Evaluating Bladder Function and Safety in Prenatal Fetoscopic Versus Prenatal Open Myelomeningocele Repair

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BACKGROUND

• SB: MC permanently disabling birth defect (34/100k prevalence)

• Increasing use of prenatal intervention after MOMS trial

• Minimally invasive surgery becoming mainstream
  – Fetoscopic MMC repair used by a growing number of institutions
BACKGROUND

• Fetoscopic benefits
  – Demonstrated within MFM and NSGY literature*

  ↓ preterm labor rates  →  2 week gestation age improvement with fetoscopic

  ↑ vaginal delivery rates

• CIC +/- anticholinergics is norm in SB population (90%+)
  – Not ideal metric for success

*Belfort MA, et al, Obstetrics and Gynecology, 2017
AIM + HYPOTHESIS

• Establish utility of the UMPIRE bladder risk stratification as a predictor of urologic outcome

• We hypothesized that prenatal fetoscopic repair is superior to prenatal open with respect to postnatal bladder risk
METHODS

• Retrospective
• All prenatal MMC repairs
  – Prenatal open
  – Fetoscopic repair
• RBUS and CMG <9mo age AND
• Follow up studies within 18mo of initial

<table>
<thead>
<tr>
<th>Repair Type</th>
<th>Initial High Risk</th>
<th>Follow up High Risk</th>
<th>Total Improved</th>
<th>Initial HN</th>
<th>Follow up HN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenatal Open</td>
<td>11 (73.3%)</td>
<td>6 (40%)</td>
<td>5 (33%)</td>
<td>2 (13%)</td>
<td>0 (0%)</td>
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<td>(N=15)</td>
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<tr>
<td>Fetoscopic</td>
<td>7 (54%)</td>
<td>1 (7.7%)</td>
<td>8 (62%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<td>(N=13)</td>
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</table>
METHODS

• US: evaluated for HN
  – None, Unilateral, or Bilateral

• CMG: evaluated for bladder risk categorization
  – Normal/Abnormal SAFE
  – INTERMEDIATE
  – HIGH

<table>
<thead>
<tr>
<th>Safe</th>
<th>Intermediate</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>• Normal Capacity</td>
<td>• MDSP/DLPP 25-40cmH2O</td>
<td>• MDSP/DLPP &gt;40cmH2O</td>
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<tr>
<td>• MDSP/DLPP &lt;25cmH20</td>
<td>• Presence of NDO</td>
<td>• Presence of NDO + DSD</td>
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<tr>
<td>• No NDO</td>
<td>• No DSD</td>
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<tr>
<td>• No DSD</td>
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MDSP = Maximum Detrusor Storage Pressure; DLPP = Detrusor Leak Point Pressure; NDO = Neurogenic Detrusor Overactivity; DSD = Detrusor Sphincter Dyssynergia
FINDINGS

FETOSCOPIE: Less High Risk bladders present on initial and follow up studies
FINDINGS

- Hydronephrosis present in 13% of prenatal open
  - Resolved in all

- No hydronephrosis seen on initial or follow up RBUS in fetoscopic
CONCLUSIONS

• Fetoscopic demonstrates fewer high risk bladders on:
  • Initial evaluation (54% vs. 73%)
  • Final follow-up (7.7% vs. 40%)

• Fewer prenatal open improve on follow up (33% vs 62%)

• Larger, multi-institutional, prospective studies are needed