversarium | Bilateral accessory Foramen Transversarium |
|---------|----------------------------|-----------------|---|---|--|
| 1 | Present study | 150 | 10.60% | 7.30% | 3.30% |
| 2 | Mishra, Kumari et al [8] | 220 | 14.09% | 4.54% | 9.54% |
| 3 | Akhtar, Rahman et al [9] | 174 | 14.36% | 11.49% | 2.87% |
| 4 | Patra, Kaur et al [10] | 150 | 22% | 10.67% | 11.33% |
| 5 | Katikireddi et al [11] | 100 | 3% | 2% | 1% |
| 6 | Shital, Kiran et al [12] | 210 | 16.19% | 9.52% | 6.67% |
| 7 | Murugan, Verma et al [13] | 150 | 12.60% | 10.60% | 2% |
| 8 | Chaudhari et al [14] | 133 | 23.15% | 14.73% | 8.42% |
| 9 | Chandravadiya et al [15] | 210 | 4.76% | 3.80% | 0.95% |
| 10 | Ratnakar, Remya et al [16] | 140 | 5.70% | 3.60% | 1.42% |

common unilaterally (7.3%) rather than bilaterally (3.3%), which is also correspond with other study.

CONCLUSION

The presence of accessory Foramen Transversarium is not uncommon entity. But it is very important to know the presence of it as clinical point of view, mainly to the surgeon to understand the variable course of vertebral artery and prior to any cervical surgery. It is also helpful to the radiologist during various imaging procedure like CT, MRI. To give the correct identified report to the surgeon or clinicians.

Conflicts of Interests: None

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