Current Perspectives in Fecal Incontinence Treatment: The Use of Devices for the Management of Fecal Incontinence-An Evidence-Based Discussion

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An Evidenced-based Approach to the Management of Accidental Bowel Leakage

Pelvic Floor Disorders Week
October 14, 2015
Disclosures

- NICHD-grant support
- NIDDK-grant support
- Pelvalon-research and consultant support
- Kimberly Clarke-consultant support
- UpToDate-royalties
Objectives

- To become aware that there is FDA oversight of devices used for the treatment of gastroenterology-urology conditions
- Understand that barrier devices are those that allow passive control in the setting of accidental bowel leakage
- Become familiar with new device approaches to the management of fecal incontinence
- Look at current evidence and efficacy of devices for the treatment of fecal incontinence
FDA Definition of Devices

“an instrument, apparatus, implement, machine, contrivance, implant, in vitro agent, or other similar or related article, including a component part or accessory which is:

- recognized in the official National Formulary, or the United States Pharmacopeia, or any supplement to them,
- intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease, in man or other animals, or
- intended to affect the structure or any function of the body of or other animals, and which does not achieve its primary intended purposes through chemical action within or on the body of man or other animals and which is not dependent upon being metabolized for the achievement of any of its primary intended purposes”

Fed Regist 2015; 80:30931-3
Devices

- Until recently there was no requirement for makers of devices for the control of FI or ABL to provide robust efficacy data.
- The FDA recently issued a final order for the classification of rectal control system (Eclipse) into a class II (special controls).
- This will provide “a reasonable assurance of safety and efficacy of the device”.

*Fed Regist 2015; 80:30931-3*
Devices

- Passive approach to management of FI
- Disposable/Reusable
- Ease of insertion and removal
- Cost, variable
Current Treatment Options

Least Invasive

Medical Therapy

Behavioral Therapy

Treatment Gap

Most Invasive

RF Ablation

Sphincter Surgery

Artificial Sphincter

Injectable Bulking Agent

Sacral Nerve Stimulation

Medical Therapy

Behavioral Therapy
Systems

- Fecal and Bowel Management Systems (FMS/BMS)
- Latex-free, indwelling rectal catheters
- Typically comprised of a low-pressure retention balloon that holds the catheter in the rectum
- Soft flexible tube has a wide bore with the internal lumen of approx 22mm
- Tube passes through anus
- Irrigation ports
- Used to assist patient care givers in optimizing care of critically ill or incapacitated patients with diarrhea/fecal incontinence

Br J Nurs 2014; 23:881-85
Transanal Device: Anal Plug

- Two sizes (37mm and 45mm) evaluated in 20 patients (16 women, 4 men)
- Each plug tested for 2 weeks
- Patients completed a questionnaire after each size tested
- 14/20 (70%) could not tolerate
- 4/20 (20%) continued on a regular basis; 2 (10%) to use occasionally
- No preference for small/large in those who tolerated
- “Highly successful”
- No association between plug comfort and anorectal electrosensitivity testing; no predictors of successful use

**Devices**

**Peristeen Anal Plug**

- Coloplast UK
- Sizes small and large
- Soft foam surrounded by a water soluble film
- Film dissolves in 30 seconds
- Plug expands 3-4 times
- Can be left in for 12 hours
- eBay, $9.99
Transanal Device: Procon

■ **Indications**
  
  - Severe incontinence with failure of other treatment options
  
  OR

  - Unable or not interested in other options

■ **Contraindications**

  - Suture line in anal canal
  
  - Proctitis
Transanal Device: Procon

18 consented; 7/18 (39%) completed 14 day trial (14 consecutive days of use); 5 female, 2 male
CCFI Score>7, anorectal physiology testing, continence diary, modified FIQOL
5/7 (71%) complete satisfaction


<table>
<thead>
<tr>
<th>Patient</th>
<th>Pre-Procon</th>
<th>With Procon</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

Scale: 0=worst imaginable quality of life; 20=best imaginable quality of life
Transanal Devices
Procon 2®

- Single-use disposable balloon cuff, silicon catheter with an IR photo interrupter sensor and flatus vent holes at distal end connected to a pager and allows escape of gas
- Silicone balloon water-filled to 25-30 mL
- When stool enters rectum, photo-interruptor sensor sends signal indicating imminent BM.
- Voluntary evacuation by deflating balloon and removing catheter
Transanal Device: Renew Anal Insert

- A single-use, soft silicone anal insert for the management of ABL
- Top disc forms a seal at the top of the anal canal helping to prevent leakage of liquid/solid stool
- 2 top disc diameters (22 and 28 mm)
- Stem spans anal canal, bottom disc remains outside anal verge to help prevent displacement of the device up into the canal
- Designed to self expel during voluntary bowel movement, can also be manually removed
DESIGN:
- Multi-center, prospective, open-label, single-arm cohort
- At least weekly leakage of solid and/or liquid stool.
- Severity score – ABL severity scale (Wexner) ≥ 12 (max 20)
- 4 wk baseline → 12 wk continuous use → 4 wk return

OUTCOMES:
- Average daily ABL episodes
  - Weekly bowel diaries
- ABL severity scores - Wexner
- Satisfaction & ease of use
- Adverse events

SUCCESS
- ≥ 20 % reduction in ABL
- ≥10% reduction in severity
- Sample size = 76 subjects
  90% power
Results

- 91 eligible subjects \( \rightarrow 73 \) (80%) completed 12 wks
- 90% Women/Caucasian, 68.6 ± 12.1 yrs
- 7 (8%) withdrew for dissatisfaction with insert

- ABL frequency was reduced by 82% (p<0.001)
  - 8 IE/week to \( \rightarrow \) 1-2 IE/week
  - median 0.89/day \( \rightarrow \) 0.17/day
  - mean 1.13±0.85/day \( \rightarrow \) 0.29±0.38/day

- 92% ≥ 20% reduction in ABL frequency
- 78% ≥ 50% reduction in ABL frequency
- 9% (8/85) achieved total continence

Lukaczy et al, 2015
Daily ABL Episodes by Week

- Mean Daily ABL
- Median Daily ABL

- Baseline: N=85
- Week 1: N=79
- Week 2: N=77
- Week 3: N=75
- Week 4: N=73
- Week 5: N=74
- Week 6: N=73
- Week 7: N=71
- Week 8
- Week 9
- Week 10
- Week 11
- Week 12
- Return
Daily ABL Episodes by Week

- **Mean Daily ABL**
- **Median Daily ABL**

N=85, N=79, N=77, N=75, N=73, N=74, N=73, N=71

- 76.5% reduction
- 92.5% reduction
Daily ABL Episodes by Week

- Mean Daily ABL
- Median Daily ABL

Frequency of ABL

N=85  N=79  N=77  N=75  N=73  N=74  N=73  N=71

40% reduction
Results

- Mean ABL severity improved by 29.4% (p<0.001)
  - Median 16 → 11 (max 20)
  - Mean 16.2 ± 2.1 → 10.9 ± 4.481
  - 81% (62/77) achieved ≥ 10% reduction ABL severity
  - 75% (58/77) reduction both ≥20% frequency & ≥10% severity
  - 78% (57/73) were very or extremely satisfied
  - 91% rated their experience ≥8 out of 10.
- There were no serious adverse events related to insert use
  - 3 moderate AE in 2 subjects – Fecal urgency, soreness, bleeding hemorrhoids
  - Displacement in 23.9% resolved with expulsion
    - 60% (70/116) occurred in 2 subjects
Conclusions

- Convenient, safe and “effective” management strategy for individuals with ABL
- Comparable efficacy to more invasive approaches
  - 78% achieved >50% reduction ABL (Renew)
- If successfully fit, high satisfaction and low adverse event rates
- Alternative or adjunctive to invasive therapy
New Paradigm Device: Vaginal Bowel Control (VBC) System

- A non-surgical treatment option consisting of a vaginal insert and pressure-regulated pump
- Designed to offer a low-risk and easily reversible treatment for FI
- Dynamically controls bowels under user control
VBC System Components

**Device:**
- Dual-layer balloon: silicone surface, polyurethane bladder
- Flexible base composed of silicone and stainless steel
- Physician customizes pressure, balloon and base size to each patient

**Detachable Inflation pump:**
- Allows patient to deflate balloon for bowel movements
- Regulating valve caps balloon pressure
- Dedicated clinician pump (not shown) includes pressure gauge
Robust Clinical Evaluation

Feasibility 1
- 100 subjects fit with different iterations of the device
- Comfort & ease of use confirmed
- Excellent safety profile established

Feasibility 2

LIFE Study
- 61 subjects at 6 US centers
- Primary endpoint: Reduction in FI episodes measured by diary
- Population: 2+ events per week
- Duration: 1 and 3 month follow-up
- Results presented at AUGS-IUGA 2014 Richter et al, 2015

LIBERATE Study
- Current study of long-term use
- Next generation insert design
- ~120 subjects at 12-15 US centers
**Trial Design – LIFE Study**

<table>
<thead>
<tr>
<th><strong>Objective</strong></th>
<th>To evaluate the safety and effectiveness of the Vaginal Bowel Control System for the treatment of female fecal incontinence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Multi-center, prospective, open label clinical trial NCT01655498 (<a href="http://clinicaltrials.gov">http://clinicaltrials.gov</a>)</td>
</tr>
<tr>
<td><strong>Sites</strong></td>
<td>6 US sites</td>
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<tr>
<td><strong>Inclusion Criteria</strong></td>
<td>Females, age 19-75 years. ≥4 FI episodes on baseline diary (2/wk); major &amp; minor soiling only</td>
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<table>
<thead>
<tr>
<th><strong>Baseline Diary</strong></th>
<th>Fitting Period (May repeat)</th>
<th>Treatment Period Diary*</th>
<th>Optional Treatment Period Diary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 weeks</td>
<td>1 week</td>
<td>1 month</td>
<td>2 months</td>
</tr>
</tbody>
</table>

*Primary Outcome: Proportion of women obtaining ≥50% reduction of FI episodes

Secondary Outcomes: FIQOL, MMHQ, PGI-I, patient satisfaction, Adverse events
Results
Patient Flow

Consented (200) → Screen Failures (Pre-Fitting) (46)

Baseline Diary (154) → Ineligible by Diary: <2 episodes/wk (44)

Entered Fitting Period (110) → Fit Not Achieved and Other Screen Failures (Post-Fitting) (49)

Entered Treatment Period (ITT cohort) (61) → Study Discontinuations (3) → Unanalyzable Diaries (2)

Completed Treatment Period with no major deviations (Per Protocol Cohort) (56) → Completed Optional Treatment Period with analyzable diaries (44)
  - Unanalyzable diary (1)
  - Lost to follow-up during OTP (3)
## Patient Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N=61</th>
<th>Details</th>
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<tbody>
<tr>
<td>Age (years) [mean ± SD]</td>
<td>60.8 ± 9.4</td>
<td></td>
</tr>
<tr>
<td>Ethnic origin</td>
<td></td>
<td>(45) 74%</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td>(45) 74%</td>
</tr>
<tr>
<td>Black</td>
<td></td>
<td>(10) 16%</td>
</tr>
<tr>
<td>Body-mass index ≥30</td>
<td></td>
<td>(18) 30%</td>
</tr>
<tr>
<td>Previous gynecologic surgeries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>(29) 48%</td>
<td></td>
</tr>
<tr>
<td>Prior prolapse surgery</td>
<td>(5) 8%</td>
<td></td>
</tr>
<tr>
<td>Prior urinary incontinence surgery</td>
<td>(9) 15%</td>
<td></td>
</tr>
<tr>
<td>Parity [mean ± SD (range)]</td>
<td>2.1 ± 1.1 (0-4)</td>
<td></td>
</tr>
<tr>
<td>Post-menopausal (self-reported)</td>
<td>(51) 85%</td>
<td></td>
</tr>
<tr>
<td>Number of fecal incontinence episodes per 2-week period [mean ± SD (range)]</td>
<td>11.8 ± 9.1 (4-56)</td>
<td></td>
</tr>
</tbody>
</table>
### Outcomes

<table>
<thead>
<tr>
<th>Proportion of patients in <strong>Intent-to-Treat Cohort</strong> meeting primary endpoint</th>
<th>1 Month Treatment Period</th>
<th>Optional 3-Month Treatment Period</th>
</tr>
</thead>
</table>
| Proportion of patients in **Per-Protocol Cohort*** meeting primary endpoint | **78.7% (48/61)**  
(95% CI 66%, 88%)  
*p < 0.0001* | 86.4% (38/44)  
(95% CI 73%, 95%)  
*p < 0.0001* |

