

ABSTRACT

MORPHOMETRIC ANALYSIS OF ATLAS IN WESTERN TAMILNADU

POPULATION

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Introduction:

Atlas was the primordial titan who held up the celestial sphere. Atlas vertebra holds the head like a globe. The knowledge of the morphometry and the morphology of the atlas vertebra was necessary for the neurosurgeons, orthopedicians and radiologist. The presence of foramina was studied in order to avoid iatrogenic injury to vertebral artery groove. The study was focussed on the morphometry and morphology on dry atlas vertebra and in atlas images from CT images of Brain and Cervical spine.

Aims and objectives:

To study the Morphometry and morphology of atlas vertebra in both dry bone and in CT images of Head and Neck region.

Materials and methods:

The study was conducted in 50 dry atlas vertebrae and in 200 CT images which included 100 male and 100 female. The Morphometry parameters are measured using Vernier caliper in dry atlas bone and in 2D CT images by using special tool bar. The distribution of the ponticuli in our population was observed in both dry bone and in 3D CT images.

Observations and Results:

Dry bone:

The most common shape of foramen transversarium was type 2. The mean antero posterior and transverse diameter of foramen transversarium was 7.53mm and 5.51mm respectively. The mean inner groove length of vertebral artery groove was 7.02mm \pm 1.20mm. The mean outer groove length was 11.35mm \pm 1.97mm. The mean width and thickness of the vertebral artery groove was 8.59mm \pm 1.29mm and 3.93mm \pm 0.93mm respectively. The mean values of D1, D2, D3 and D4 of vertebral artery grooves were 12.22mm \pm 1.85mm, 16.67mm \pm 2.79mm, 18.94mm \pm 2.54mm and 26.11mm \pm 2.53mm respectively the most common shape of superior articulating facet was irregular type. The mean value of the antero posterior and transverse diameter of the superior articulating facet was 21.84 \pm 2.43mm and 11.61 \pm 1.66mm respectively. The mean value of the antero posterior and transverse diameter of the inferior articulating facet was 17.26 \pm 1.57mm and 14.71 \pm 1.24mm respectively. The mean value of the width of the atlas vertebra was

71.6±5.51mm. The mean value of the distance between the lateral most edge of right and left foramen transversarium was 57±4.28mm. The mean value of the distance between the medial most edge of the right and left foramen transversarium was 48.18±3.28mm. The mean value of the external antero posterior diameter was 40.67±3.73mm. The mean value of the internal antero posterior diameter was 27.8±2.41mm. The mean value of the intertubercular distance was 16.16±1.92mm. The frequency of ponticuli posterior and ponticuli lateralis among 50 dry atlas vertebrae was 16% and 6% respectively.

CT images:

The mean anteroposterior dimension and transverse diameter of foramen transversarium was 7.06 mm ± 1.11 mm and 5.80 mm ± 1.16 mm respectively. The mean inner and outer length of the vertebral artery groove was 8.53±1.60 mm and 13.80±2.15mm respectively. The mean value of the width of the vertebral artery groove was 6.89±1.38 mm. The mean value of D1, D2, D3, and D4 of the vertebral artery groove was 11.56±2.17 mm, 15.2±2.74mm, 18.34±3.43mm and 26.25±4.18mm respectively. . The mean value of β1 and β2 of the vertebral artery groove was 48.22±6.17degrees and 63.94±5.33degrees respectively. The mean value of the width of the atlas vertebra was 72.91±5.55mm. The mean value of the distance between the lateral most edge of the right and left side of the foramen transversarium was 55.89±4.67mm. The mean value of the distance between the medial most edge of the right and left side of the foramen transversarium was 44.16±3.53mm. The mean value of the external antero posterior diameter was 40.37±3.22mm. The mean value of the internal antero posterior diameter of

the atlas vertebra was 29.64 ± 2.57 mm. The mean value of the inter-tubercular distance of 200 atlas image was 16.11 ± 2.06 mm. . The frequency of ponticuli posterior, ponticuli lateralis and posterolateral ponticuli was 18.5%, 1% and 1.5% respectively.

Conclusion:

The knowledge based on the morphometry and morphology are applied clinically during posterior dissection of neck. The presence of ponticuli should be assessed before any cervical surgeries and in cervical spine traumas to avoid vertebral artery rupture.