SHOULDER DYSTOCIA: DIAGNOSIS AND MANAGEMENT

Definition

- Dystocia
- Pronunciation: dis-tO-shuh
- Function: noun
- Slow or difficult labor or delivery

Shoulder Dystocia: Definition

- Difficulty with delivery of the shoulders
- Maneuvers in addition to gentle downward traction on the fetal head.
- Prolonged head-to-body delivery time (> 60 seconds) and/or use of obstetric maneuvers.


Incidence

<table>
<thead>
<tr>
<th>Author</th>
<th>Time frame</th>
<th># SD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lurie</td>
<td>1/86 - 12/91</td>
<td>52</td>
<td>0.19</td>
</tr>
<tr>
<td>Benedetti</td>
<td>6/74 - 12/75</td>
<td>33</td>
<td>0.37</td>
</tr>
<tr>
<td>Smith</td>
<td>1980 - 1985</td>
<td>203</td>
<td>0.58</td>
</tr>
<tr>
<td>Gherman</td>
<td>1/91 - 12/94</td>
<td>250</td>
<td>0.57</td>
</tr>
<tr>
<td>Langer</td>
<td>1970 - 1985</td>
<td>456</td>
<td>0.60</td>
</tr>
<tr>
<td>Lewis</td>
<td>1/83 - 12/92</td>
<td>747</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Pathophysiology

- Persistent AP location of shoulders @ pelvic brim:
- Increased resistance between fetal skin & vaginal walls
- Large fetal chest relative to BPD
- Precipitous labor (absence of truncal rotation)
- Anterior shoulder impacts with symphysis pubis: "turtle sign"
Historic risk factors

- Diabetes
- Macrosomia
- Prolonged second stage
- Midpelvic operative delivery
- Oxytocin use
- Maternal obesity
- Postterm pregnancy
- Prior shoulder dystocia

Intrapartum Risk Factors

- First stage:
  - protraction disorders
  - prolonged deceleration phase
- Prolonged 2nd stage*
  - nullip: 3 hr. w/ reg. anesthesia or 2 hr. w/o
  - multip: 2 hr. w/ reg. anesthesia or 1 hr. w/o
- Mid-pelvic operative delivery


Shoulder Dystocia: Erroneous Assumptions

- Risk factors can always be identified prior to labor
- The presence of risk factors is highly predictive of shoulder dystocia

Shoulder Dystocia: Erroneous Assumptions (cont)

- Costs associated with planned cesareans to avoid shoulder dystocia are less than the costs associated with shoulder-dystocia-related injuries

American College of OB/Gyn Practice Patterns

Is Shoulder dystocia predictable?

- Ouzounian et al
- 1686 cases of SD over 10-yr period
- Oxytocin + Induction + BW > 4500 gm had OR 23.5 for occurrence of SD
- BUT,
- Sensitivity and PPV were 12% and 3%, respectively

Shoulder Dystocia & Fetal Macrosomia

Recurrent Shoulder Dystocia

- Prior studies show 3-16% risk for recurrent shoulder dystocia in subsequent delivery
- Largest study to date - Ouzounian et al.
  - 1,686 Shoulder dystocia cases
  - 263 underwent additional vaginal birth
  - Recurrence 3.7% - OR 7.4


Risk factors vs. “Predictors”

- Presence of one or more risk factors
  - Heightened awareness for potential shoulder dystocia
  - Review personal paradigm
  - Mobilize staff
- Current risk factors are not reliable predictors

Maternal Complications

- Postpartum hemorrhage (11%)
- 4th degree laceration (3.8%)
- Cervical tears (2%)
- Bladder atony
- Uterine rupture


Accoucheur Complications

- Tachycardia, sweating & terror
- Physical trauma
- LITIGATION!!
  - Norway (1988-97): 11% of claims (n=370)
    - Brachial plexus palsy: 75.6%
    - Cerebral palsy: 17.1%
    - Perinatal death: 7.3%


Neonatal Complications

<table>
<thead>
<tr>
<th>Author</th>
<th># SD</th>
<th>Death</th>
<th>Clav. Fr.</th>
<th>Trans. BPP</th>
<th>Perm. BPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gherman</td>
<td>285</td>
<td>0.35</td>
<td>9.5</td>
<td>16.8</td>
<td>1.4</td>
</tr>
<tr>
<td>McFarland</td>
<td>276</td>
<td>0</td>
<td>8.5</td>
<td>8.5</td>
<td>NM</td>
</tr>
<tr>
<td>Beall</td>
<td>99</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>NM</td>
</tr>
<tr>
<td>Bofill</td>
<td>21</td>
<td>0</td>
<td>4.8</td>
<td>9.5</td>
<td>0</td>
</tr>
<tr>
<td>Baskett</td>
<td>154</td>
<td>0</td>
<td>5.1</td>
<td>13</td>
<td>NM</td>
</tr>
<tr>
<td>Stallings</td>
<td>13</td>
<td>10</td>
<td>3</td>
<td>10.7</td>
<td>NM</td>
</tr>
<tr>
<td>Kees</td>
<td>56</td>
<td>1.8</td>
<td>3.6</td>
<td>21.4</td>
<td>NM</td>
</tr>
<tr>
<td>Keller</td>
<td>120</td>
<td>1.7</td>
<td>3.3</td>
<td>3.3</td>
<td>0.83</td>
</tr>
<tr>
<td>Nocon</td>
<td>185</td>
<td>0</td>
<td>7.5</td>
<td>15.1</td>
<td>0.54</td>
</tr>
</tbody>
</table>
ACOG – PROLOG

“27 y/o G2P1 comes to your office at 9 wks. Her prior pregnancy ended with vaginal delivery, 3750 gm male with Erb’s palsy. When discussing the likely outcome of her current pregnancy, you tell her that the most probable reason for the recurrence of Erb’s palsy as a result of shoulder dystocia is:”

ACOG – PROLOG

A. Size of the baby
B. Her development of gestational diabetes
C. Operative vaginal delivery
D. Forces of labor
E. Induction of labor

SD and BPP

- BPP often occurs in presence of SD
- Same factors that predispose to SD also predispose to BPP
- Association should not be equated with an absolute or causative link!
**Brachial Plexus Palsy**

- Birth Weight >4500 41%
- Diabetes 11%
- >2 hr Second Stage 14%
- Operative Vaginal Delivery 21%
- Shoulder Dystocia 94%


**Shoulder Dystocia and Neonatal Brain Injury**

<table>
<thead>
<tr>
<th></th>
<th>Injury</th>
<th>No injury</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cases</td>
<td>15</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Head/should.</td>
<td>10.6 ± 3.0</td>
<td>4.3 ± 0.7</td>
<td>0.03</td>
</tr>
<tr>
<td>Birthweight</td>
<td>4562 ± 157</td>
<td>4709 ± 145</td>
<td>0.49</td>
</tr>
</tbody>
</table>

A head/shoulder interval of > 7 minutes had a sensitivity of 67% for predicting brain injury.


**Management - Shoulder Dystocia Drill**

- No sequence or combination of maneuvers proven definitively "superior"*
- McRobert's maneuver reasonable first-line maneuver.
- Well-organized and rehearsed sequence is most important.
- Summon help, remain calm, initiate maneuvers.

*ACOG Practice Bulletin, 2002

**Management**

- McRobert's maneuver
- Suprapubic pressure
- Proctoepisiotomy?
  - Clinician's best judgement
- Wood's/Rubin's corkscrew
- Posterior arm extraction
- Zavanelli
- Other maneuvers

**McRoberts Maneuver: Benefits**

- Straightens maternal sacrum relative to lumbar spine
- Cephalic rotation of symphysis pubis
- Enhances passage of posterior shoulder over sacrum

**X-ray Analysis of the McRoberts Maneuver**

<table>
<thead>
<tr>
<th>Inclination Angle</th>
<th>Lithotomy</th>
<th>McRoberts</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symphysis to sacral promontory</td>
<td>38.2 ± 1.96</td>
<td>51.5 ± 2.03</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Around L5</td>
<td>27.1 ± 5.26</td>
<td>25.6 ± 5.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Around symphysis</td>
<td>56.7 ± 1.75</td>
<td>38.7 ± 2.2</td>
<td>0.001</td>
</tr>
<tr>
<td>L5 &amp; upper sacrum</td>
<td>133.7 ± 2.25</td>
<td>140.1 ± 2.12</td>
<td>0.04</td>
</tr>
</tbody>
</table>


**McRoberts Maneuver: Benefits**

- Opens pelvic inlet to maximal dimension
- Pelvic inlet brought perpendicular to maximum expulsive forces
- Reduces shoulder extraction forces and brachial plexus stretching

Gonik B. Obstet Gynecol 1989;74:44-7

**McRoberts Maneuver**

- McRoberts’ alone: 41.5% successful
- McRoberts + SPP and/or proctoepisiotomy: 54.2% successful