*5 subjects were excluded from PP analysis due to non-analyzable diary data (2), exited due to unrelated health issues (2), and withdrew consent (1)
Per Protocol

Success Rate by Improvement Range

<table>
<thead>
<tr>
<th>% of Patients</th>
<th>1 Month (N=56)</th>
<th>3 Months (N=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>41%</td>
<td>86%*</td>
</tr>
<tr>
<td>80%</td>
<td>29%</td>
<td>44%</td>
</tr>
<tr>
<td>60%</td>
<td>16%</td>
<td>13%</td>
</tr>
<tr>
<td>40%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td>16%</td>
</tr>
<tr>
<td>0%</td>
<td></td>
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*≥50% = Success Criteria

*86%* = Success Criteria

100% = Complete Remission
≥75%, <100% = Partial Remission
≥50%, <75% = Minimal Response
<50% = No Response
Quality of Life

**FIQOL Subscales**

- Lifestyle
- Coping Behavior
- Depression/Self Perception
- Embarrassment

**MMHQ subscales**

- Incontinence Impact
- Role Limitations
- Physical Limitations
- Social Limitations
- Personal Relationships
- Emotions
- Sleep/Energy
- Severity Measures

p≤0.008 for all subscales
Other Secondary Outcomes

- 86% of patients (48/56) reported control of their FI as being “Very much better” (57%) or “Much better” (29%) on the PGI-I question.

- 96% of patients reported at treatment completion that they found the Insert to be comfortable (48%) or could not feel it (48%).

- 98% reported they would recommend VBC system to a friend.

- Adverse Events:
  - No device-related serious adverse events
  - Most common, cramping or discomfort
  - 72% (67/93) of AEs occurred in Fitting Period
Examine the impact of the VBC system on parameters of bowel function that may assist in improving continence

- Frequency
- Urgency
- Stool consistency
- Evacuation
Reduction in Frequency

- At baseline, 12 subjects reported a high frequency of bowel movements (average of >2 per day), max avg 4.5/day
- After 1 month, 67% of these patients reported reduced frequency in bowel movements

**Bowel Movement Frequency**
*(Patients who were High Frequency at Baseline, n=12)*

- Experienced **Low** Frequency (<0.5/day)
- Experienced **Medium** Frequency (≤2, ≥0.5/day)
- Maintained **High** Frequency (>2/day)
Reduction in BM Urgency

% of Bowel Movements per Patient Associated w/ Urgency

Baseline: 54%
1-Month: 26%

*p<0.0001

*Associated with >25% of Bowel Movements
Change in Stool Consistency

% of Bowel Movements per Patient Reported as Liquid

Baseline: 36%
1-Month: 21%

*p = 0.0001

*Associated with >25% of Bowel Movements
Reduction of Incomplete Evacuation

% of Bowel Movements per Patient Reported Incomplete

39% Baseline

26% 1-Month

p = 0.003

*Associated with >25% of Bowel Movements
Characteristics Associated with Successful Fit

- Overall 110 consented women underwent attempted fitting of the device
- 61/110 (55.5%) successful
- Multivariable analysis revealed that previous prolapse surgery (p=0.007) and shorter vaginal length (p=0.041) independently associated with successful device fitting
- Women not undergoing previous prolapse surgery had OR 4.7 (95% CI 1.53, 14.53) of successful fit
- For every additional cm vaginal length, OR 1.49 (95% CI 1.02, 2.17) of successful fit

Conclusions

- VBC device is a new paradigm for treating FI
  - Low-risk and reversible
  - Dynamic control of the bowel
Clinical Significance of Devices

- All devices can be tried early in the treatment algorithm without eliminating other treatment options.
- Devices usually have some element of sizing, so optimizing fit may take time.
- Devices are mainly single-use except the Eclipse vaginal bowel control device.
- Use of inserts should not absolutely preclude an attempt at a behavioral approach (PFMT/biofeedback, dietary strategies, medications) or consideration of surgery treatment options (after a failed attempt at behavioral therapy).