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Anatomical Study of Morphometric Patterns of Accessory Foramen Transversarium in Dried Atlas Vertebrae

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ABSTRACT: The Transversarium Foramen is a void between one of the transverse pathways surrounding the vertebral artery, venus, and a nerve-like plexus. Special transverse cervical process system created by fusion with the body of remains of the costumes and a true transversal process. Atlas that transmits a vascular bundle of the spine. The purpose of this research is to investigate anatomy and, where appropriate, improvements in the Atlas Foramen transversarium (FT), which may degrade the course of the vertebral artery to insufficiency. In vertebrates, the cervical vertebrae are just behind the skull. The cervical vertebrae, given their size, have the great work in supporting the brain. Defense of the spine and stability of the head and arms. A common function of the transversal process of cervical vertebras is the transversal foramen. Both cervical vertebras excluding the seventh cervical vertebrae transfer lower cervical, vertebral and sympathetic fibers. Foramen transverse is present.

KEYWORDS: Atlas vertebrae, Foramen Transversarium (FT), Inferior cervical ganglion, Sympathetic fibres, Vertebral artery

INTRODUCTION

The cervical spine consists of 7 vertebrae-C1-C7. It starts at the base of the skull and extends down to the skull. The vertebrae is thoracic. Cervical vertebrae consist of irregular bones sometimes referred to as the vertebral bones that surround the spinal cord, and skin, joints, and ligaments and tendons for assisting, structuring and stabilising to his back. The first vertebra in the cervix is unique in that it is a ring revolving around the second odontoid vertebrae [1]. The second portion of the vertebral artery travels into the adjacent transverse C6-C1 Foramen (TC) along with a spinal cord venous plexus, and a plexus that is sympathetic to the magnum foramen [2]. The Crossword Foramen is a special transverse cycle characteristic of cervical vertebra not present in any other vertebra [3]. So, on both sides of the Vertebra is a transverse foramen. The transverse foramen was distributed vertebrally. A nerve and artery plexus across the neck. A branch of the artery, as well as the vertebral nerve Ganglion cervicothoracique. There are several anatomical differences in the cervical tract and the deep thoracic vertebrae proximal. It undergoes transformation during phylogeny [4]. An Atlas Vertebrae and other cervical vertebrae varies in form and in humans it's perhaps the most complex vertebrae. Owing to the rapid transition that takes place during phylogeny, there are separate divisions in the proximal and cervical thoracic vertebraes. The writers face phylogeny transition [5]. The Atlas vertebrae differs in shape from others as it is probably the most complex human-made vertebrae.

Research studies have been studied by several scholars on the differences in Foramen scale, shape, size, incompleteness or double Transversarium, but very few authors did research on Retroarticular foramen variant which the researcher had studied. The lack or presence of Double FT or attachments is rare and may affect the vertebral arteries procedure [6]. In such situations, the vertebral vessels may be compressed by head movements, and therefore can cause vascular insufficiency. Clinically speaking, it can be prevalent as headache, dizziness,

migraine and faint offensives. Knowledge of variations in the structure of the Atlas FT can be changed [7]. The success rate of the operations, thus preventing damage to annexed vital systems such as the spinal cord, origin of the nerves, cranial nerves and the spinal arteries. There are numerous research projects focussing on the origin and course of the cervical spinal artery as well as on the literature missing in accessories anatomy and FT deficiency in the cervical spine [8]. The purpose of this analysis was to analyze the anatomy and changes in the Atlas FT that could disrupt the path of the vertebral artery and its deficiency. In the right way of viewing X-ray images or informatic axial tomography including angiograms the data given from that analysis will be helpful. Details can also be effective in the avoidance and reduce risks, including vertebral artery [9]. Injury and injury to the spinal cord during spine surgery. When the occurrence of through neck fractures and related syndromes rises, doctors, orthopedics, neurosurgeons and radiologists are studying the osseous variants of the atlas of vertebra as well as its Foramine Transversarium [10].

