**Background**

- “Orbeez®,” another water-absorbing bead remains available as a children’s toy.
- We sought to determine the extent to which “Orbeez®” enlarge in various liquid media and potential risk for pediatric bowel obstruction.

**Methods**

- Three “Orbeez®” SuperAbsorbant Polymer (SAP) beads of different colors (red, yellow, green) but of the same material were added to 210ml of the following liquid media:
  - Room Temperature Water
  - Whole Milk
  - Simulated Gastric Fluid (Ricca Chemical Company: 0.2% (w/v) NaCl in 0.7% (v/v) HCl)
  - GoLytely (Braintree Laboratories: PEG 3350 and Electrolytes)
  - Vodka (80 proof)
- Diameter prior to exposure to media were measured using a caliper to the nearest 0.1mm at 1h, 2h, 4h, 6h, 12h and 24h.
- An additional 10 beads were added to simulated gastric fluid and observed for additional 72h (96 h total) for clumping or additional growth.

**Results**

<table>
<thead>
<tr>
<th>Media</th>
<th>Diameter (cm)</th>
<th>Time (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.1</td>
<td>1h, 2h, 4h, 6h, 12h, 24h</td>
</tr>
<tr>
<td>Milk</td>
<td>0.1</td>
<td>1h, 2h, 4h, 6h, 12h, 24h</td>
</tr>
<tr>
<td>Gastric Fluid</td>
<td>0.1</td>
<td>1h, 2h, 4h, 6h, 12h, 24h</td>
</tr>
<tr>
<td>GoLytely</td>
<td>0.1</td>
<td>1h, 2h, 4h, 6h, 12h, 24h</td>
</tr>
<tr>
<td>Vodka</td>
<td>0.1</td>
<td>1h, 2h, 4h, 6h, 12h, 24h</td>
</tr>
</tbody>
</table>

- Growth was observed in all liquid media
  - The largest growth (11.5mm) was observed in Vodka at 24 hours
  - The least growth (3.7 mm) was observed in simulated gastric fluid
- No clumping was observed at any time
- No bead was greater than 12 mm in size at any time

**Conclusion**

- “Orbeez®” beads enlarge to a different extent in different liquid media
- Growth in simulated gastric fluid was minimal
- In-vivo growth expected to be less than that of pure water seen in this in-vitro study.
- It does not appear that “Orbeez®” swell to sizes that would be concerning for pyloric or intestinal obstruction:
  - Normal diameter of pediatric small bowel reported to be 2.5-3 cm
  - Pylorus may not permit passage of objects >1.5cm

2. NASPGHAN Postgraduate Course Updates on Common Problems and Hot Topics, Oct2011