**Need for Additional Maneuvers**

<table>
<thead>
<tr>
<th></th>
<th>McRoberts</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=98)</td>
<td>(n=138)</td>
</tr>
<tr>
<td>Mat age (yr)</td>
<td>37.1 ± 6.4</td>
</tr>
<tr>
<td>Mat wt. (lb)</td>
<td>160.3 ± 19.4</td>
</tr>
<tr>
<td>EGA (wk)</td>
<td>39.7 ± 1.8</td>
</tr>
<tr>
<td>Birth wt (gm)</td>
<td>4024.5 ± 458.7</td>
</tr>
<tr>
<td>Epidural</td>
<td>14 (14.1%)</td>
</tr>
<tr>
<td>Active (min)</td>
<td>206.8 ± 259.1</td>
</tr>
<tr>
<td>2nd stage (min)</td>
<td>46.4 ± 44.4</td>
</tr>
<tr>
<td>Op. del</td>
<td>7 (7.1%)</td>
</tr>
<tr>
<td>Oxytocin</td>
<td>37 (38.7%)</td>
</tr>
</tbody>
</table>


**McRobert’s maneuver**

- Should we do it on every delivery?
- Complications can occur

**McRoberts Maneuver: Complications**

- Case #1:
  - 5 minute 2nd stage
  - Prophylactic McRoberts
  - 4314 gram infant
  - No shoulder dystocia
  - 5 cm symphyseal separation
  - Inferior displacement of pubic rami
  - Transient femoral neuropathy
McRoberts Maneuver: Complications

- Case #2:
  - 2 hr, 11 min second stage
  - Prophylactic McRoberts
  - 3598 gram infant
  - no shoulder dystocia
  - 5 cm symphysis separation
  - sacro-iliac joint dislocation
  - transient left fem. cutaneous neuropathy
  - ORIF & symphysis pubis fixation

Suprapubic Pressure
Delivery note

- “…head delivered over intact perineum. Turtle sign and shoulder dystocia encountered. Head replaced within uterus and patient taken for C-Section – see dictated operative report for details of surgery.”

Zavanelli Maneuver

- Sandberg (1999):
  - 92 reported cases
  - Zavanelli successful in 78 cases (85%)
- Severe maternal complications:
  - uterine infection
  - vaginal rupture
  - lower uterine segment laceration
  - uterine rupture


What next?

- All maneuvers used thus far unsuccessful
- Take a deep breath!
- Repeat maneuvers
- Still unsuccessful?

Gaskin Maneuver

- Initially described in 1976
- Bruner (1998):
  - 83% success rate (82 cases)
  - maternal morbidity: 1.2% (1 case PPH)
  - neonatal morbidity: 4.9%:
    - one infant with fx’d humerus
    - three neonates with low Apgar scores
    - no cases of BPP
  - average time to delivery: 2-3 mins


Gaskin Maneuver (cont.)

- Mechanism of action:
  - downward force of gravity
  - favorable change in pelvic diameter

Symphysiotomy

Emergency Symphysiotomy

<table>
<thead>
<tr>
<th>Birthwt</th>
<th>EGA</th>
<th>Mins</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>4075g</td>
<td>39</td>
<td>12</td>
<td>a) 4 u PRBCs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b) bladder neck &amp; proximal urethra laceration</td>
</tr>
<tr>
<td>3780g</td>
<td>37</td>
<td>13</td>
<td>c) urinary leakage @ 4 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>d) neonatal death on DOL #4</td>
</tr>
<tr>
<td>4820g</td>
<td>41</td>
<td>13</td>
<td>e) superficial serosal bladder laceration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>f) persistent post-partum urinary incontinence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>g) neonatal death on DOL #15</td>
</tr>
</tbody>
</table>


What about fundal pressure?

- Case-Control study (59 pairs):
  - Cases: infants with permanent Erb’s palsy & birth was complicated by SD
  - Controls: consecutive cases of SD in which infants had no BPP
  - Higher incidence of fundal pressure for cases:
    - 19/59 (32%) vs. 1/59 (2%)
    - OR = 27.5 (95% CI 4.0-1163.4), p < 0.001


What about fundal pressure?

- Fundal pressure may further aggravate anterior shoulder impaction.
- Our work does not support the use of fundal pressure in the management of shoulder dystocia.

Shoulder Dystocia: Summary

- An unpredictable, life-threatening condition
- A true obstetric emergency
- Maneuvers designed to ALLEVIATE shoulder dystocia
- Maneuvers designed to SAVE LIFE OF FETUS
- Summon help, initiate drill, work briskly using your own best clinical judgement/experience
- Consider well-designed training drills
- Document care thoroughly