

Morphometric study of the human atlas vertebra for vertebral artery groove

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Abstract

Aims: 1.To compare and contrast the measurements of vertebral artery groove of atlas with that of other studies and its significance in screw placement surgeries. 2. To compare and contrast the result of present study with previous studies.

Methods: 100 adult human atlas vertebrae of unknown sex from the department of Anatomy, Government Medical College, Aurangabad, Maharashtra, India studied for the measurement of vertebral artery groove. **Results:** The mean value for the width of vertebral artery groove was found to be 7.98 mm with a range extending from 6.42-9.56 mm and standard deviation of 0.8. **Conclusion:** The knowledge of the quantitative anatomy of the vertebral artery groove is very important for surgeons performing operative procedures in that region thereby avoiding vascular complications.

Keywords: Atlas Vertebra, Vertebral Artery Groove.

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INTRODUCTION

The atlas have certain anatomical features different from other cervical vertebrae. Thus the unique structure and anatomical location of atlas forms a safety mechanism and guards against injuries². The atlas is located at a critical point close to the vital centers of the medulla oblongata, which can get compressed by a dislocation of atlanto-axial complex or instability of atlanto-occipital joint. The vertebral artery groove is located on the superior surface of the posterior arch of atlas, vertebra lodging the third part of vertebral artery. The morphometric data of the groove is scarce in Indian literature. Iatrogenic injury to the vertebral artery is

common in posterior approaches to the atlas vertebra. One of the objective of the present study is to obtain morphometric data for the vertebral artery groove⁴

MATERIALS AND METHODS

“Morphometric study of the human atlas vertebra for vertebral artery groove” is descriptive type of observational study and performed in the Department of Anatomy, Government Medical College on 100 adult human atlas vertebrae of unknown sex. The specimens were dry, free from deformity and fully ossified. Permission was obtained from the local ethics committee. The equipment were used for measurement of parameter

1. Sliding digital vernier callipers
2. Divider
3. Steel Measuring Scale

All parameters were measured using a calliper accurate to 0.01 mm for linear measurements. Mean and standard deviation of the parameters was worked out by using the SPSS statistics program. The parameter studied was **Width of the vertebral artery groove:** With the help of digital vernier calliper the distance between outer and inner edge of vertebral artery groove was measured as width of vertebral artery groove (**Figure 1**).



Figure 1: Showing method of measurement of vertebral artery groove

OBSERVATIONS AND RESULTS

The mean value for the width of vertebral artery groove was found to be 7.98 mm with a range extending from 6.42-9.56 mm and standard deviation of 0.8.

Table 1: showing mean and S.D. of the width of vertebral artery groove

Width of the vertebral artery groove (mm)	
No. of bones	100
Range	6.42-9.56
Mean	7.98
Standard Deviation	0.8

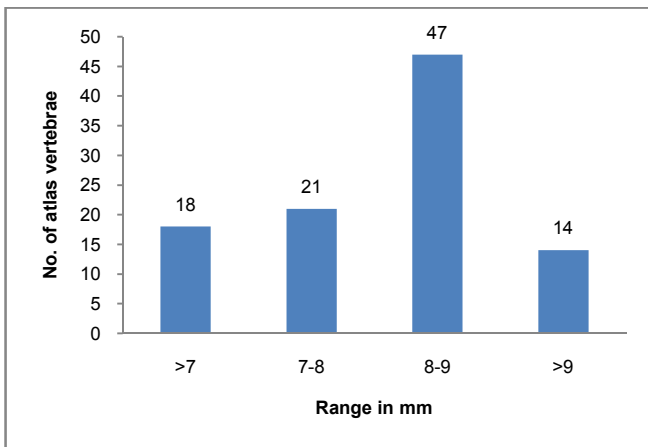


Figure 1: Showing the number of vertebrae lying within specific frequency ranges

DISCUSSION

The mean value of width of vertebral artery groove was found to be 7.98 mm with a range extending from 6.42-9.56 mm. The standard deviation was found to be 0.8. On comparison, the results of the present study were found to be correlating well with the observations made by worker like Ravichandran D⁴. Ravicahandran D⁴ and *et al* studied 75 dry human atlas vertebrae manually with vernier caliper and found that mean value of the width of vertebral artery groove of atlas vertebra to be 8.08 mm.

The studies done by other authors such as Max Franco, Francesco Cacciola¹⁴ *et al* showed the mean values of the parameter under discussion to be on slightly lower side, as well as study done by Gokflin Fiengul⁷ showed the mean value slightly higher side as compared to the present study.

Table 2: Showing comparison of means of width of vertebral artery groove of atlas vertebrae amongst different workers

Sr. No.	INVESTIGATORS	Mean (mm)
1	Max Franco	7.58
2	Francesco Cacciola	7.9
3	Gokflin Fiengul	8.7
4	Ravichandran D	8.08
5	Present study	7.9

CONCLUSION

The mean value for the width of vertebral artery groove was found to be 7.79 mm, correlating with the results obtained by Gokflin Fiengul, Ravichandran D. The knowledge of the quantitative anatomy of the vertebral artery groove could prove useful to surgeons performing operative procedures in that region there by avoiding vascular complications.

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