Original article

Metopic suture and its variations

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Abstract:
Introduction: Metopic suture is defined as a condition in which two pieces of frontal bone fail to merge in early childhood. Complete metopic suture extends from nasion to bregma and incomplete metopic suture present at the glabella of skull. It may be misdiagnosed as vertical traumatic skull fracture.

Methods: This study was conducted in 50 skulls from the Department of Anatomy, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry. Skulls with signs of disease and damaged skulls were excluded from the study. Metopic sutures are divided into three groups Absent, Complete and Incomplete sutures.

Results: Complete metopic suture were present in 2% (1/50), Incomplete metopic suture were present in 44% (22/50) and Absent in 54% (27/50).

Conclusion: The persistence of metopic suture in adults which separates the frontal bones are important in assessing the radiological images and in evaluation of medico legal cases.

Keywords: Metopic suture, vertical fracture

Introduction:
Frontal bone is a curved plate of pneumatic bone. Metopic suture is formed between the tubers of frontal bone. Usually it is closed by the intramembranous ossification from the inner face of skull. The closure occurs from the two primary centres from each half of the frontal bone. There are two types; complete and incomplete Metopic sutures. Complete Metopic suture is from nasion to bregma. Incomplete Metopic suture starts from nasion but does not reach till bregma. The incidence of metopism may vary by race. Usually Metopic suture will start to close from the age of 18 months by the end of 8 – 9 years it gets completely fused, persistent of this suture results in metopism.

Figure 1: showing normal appearance

Figure 2: showing complete metopic suture
Materials and methods:
This study was conducted on 50 skulls from the Department of Anatomy, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry. Skulls with signs of disease and damaged skulls were excluded from the study. They were divided into three groups: Absent, complete, and incomplete Metopic sutures.

Results:
Complete Metopic suture were present in 2% (1/50). Incomplete Metopic suture were present in 44% (22/50) and absent in 54% (27/50). Out of 22 incomplete metopic sutures, Single linear Metopic suture were present in 9/22 (40.9%). Double linear Metopic suture were present in 6/22 (27.2%). V-shaped Metopic suture were present in 4/22 (18.2%), U shaped Metopic suture were present in 3/22 (13.7%).

<table>
<thead>
<tr>
<th>S.NO</th>
<th>METOPIC SUTURE</th>
<th>NUMBER</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ABSENT</td>
<td>27 / 50</td>
<td>54 %</td>
</tr>
<tr>
<td>2.</td>
<td>COMPLETE</td>
<td>1 / 50</td>
<td>2 %</td>
</tr>
<tr>
<td>3.</td>
<td>INCOMPLETE</td>
<td>22 / 50</td>
<td>44 %</td>
</tr>
<tr>
<td>3 A</td>
<td>SINGLE LINEAR</td>
<td>9 / 22</td>
<td>40.9 %</td>
</tr>
<tr>
<td>3 B</td>
<td>DOUBLE LINEAR</td>
<td>6 / 22</td>
<td>27.2 %</td>
</tr>
<tr>
<td>3 C</td>
<td>V – SHAPED</td>
<td>4 / 22</td>
<td>18.2 %</td>
</tr>
<tr>
<td>3 D</td>
<td>U – SHAPED</td>
<td>3 / 22</td>
<td>13.7 %</td>
</tr>
</tbody>
</table>

Table 1: showing results in percentages

Discussion
Metopic suture is an dentate suture extending from nasion to bregma. According to Del Sol et al the causative factors Metopic suture are: abnormal growth of cranial bones, hydrocephalus, growth retardation, Atavism, Stenocratophia (abnormal narrowing of temporal area of the head), Plagiocephaly (cranial malformation causing a twisted and asymmetrical head because of Synostosis of cranial sutures), Scaphocephaly (deformed head projecting forward like keel of boat). It is commonly seen in Apert syndrome.

The incidence of complete Metopic suture from other studies are as follows: Bryces et al at 1915 conducted this study in different races, European – 8.5%, Mongolism – 5.5%, Negros – 1.2%.Woo et al at 1945 conducted this study in Mongoloid race – 10%. Romanes et al at 1972 conducted this study on European race – 8%. Das et al at 1973 conducted this study on Indians - 3%. Chandrasekaran et al at 1985 conducted this study on South Indians – 3%.

Compared to other studies the incidence of Metopic suture in South Indian population is 2-3% as seen in the present study as well as other literature.

Conclusion:
The knowledge about the Metopic suture is very important for radiologist, orthopaedic Surgeons, Oromaxillofacial Surgeons, neurosurgeons in daily practice. Since this suture resembles an vertical fracture of the frontal bone.
Figure 3: showing Single linear type of suture

Figure 4: showing double linear type of suture

Figure 5: showing V – shaped suture

Figure 6: showing U – shaped suture

References:
