Case Presentation

Georges E. Al khoury MD
Kings County Hospital Center
11/19/2004
Management of colonic Volvulus

Georges E. Al khoury MD
Colonic Volvulus

- **Volvulus**: *Volvere* (to Twist) = axial rotation of an organ around its pedicle.
- Mobile segments of the colon
- Infarction !! torsion of the vessels / closed loop obstruction
- 1% to 4% of all cases of intestinal obstruction and 10% to 15% of colonic obstructions (western countries)
- 20% to 50% of all intestinal obstructions (In Eastern Europe, Africa and Asia)
# Colonic Volvulus

<table>
<thead>
<tr>
<th>Location</th>
<th>Incidence</th>
<th>Mean Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigmoid</td>
<td>60-80%</td>
<td>70</td>
</tr>
<tr>
<td>Cecal</td>
<td>20-40%</td>
<td>50</td>
</tr>
<tr>
<td>Splenic &amp; transverse</td>
<td>4%</td>
<td>35</td>
</tr>
</tbody>
</table>
Colonic Volvulus predisposing factors

- Anatomic predisposition and pathologic distention of the colon.
- Colonic stasis with chronic distention and laxative abuse.
- High fiber diet (African communities)
- Pregnancy
- Ogilvie's syndrome, Hirschprung’s
- Megacolon (chagas’ disease hypothyroidism, parkinson, ....)
Sigmoid Volvulus

- In the US: pts of all ages with psychiatric or neurologic disease and elderly pts with debilitating diseases.
- The usual history is one of severe, chronic constipation
- Anatomically the sigmoid colon must be disproportionately long compared with its mesenteric base
Sigmoid Volvulus Clinical Features

- Early symptoms: intermittent cramping, lower abdomen pain, and progressive abdominal distention.
- Later come N, V, dehydration, obstipation.
- Similar episodes in the past that were terminated spontaneously by the passage of large amounts of flatus and stool.
Sigmoid Volvulus Clinical Features

- Pts characteristically are seen late in the course of their illness.
- Diffuse abd tenderness, distention tympany.
- Fever, abd tenderness, peritonitis suggests that strangulation is present.
- Perforation is unusual because the sigmoid colon in older pts is usually thickened.
Sigmoid Volvulus Diagnostic Strategy

- Institutionalized pt with an acute abdomen.
- Plain-film radiograph: “bent inner tube”, diagnosis 80%.
- Barium Enema: twisted “bird’s beak” or “ace of spades”.
- CT scan: mesocolon “whirl sign” gangrene?
Sigmoid Volvulus

- Massively dilated colon with a classic bent inner tube appearance emanating from the pelvis toward the RUQ
Sigmoid Volvulus by BE

- The contrast agent stops abruptly at the narrowed point of torsion in the colon.
- 5% reduction.
Sigmoid Volvulus

- Pathognomonic twisted "bird’s beak” or “ace of spades” deformity
Sigmoid Volvulus: History

- Papyrus Ebers from ancient Egypt: “if he does not evacuate it for a twist in the bowel and if the phlegm does not find a way out the it shall rot in the belly”
- Ancient Greece: purgatives were the first choice of treatment
- Hippocrates: 12 inch long suppository for relief of obstruction.
- 1859 Mr Gay: “with a tube per rectum the bowel could be relieved of its contents and rolling the body over the bowel would right itself”
- 1883 Atherton: the first successful American operative detorsion of the sigmoid volvulus
- 1989 Senn: enyerotomy in all cases, shortening of the mesentery sigmoidoplexy, resection w primary anastomosis
- 1905 Monihan: “anything over 10% mortality was the mortality of delay”
Sigmoid volvulus: 1947
Bruusgaard

- "the treatment may be either non operative or operative"
- 168 admissions of 91 pts, non operative reduction was attempted 148 times with proctoscopy and rectal tube succeeded 123 times. Total mortality for 91 pts was only 14.2%.
- Since Bruusgaard's article the approach in the US for sigmoid volvulus has been to first attempt non operative reduction.
Sigmoid Volvulus: Management

- Relief of obstruction and the prevention of recurrent attacks.
- Studies from large referral centers 1970-1980s
- Decompression with rigid or flexible endoscope is now considered the initial treatment of choice for pts without evidence of intestinal ischemia
- Success is achieved in 60% to 95% of pts
- Mortality rate 2%.
- Recurrence rate 40% to 90%.
- Mortality rates in the presence of gangrene are 25% to 80%.
- Spontaneous reductions: 2% of pts
Sigmoid Volvulus: Management

- The rectal tube has to pass the point of torsion (18 to 20 cm above the anus).
- Erect and supine radiographs of the abdomen are obtained to confirm the effectiveness of the procedure and to rule out pneumoperitoneum.
- The rectal tube can be removed 48 to 72 hours after reduction.
Sigmoid volvulus
Sigmoid Volvulus:
Endoscopy

- Flexible fiberoptic endoscopy has facilitated decompression of the dilated and friable bowel.
- Total colonoscopy permits evacuation of bowel contents proximal to the site of the volvulus.
Percentage of pts in whom sigmoid volvulus was successfully reduced by non operative modalities in 19 American series totaling 596 pts

<table>
<thead>
<tr>
<th>Modality</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enemas</td>
<td>3</td>
</tr>
<tr>
<td>Barium enema</td>
<td>5.4</td>
</tr>
<tr>
<td>Proctoscopy</td>
<td>19</td>
</tr>
<tr>
<td>Proctoscopy and rectal tube</td>
<td>40.1</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>0.2</td>
</tr>
<tr>
<td>Spontaneous reductions</td>
<td>2.3</td>
</tr>
<tr>
<td>Total 70.0</td>
<td>70</td>
</tr>
</tbody>
</table>
SURGICAL MANAGEMENT
Acute Sigmoid Volvulus

- Failed decompression, fever and leucocytosis, intestinal ischaemia, perforation or peritonitis.
- Gangrenous colon in industrialised countries <10%, 25% in developing countries.
- Gangrenous colon requires immediate excision.
- Untwisting is not advised.
- Colostomy and mucous fistula or Hartmann’s procedure.
- Mortality: primary anastomosis (0%-33%) v/s (0-50%) for colostomy.
Outcome following emergency resection for sigmoid volulus in series detailing the presence of gangrene

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Viable bowel</th>
<th></th>
<th>Gangrenous bowel</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Mortality (%)</td>
<td>Number</td>
<td>Mortality (%)</td>
</tr>
<tr>
<td><strong>African Series</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shepherd (1969)</td>
<td>389</td>
<td>8.0</td>
<td>36</td>
<td>47.0</td>
</tr>
<tr>
<td>Schagen (1985)</td>
<td>116</td>
<td>1.7</td>
<td>22</td>
<td>18.0</td>
</tr>
<tr>
<td>Ejumu (1985)</td>
<td>21</td>
<td>4.8</td>
<td>3</td>
<td>33.0</td>
</tr>
<tr>
<td>Sroujieh (1985)</td>
<td>20</td>
<td>10.0</td>
<td>3</td>
<td>33.0</td>
</tr>
<tr>
<td>Bagarani (1993)</td>
<td>10</td>
<td>5.8</td>
<td></td>
<td>21.0</td>
</tr>
<tr>
<td>Udezue (1990)</td>
<td>3</td>
<td>0.0</td>
<td></td>
<td>18.0</td>
</tr>
<tr>
<td><strong>Western Series</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drapanas (1961)</td>
<td>18</td>
<td>17.0</td>
<td>5</td>
<td>60.0</td>
</tr>
<tr>
<td>People (1990)</td>
<td>50</td>
<td>0.0</td>
<td>4</td>
<td>75.0</td>
</tr>
<tr>
<td><strong>Average mortality</strong></td>
<td>5.9</td>
<td></td>
<td>38.0</td>
<td></td>
</tr>
</tbody>
</table>
Outcome following emergency and elective resection for sigmoid volvulus in series of more than 20 patients undergoing surgery

