Management of Neurogenic Bowel Dysfunction

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DEFECATION

• Delivery of colon contents to the rectum
• Rectal compliance and accommodation
• Responses of the anal sphincters
• Rectal and pelvic sensation
• Skeletal muscle responses
DEFECATION

• Normal defecation is the result of a complex interaction between the central nervous system, peripheral nerves, and muscles.
DEFECATION

• Transport of stool throughout the colon
  • Transit
    – Colonic motility
  • Stool consistency

• Filling of the rectum from the sigmoid colon
DEFECATION

• High pressure zone in anal canal (sphincters)

• Rectal distention initiates the rectoanal inhibitory reflex (RAIR). The relaxation of the internal anal sphincter, exposes the rectal contents to the highly sensitive anal mucosa.
DEFECATION

• At the same time that the RAIR occurs, there is simultaneous contraction of the external anal sphincter.

• Rectal distention is interpreted at a conscious level through stretch receptors located in the muscle of the pelvic floor, as a desire to defecate.
• If defecation is to be deferred, conscious contraction of the external sphincter, together with rectal compliance, provide time for recuperation of the function of the internal anal sphincter, and the process is deferred until it is socially acceptable.

• If defecation is to occur, the anorectal angle is opened, and an increase in the intrarectal and intrabdominal pressures result in reflex relaxation of the two sphincters, and defecation occurs.
Neurogenic Bowel Dysfunction (NBD)

- Loss of normal bowel function as a result of nerve injury, neurological disease, or congenital defects of the nervous system
  - myelomeningocele
  - tethered cord
  - spinal cord injury
  - multiple sclerosis

Worsoe, J., Rasmussen, M, Christensen, P., Krogh, K. Gastroenterology Research and Practice (2013)
DYSFUNCTION

• Problems with transit
  – Too slow or too fast

• Problems with anorectal function
  – Too weak; too open

• Problems with sensation
  – Very decreased or absent

• Problems with voluntary control
  – Inability to control
Anorectal Manometry
Anorectal Manometry
NBD Relaxation
SQUEEZE
Bowel Problems

- Not urgent
- Not life threatening

However as the children grow they become one of the most important aspects of the children’s care.

The social and medical impact that defecation problems have on children with spina bifida, their quality of life and their families can not be underestimated.

Lack of bowel control continues to be an important and socially devastating problem.
The type of bowel dysfunction is dependent on the level of the spinal lesion.
Level of Spinal Injury

- Children with lower MMC have abnormal amplitude and duration of the RAIR with no dose response curve.
- Children with higher MMC have abnormal amplitude with normal duration.
- The lower the spinal lesion the defecation problems are more difficult to control.
TREATMENT OBJECTIVES

• Prevent constipation and impaction
• Predictable-social continence
• Independence
Treatment Considerations

- Cognitive ability
- Physical function
- Lifestyle/patient preferences
- Goals
- Caregiver assistance
Stepwise Algorithm

- Lifestyle and Diet
- Oral Meds
- Rectal Therapy
- Transanal irrigation enemas
- Ace
- Sacral Nerve Stimulation
- Ostomy
Non-surgical Approach

Non-surgical interventions are successful in 60-90% of patients with NBD

Gor, R., Katorski, J., Elliot, S. (2016) *Current Opinion in Urology*
Lifestyle Modifications

- Toilet sitting
- Abdominal massage
- Dietary interventions
Oral Medications

- Consistency (soften/bulk)
- Osmotic
- Stimulant
- Secretogogue
Consistency

• Fiber
• Special mixture
  • Apple sauce
  • Prune juice
  • Unprocessed bran
• Colace
• Mineral oil
Osmotic Laxatives

• Miralax

• Milk of Magnesia

• Lactulose
Stimulant Laxatives

Bisacodyl

Senna
Lubiprostone (Amitiza)
Linaclotide
Fecal Incontinence

- Fiber
- Questran
- Loperamide
- Biofeedback
Rectal Interventions

- Digital Stimulation
- Suppositories and small volume enemas
- Enemas
- Transanal irrigations
Suppositories

Liquid glycerin suppositories
Cone Enema
Peristeen

- Improved social continence
- Decreased sitting times
- Improved quality of life scores
Peristeen
Peristeen
Surgical interventions

- MACE/Cecostomy
- Sacral nerve stimulation
- Fecal diversion
Antegrade Colonic Enemas (ACE)

• **Surgery:** Laparotomy or Laparoscopy
  – **Disadvantages:** Major surgery. Complications: stomal stenosis, leakage or difficulty with catheterization
  – **Advantages:** Can be done at the same time as the creation of a urinary conduit. There is no indwelling device

• **Percutaneous:** Radiology, Colonoscopy
  – **Disadvantages:** There is an indwelling device
  – **Advantages:** No major surgery
MACE

- Developed by Malone in 1990
- Combined antegrade enema with Mitrofanoff technique to form nonrefluxing catheterizable channel
Antegrade continence enema

Appendicostomy

Cecostomy

Malone 1990 Lancet
ACE

- Allows complete emptying of colon
- Gives predictability
- Independence
Antegrade continence enema
What is it?
Button appendicostomy
SIGMOIDOSTOMY

- Left sided cecostomy
ACE

• The use of tap water has been associated with hyponatremia, so it is preferable to administer saline.

• The type, volume, and frequency must be individualized for each patient although it usually varies from 400 to 2500 mL
ACE REGIMENTS

- Saline
- Golytely
- Glycerin
- Castile soap
- Bisacodyl enema solution
### ACE MYELOMENINGOCELE

<table>
<thead>
<tr>
<th>N=20</th>
<th>Before</th>
<th>6 months</th>
<th>16 months</th>
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<tbody>
<tr>
<td><strong>Fecal incontinence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>4</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>1-4 month</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Several/week</td>
<td>8</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>Psychosocial problems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Considerable</td>
<td>14</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>11</td>
<td></td>
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</table>

Global self esteem was improved
15-20% of patients continue to have problems after the ACE
## Results

### Complications

Other complications in literature:
- Stoma stenosis
- Wound infection
- Bowel obstruction from adhesions
- Hyperphosphatemia
- Appendicitis

<table>
<thead>
<tr>
<th>Complications (n)</th>
<th>Surgical (15)</th>
<th>Percutaneous (16)</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Tube leaking</td>
<td>6 (40%)</td>
<td>7 (44%)</td>
<td>1.00</td>
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<tr>
<td>Dislodged tube</td>
<td>3 (20%)</td>
<td>5 (31%)</td>
<td>0.69</td>
</tr>
<tr>
<td>Tissue granulation</td>
<td>9 (60%)</td>
<td>12 (75%)</td>
<td>0.46</td>
</tr>
<tr>
<td>Pain during irrigation</td>
<td>7 (47%)</td>
<td>9 (56%)</td>
<td>0.72</td>
</tr>
</tbody>
</table>
Meet the Newest Members of
The Motility Team
Sacral Nerve Stimulation

• Electrode placed through a sacral foramen between S2 and S4 (preferably S3)
• Stage I- 3 week percutaneous evaluation test-with evaluation of response
• Stage II-implantation of permanent pulse generator in gluteal pocket
• Decrease in fecal incontinence, may have an effect on NBD constipation
• Limited or no MRI exams can be performed in patients with an implanted stimulator
Fecal Diversion

- For severe refractory cases
- May simplify bowel care
- Helpful in patients with severe incontinence and skin breakdown
- Reduced time for bowel program
Questions?