Management of Chiari Malformation in Pregnancy and Delivery

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Chiari Type I

- Downward displacement of the cerebellar tonsils below the foramen magnum of more than 5 mm

- May be associated with syringomyelia

Images provided courtesy of Dr. Sanjay Prabhu; Staff Pediatric Neuroradiologist; Boston Children's Hospital
Chiari Type II

- Downward displacement of the cerebellar vermis and tonsils
- Kink in the medulla
- Hydrocephalus
- Syringomyelia
- Spinal myelomeningocele

Images provided courtesy of Dr. Sanjay Prabhu; Staff Pediatric Neuroradiologist; Boston Children’s Hospital
Chiari Type III

- Downward displacement of the cerebellum and brainstem
- Cervical or occipital encephalocele
- Spina bifida

Images provided courtesy of Dr. Sanjay Prabhu; Staff Pediatric Neuroradiologist; Boston Children’s Hospital
Chiari I

- Incidence

- Symptoms

- Labor concerns


Methods

- EMRs were used to identify all women who delivered at Magee Women’s Hospital & Brigham and Women’s Hospital between 1/2010 – 12/2015 with Chiari I malformation based on neuroimaging.

- Excluded women who had undergone surgical decompression prior to delivery.

- Retrospective chart review: demographics, neurologic history, radiology reports, choice of mode of delivery, anesthetic method and outcome were recorded.

# Results

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (n = 95) (years)</td>
<td>28.7 ± 6.6</td>
</tr>
<tr>
<td>Gravity (n = 95)</td>
<td>2.1 ± 1.3</td>
</tr>
<tr>
<td>Parity (n = 95) 0/1/2/3+</td>
<td>42/35/8/10</td>
</tr>
<tr>
<td>Gestational Age (n = 95) (weeks)</td>
<td>38.0 ± 3.4</td>
</tr>
<tr>
<td>Mode of Delivery (Vaginal/Cesarean Section) (n = 95)</td>
<td>51/44</td>
</tr>
<tr>
<td>Anesthesia Type (Spinal/Epidural/General/Local or none/unknown) (n = 94)</td>
<td>24/38/12/20/1</td>
</tr>
<tr>
<td>Chiari size (n = 92) (mm)</td>
<td>9.3 ± 4.3</td>
</tr>
<tr>
<td>Asymptomatic/Headache (n = 94)</td>
<td>58/36</td>
</tr>
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Symptoms

- Chiari size and symptoms
Mode of Delivery

- No difference in the median size of Chiari for women who underwent C-section vs vaginal delivery.

- 10 C-sections done at physician recommendation due to Chiari. No difference in size of the Chiari when compared to the women who had C-section for obstetrical indications.
Women with Chiari Malformation that underwent C-section

- Elective Repeat Cesarean Section: 14%
- Cesarean Section recommended due to Chiari Malformation: 23%
- Cesarean Section done for Obstetric Considerations: 63%
Patients referred for Cesarean Section due to Chiari I

<table>
<thead>
<tr>
<th>Number</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Hydrocephalus</td>
</tr>
<tr>
<td>1</td>
<td>Papiledema</td>
</tr>
<tr>
<td>1</td>
<td>Headache and paresthesias</td>
</tr>
<tr>
<td>3</td>
<td>Headache alone</td>
</tr>
<tr>
<td>2</td>
<td>Asymptomatic</td>
</tr>
</tbody>
</table>
Women with Chiari who had a vaginal delivery (51)

- 21 Headaches
- 30 Asymptomatic

- No reported worsening in either group
Women with Chiari who had Neuraxial Anesthesia- 62

- 38 Epidural
- 24 Spinal
- 0 Combined

No complications reported which could be attributed to the Chiari
Discussion

- 62 deliveries in women with Chiari I malformation, neuraxial anesthesia was administered without worsening headaches or any symptoms of tonsillar herniation.

- 51 women with Chiari malformation were able to labor and deliver vaginally without neurologic deterioration

Choice of mode of delivery in women with asymptomatic should be based upon obstetrical considerations.

Women with Chiari I malformation who are experiencing headache as the only manifestation of their Chiari I malformation can be delivered based upon obstetrical considerations.

Women with Chiari I malformation with hydrocephalus and papilledema (with or without headache) may be considered to be high risk for both vaginal delivery and neuraxial anesthesia.
“This is a teaching hospital”