MORPHOLOGICAL VARIATION OF FORAMEN MAGNUM.

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Abstract

Aim:- To study the foramen magnum size, shapes variations in the dryskulls.

Materials and method:- The morphological diameter variation distance taken from
i) Antero posterior/sagittal diameter
ii) Transverse diameter of foramen magnum from completely ossified unknown ages of male, female 250 skulls of south India, Tamilnadu, Nammakal district dental colleges with the help of Vernier caliper

Result and conclusion:- According to our study foramen magnum shows shape variations like rhomboid, hexagonal, pentagonal, oval, irregular and spherical. It is very useful to identify the sex difference and also with the clinical intervention by the mean diameter of longitudinal transverse diameter of foramen magnum.

Introduction:-
Foramen magnum provides the communication between the cranium and vertebral column. The knowledge of FM diameter is very important to the surgeons, anthropological and forensic medicine. In this study we find out the variation of foramen magnum of the skull. Many studies focused on the Occipital condyles and foramen magnum. Morphometric analysis highlighting their clinical, orthopedic, neurosurgical and forensic importance. Pathological FM dimensions, as in achondroplasia and brain herniation cases can result in compression of the vital structures passing through it and can influence the flow of blood and CSF. In the present study, the FM were classified according to their shape; their anatomic matric values were evaluated. The morphological abnormalities in the region were reported and possible correlations between the parameters studied, were investigated, as an orientation point in cases requiring craniocervical surgery.
Materials and method:-
The morphological diameter variation distance taken as follows(diagram)

i) Antero posterior/sagittal diameter (the distance from basion to opisthion)
ii) Transverse diameter of foramen magnum (the distance between the lateral margins of the FM at the point of greatest lateral curvature)
iii) Shape of foramen magnum

From completely ossified unknown ages of male, female 150 skulls of South India, Tamilnadu, Nammakal district Dental colleges with the help of vernier caliper. The different shapes of foramen magnum like round, oval, egg, irregular, pentagonal, hexagonal were measured. The area of the foramen magnum was calculated by using the formulae $\frac{1}{4} \times 3.14 \times FMW \times FML$. Foramen magnum index was calculated by width * 100/foramen magnum.

Results:-
Comparison of male and female fm skull

<table>
<thead>
<tr>
<th>SHAPES</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVAL</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>EGG</td>
<td>23.3</td>
<td>21.2</td>
</tr>
<tr>
<td>ROUND</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>HEXAGONAL</td>
<td>15</td>
<td>25.3</td>
</tr>
<tr>
<td>IRREGULAR</td>
<td>30.7</td>
<td>35.7</td>
</tr>
<tr>
<td>PENTAGONAL</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>
II) Graphical comparison:

![Graphical Comparison](image)

II) Mean value of foramen magnum AP and TP diameter of both sex

<table>
<thead>
<tr>
<th>Gender</th>
<th>Ap diameter</th>
<th>Tpdiameter</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30.3</td>
<td>22.2</td>
<td>&gt;0.006</td>
</tr>
<tr>
<td>Female</td>
<td>25.6</td>
<td>20.8</td>
<td>&gt;0.001</td>
</tr>
</tbody>
</table>

III) Index of foramen magnum area with other articles

<table>
<thead>
<tr>
<th>Authors</th>
<th>FM area(mm²)</th>
<th>FM index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present study</td>
<td>913.07</td>
<td>85.66</td>
</tr>
<tr>
<td>Gunay et al</td>
<td>909.91</td>
<td>-</td>
</tr>
<tr>
<td>Burden et al</td>
<td>874.4</td>
<td>89.34</td>
</tr>
</tbody>
</table>

Discussion and conclusion:

In our study the result of FM of the skulls shows antero posterior and transverse diameter maximum and minimum values were noted respectively. Normally, the foramen magnum is oval shape, but in our study shows different shapes, variation of foramen magnum. In the present study reported that, the male skulls shows more variation with the help of mean values as well as antero posterior diameter and transverse diameter of the female skulls of FM.

Result shows that, the FM was identified in the male skulls shown irregular and egg shape compared to the female skulls comparison with AP and TP and also with p value > 0.006 in males. It is very important and useful for the clinical intervention because, the vital structures passing through it. According to

i) SINDEL et al observed that the foramen magnum shape is oval at 18.9%

ii) MURSHED ET AL found OVAL FM at 8.1%, PENTAGONAL FM at 14.6%, HEXAGONAL FM at 14.6%.

iii) According to ZAIDAI AND DAYAL REPORTED that HEXAGONAL FM at 24.5, PENTAGONAL FM at 7.5%, irregular FM at 18%, hexagonal FM at 8%. 
**Reference:-**