METHODOLOGY

aThirty dry peopletlas vertebrae with uncertain sex "(belonging to North Indian people)" were obtained through maceration from the corpses made available for dissection in the Anatomy Department. All of that the atlas vertebrae have been carefully cleaned and numbered from 1 to 30. Damaged and pathological vertebrae of the Atlas have been excluded from study. Linear FT measurements, i.e. longitude, distance, and the depth (Fig. 1), was measured by means of a Vernier caliper with minimum 0.02 mm count, and every dimension from the graduated caliper scale was then read. All aspects the bones were taken straight away and then the data was stored on the PC pad. The foramen on both sides of the Vertebrae such as Elliptical Right, Elliptical Anteroposterior, Rounded, Left-Right and Elliptical Transverse is found as being of the transversal foramen (Fig. 2 and 3). Some addition or absence of FT and osteophytic intrusions, if any, have also been studied (Fig. 4). The t-test of the pupil was used to determine the existence of any discrepancy between right and left spinal hands. Tests were deemed significant when $P<0.05$.

Fig.1: Superior View of Atlas Vertebra showing Dimensions of FT length, Width and Depth

Dependent on the foramen-shaped observations listed as Type 1, elliptical with anteroposterior direction as Type 2, elliptical with transverse direction as Type 3, elliptical with right to left, 5 different types of FT. Type 4 direction, and left to right elliptical steering as type 5 (Figs. 2 and 3). The FT transmits the vertebral arteries, i.e. the vertebral artery and vein, and the

transversarial accessory foramen may be present to compartmentalize the FT contents. So the assumption can be that the variations in vertebral vessel progression will be causes FT variation, and FT variability can be useful for estimating differences in Spinal tubes. FT defects may also mean a loss of the VA or of the artery, which runs along and narrows the transverse path. The same applies to single or double FT accessories could mean doubling of the vertebral vessels. Single and double FT and Osteophytic Accessories Trespasses on both were also observed on both the vertebral sides (figure 4).

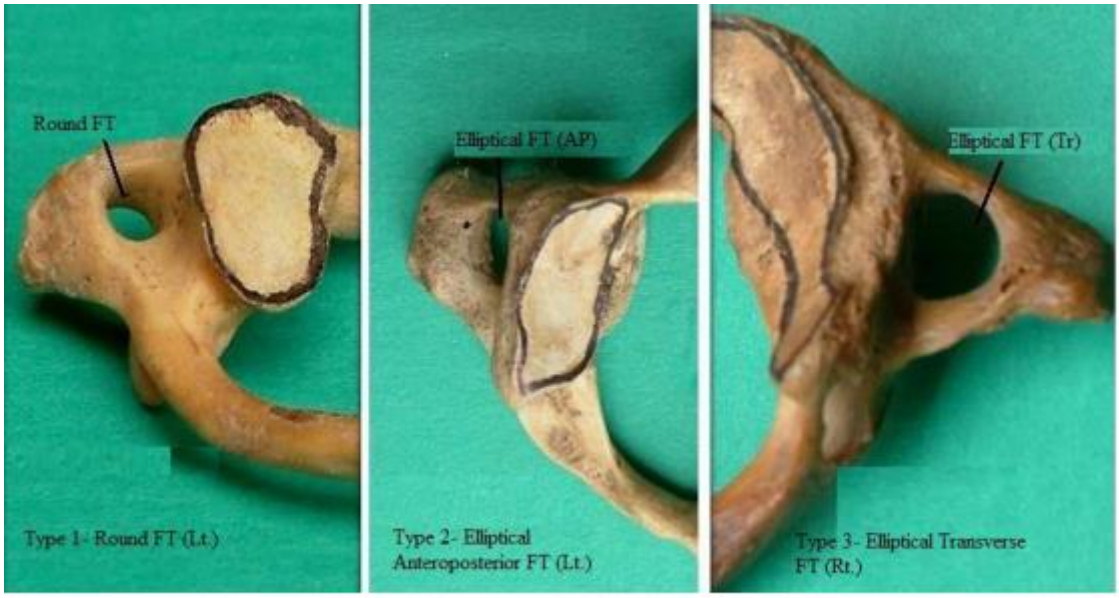

Fig.2: Superior View of Atlas Vertebra showing different shapes of Foramen Transversarium (FT); Type 1, Type 2 and Type 3