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Emergency</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Mortality (%)</td>
</tr>
<tr>
<td><strong>African Series</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schagen (1985)</td>
<td>22</td>
<td>18.0</td>
</tr>
<tr>
<td>Bagarani (1993)</td>
<td>14</td>
<td>21.0</td>
</tr>
<tr>
<td>Mokoena (1995)</td>
<td>27</td>
<td>30.0</td>
</tr>
<tr>
<td><strong>Western Series</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arnold (1973)</td>
<td>25</td>
<td>44.0</td>
</tr>
<tr>
<td>Ballantyne (1982)</td>
<td>195</td>
<td>37.0</td>
</tr>
<tr>
<td>Bak (1986)</td>
<td>14</td>
<td>36.0</td>
</tr>
<tr>
<td><strong>Average mortality</strong></td>
<td><strong>31.0</strong></td>
<td></td>
</tr>
</tbody>
</table>
Elective Surgery for Decompressed Sigmoid Volvulus

- Resectional or non-resectional ??
- Traditional opinion is that resection of at least the sigmoid colon is mandatory.
- If associated with megacolon, total colectomy or subtotal colectomy is advised.
- Subtotal colectomy when dysmotility has been demonstrated preoperatively to involve the entire colon.
- Mortality of 21%
- Recurrence of 1.2%
Laparoscopic Resection

- Laparoscopic resection of the sigmoid colon for decompressed sigmoid volvulus may be a useful alternative in high risk patients or in the elderly who may not tolerate conventional colonic surgery.
Colopexy

- Advantage of not requiring resection of the sigmoid colon, not requiring bowel preparation.
- Mortality is 11%
- Recurrence is 22%.
- Percutaneous endoscopic colopexy using PEG Kit
Series on management of viable bowel in sigmoid volvulus detailing resection and colopexy

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Resection</th>
<th>Colopexy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mortality (%)</td>
<td>Recurrence (%)</td>
</tr>
<tr>
<td>Welch (1987)</td>
<td>52</td>
<td>0</td>
</tr>
<tr>
<td>Hines (1967)</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Salim (1991)</td>
<td>13.0</td>
<td>0</td>
</tr>
<tr>
<td>Bagarini (1993)</td>
<td>16.0</td>
<td>0</td>
</tr>
<tr>
<td>Average</td>
<td><strong>21.0</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>
Mesosigmoidoplasty

- First described by Tiwary and Prasad in 1976
- Broadening the base of the mesosigmoid and reduction of its length
- Simple operation, low rate of operative morbidity and mortality.
- No likelihood of anastomotic leakage and sepsis.
- Undue post-operative constipation is not a problem
- Subrahmanyam’s series of 126 pts with an average f/u of 8.2 years, and a recurrence rate of 1.6% and no mortality.
- The lack of verification of Subrahmanyam’s results in other surgeons’ hands counts against its routine use.
Mesosigmoidoplasty
Extraperitonealization for Sigmoid Volvulus

- Recurrence free cure of sigmoid volvulus performed since 1968
- There is not enough freedom for the sigmoid colon to undergo torsion in the restricted space.
- Minimal complications, has low morbidity and mortality rate
- Suitable for elective and emergency situations
### Extraperitonealization: Cumulative Experience

<table>
<thead>
<tr>
<th>Author</th>
<th>n</th>
<th>Pts in f/u</th>
<th>f/y(y)</th>
<th>recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhatnagar</td>
<td>31</td>
<td>23</td>
<td>2.4</td>
<td>0</td>
</tr>
<tr>
<td>Khana</td>
<td>88</td>
<td>73</td>
<td>3.2</td>
<td>0</td>
</tr>
<tr>
<td>Avisar</td>
<td>11</td>
<td>10</td>
<td>4.5</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>106</td>
<td>3.1</td>
<td>0</td>
</tr>
</tbody>
</table>
Extraperitonealization for Sigmoid Volvulus
Extraperitonealization for Sigmoid Volvulus
Cecal volvulus