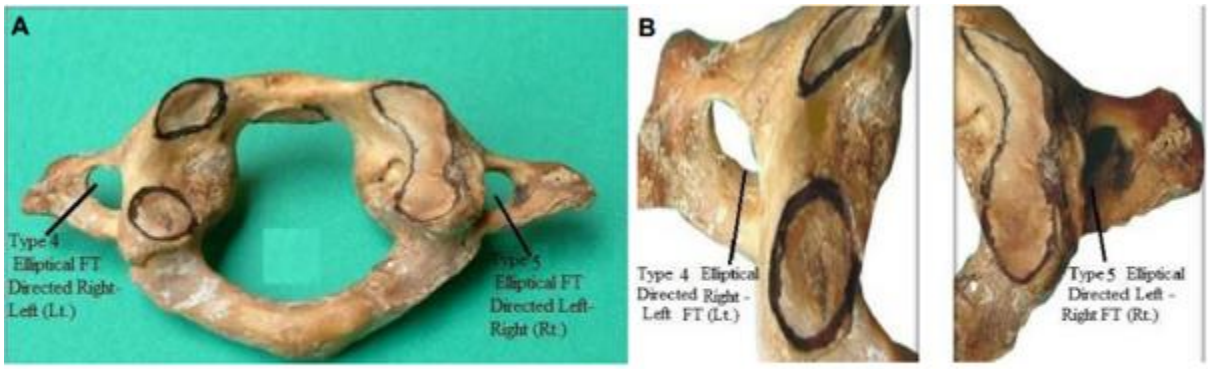

Fig.3: Superior View of Atlas Vertebra (A, B) showing different shapes of Foramen Transversarium (FT); Type 4 and 5

Fig.4: Superior View of Atlas Vertebra (A, B) showing Bilateral Accessory Foramen Transversarium (FT) and Osteophyte Encroachment

RESULTS

Table 1 showing the findings of atlas vertebrae parameters of Foramen Transversarium. FTL was found to be 6.72 mm in mean and 6.90 mm on each sides, and differences in mean FT length were statistically significant Notable (p=0.271). FTW averaged 5.17 mm and 5.40 mm on Right and wrong hand, and disparity in Mean FT range was statistically negligible (p=0.186). The FTD mean was 5.30 mm and 5.49 mm on the right as well as left sides and the gap of the FT length was statistically insignificant (p=0.238). The FT's most popular type was found in

the category 4 with 56.6 per cent (17) highest frequency on right side and left side 33.3 percent followed by Form 2 i.e. 20 percent and right side respectively. For the left 20%, to the right 5-10% then to the left 30%, to the right 10% then to the left then 13.3% and then on the right, to the left 33.3% and to the right 3.3%. To the left hand 20% and then on the right.

Table 1: Results of Foramen Transversarium Parameters of Atlas Vertebrae

S. No.	Parameters	Number	Mean (mm)	SD	Range (mm)	P value	-
1.	Foramen Transversarium (FTL)	30 (60 sides)	6.81	0.92	3.5-8.5	(p=0.271)	-
2.	Foramen Transversarium Width (FTW)	30 (60 sides)	5.28	0.99	3.0-7.0	(p=0.186)	-
3.	Foramen Transversarium (FTD)	30 (60 sides)	5.36	1.16	1.80-7.30	(p=0.246)	-
4.	Type FT	30 (60 sides)	-	-	-	(p=0.743)	**Type FT** / **Rt.** / **Lt.** Type 4 / 56.6% (17) / 33.3% (10) Type 2 / 20% (6) / 20% (6) Type 5 / 10% (3) / 30% (9) Type 1 / 10% (3) / 13.3% (4) Type 3 / 3.3% (1) / 3.3% (1)
5.	Accessory FT	30 (60 sides)	-	-	-	-	**No. Acc. FT** / **Rt.** / **Lt.** / **Bl.** Single / 0 / 13.3% (4) / 6.6% (2) double / 0 / 3.3% (1) / 0

DISCUSSION

Putting the present research in context, an intercontrast of populations with FT shape is insightful. The length of FT of atlas vertebrae in Northern Indians in this study has been slightly shorter (6.81 mm) than those collected by one of the non-specific mixed-researchers Indian peoples, and longer than those in Turkish, Ohio, Northern Greek, South Greek Africans and Kenyans. Since the atlas is one of the three most critical aspects of the craniovertebral fusion, the reverse and lateral grooves and foramines are of greater therapeutic significance. Many researchers study various Atlas Vertebrae changes including faulty anterior spinal cord, retroarticular forams, incomplete Foramen Transversarium (FT). Instead of its lateral muscle growth from superior joint faces to superior joint facets behind Atlas Arch, the foramen 's retro articular factor is created. This is described by the atlas oblique ligament ossification that could not be complete or complete. Thanks to the side muscle growth from superior articular to superior articular part, the foramen retroarticular is formed Posterior Atlas arc. This is described by the atlas oblique ligament ossification that could not be complete or complete. The vertebral nerve and the first neuron moving into the cervix during extreme spinning gestures. This may get squeezed and lead to spinal cord damage and other neurological signs. Many scholars have claimed that in the craniovertebral junction area, which is responsible for the retroarticular formation of the canal, the capacity of osteogenic cells exists, among others, who claim that the pulsation of the vertebral Artery itself will induce a bridge to oblique ossification Atlas ligament.

Clinical sense of these anatomical differences in the transversarial foramen is useful in estimating changes in since vertebral vessels are significant feature in the development of the vessels and the corresponding nerves Transversarial foramen, and presence of variations and

the vessels' course can be seen with the modifications in Transversarial foramen. It was also reported tortuosity bone erosion or narrowing of the vertebral artery may cause the total Transversarial Foramen formation. In 210 cervical vertebrae, the researchers found an occurrence of 4.76 per cent dual FT accessory. The FT Twin Accessory was found primarily in atlas C5, C6, C7 and none in the atlas vertebra. Those variations may be related to Vertebral Artery replication. A bilateral FT deficiency in the atlas vertebra was observed and recorded as Nayak Case Study. It is nevertheless known that the tortuousity bone erosion can occur from the vertebral artery, or impedes complete transverse formation Forestry men. The absence of the FT was explained due to the loss of the artery, so the cross loop takes place without loggering into the Foramen. External mechanics may play an important part in finding the abnormality of the atlas, for example while holding heavy items on the head. The foramina forms correspond with the vertebral artery. Strong rotational movements can occur at the cervical spine can result in vertebral artery compression, and compromised flowing blood. Osteophytic invasion in the Atlas FT Vertebrae: Osteophytes found in FT of Atlas vertebrae in population of 4 North Indian 13.3 percent of cases. Might distort osteophytes or decrease the FT's inner lumen which could be respond to insufficiency in the vertebral artery. The Foramina form and scale have association for the Artery of the Vertebrae. Tortuousness and Scale in turn the vertebral artery depends on loading forces and tension in the area around the neck.

Certain anomalies, injuries, and radiologists should also be noted for their correct analysis of the X-raying and computable tomographic scan may be correlated with imperfect transversarial forams. Foramen may cause multiple problems with retroarticular. Vascular and Neurological symptoms that doctors and surgeons should maintain and that variations in atlas vertebras are considered one of the root causes.

CONCLUSION

Atlas Anatomical differences can contribute to vertigo and other neurological disorders, particularly in the ossic bridges of the vertebral and first cervical arteries. For Scientists, Otirhinelaryngologists, Orthopedics and Orthopaedics, the second part of the vertebral artery is displaced and may be likely to be injured through cervical injury due to the unfinished construction of the Foramen Transversairum (FT). Knowing the differences for radiologists it is important on foramen transversarium as they might misinterpret it as fractures and surgeons to prevent threat of vertebral artery damage.

The research found several variants of the North Indian atlas vertebrae FT. No notable difference in length was found, FT width and depth on either side of the vertebral atlas. The accessories FT and osteophytes were found in a few instances. Impregnation of osteophytes by articular processes may cause vertebral compression artery or underlying pain of the sympathetic plexus. Numerous surgical techniques such as interlaminar joining, interspinal cabling and plate and transarticular and transpedicular fastening screws. The atlanto-axial complex or occipitocervical junction was currently being repaired, thereby stabilizing the cervical column formed by various traumatic and non-traumatic conditions. This is a major issue during the cervical operation that the vertebral artery is kept intact.

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