- First noted by Hiladenus in the 16th century and reviewed by Rokitansky in 1837
- 1% of all intestinal obstruction
- 18 to 44% of all colonic volvulus
- The incidence of 7.1 per million people per year
- The age and sex distribution of these patients have changed over the years and shifted toward older patients (mean, 53 years) and female predominance (female: male ratio, 1.4:1).
Cecal Volvulus

- Abnormal mobility of the cecum that results from improper developmental fusion of the mesentery of the cecum and the ascending colon with the posterior parietal peritoneum in the right gutter.
- 11.2% of the population has a cecum sufficiently mobile to allow the development of torsion (dissection of adult male cadavers by Wolfer et al, Northwestern University Medical School).
- 400 times as common as the clinical incidence.
- Donhauser and Atwell in a 1949 autopsy study found the cecum to be sufficiently mobile in 25.6% of cases to allow cecal bascule to occur.
- Incidence of previous abdominal surgery, adhesions.
- Marathon runners (congenital hypofixation coupled with a thin and flexible mesentery)
Cecal Volvulus

- Rotation of the hypermobile cecum, usually 360 degrees around the mesenteric pedicle of the ileocecal artery, produces a closed-loop obstruction
- Axial ileocolic volvulus 90% of the cases: the torsion is usually counterclockwise rotation in an oblique fashion also displacing the ileum.
Cecal Volvulus

- The clinical signs and symptoms are not specific:
  - Generalized abd pain 90%
  - Abd distention 80%
  - Constipation or obstipation 60%
  - Vomiting 28%
- The diagnosis is rarely made on the clinical grounds alone.
- The radiologic diagnosis can be made with confidence in 90% of cases.
Cecal Volvulus: Plain film

- Dilated cecum located anywhere in the abd, usually found in the epigastrium or LUQ,
- Kidney-bean shape
- The terminal ileum may be air filled and visualized in an abnormal position to the right of the distended cecum.
Cecal Volvulus: Plain film

- A single fluid level may be seen in the dilated cecum which may be seen located anywhere in the abdomen.
Cecal Volvulus :BE

- Contrast column may flow to the right colon, demonstrating the spiraling mucosal folds of the twist, or stop in a tapered beak like configuration.
- Accuracy (88%)
- Minimal complications.
Cecal Volvulus: Management

- There is no role for nonoperative management.
- Closed loop obstruction that involves variable lengths of small intestine!
- Surgery becomes urgent as soon as the diagnosis of a cecal volvulus is established.
- Nonoperative decompression by colonoscopy has been reported.
Cecal volvulus : Management

- At laparotomy determination of the viability of the bowel is the initial step in the management.
- The proportion of pts who present with a gangrenous cecum varies from 23 to 100%.
- Nonviable bowel requires immediate excision of the involved loop which can be achieved by right hemicolectomy.
- Untwisting under these circumstances is not advised, because it has been shown to result in irreversible septic shock.
- Primary anastomosis vs ileostomy must be based on the pt’s condition.
- Ileostomy and mucus fistula remain an option.
Cecal Volvulus: Management

- When the bowel is viable operative detorsion is the first step.
- Detorsion alone is not recommended, high recurrence rates 20-75%.
- Additional procedure to limit recurrence: resectional or non resectional.
- Resection: Right hemicolecction followed by primary anastomosis.
Cecal Volvulus: Management

- Non resectional procedures: cecopexy and cecostomy
- **Cecopexy**: anchoring the right colon to the parietal peritoneum prevent recurrence by eliminating prerequisite hypermobility.
- The average recurrence is 16% (0%-40%)
- Safe procedure, low mortality (0% to 18%).
- Laparoscopic cecopexy has been reported with no recurrence after follow-up.
Cecal volvulus

- **Cecostomy**: placement of cecostomy tube through a small incision on the cecal wall bringing the cecum to the anterior abdominal wall and bringing the tube through a small incision to the skin.
- Advantage: decompressing the distended segment.
- Threatening complications: gangrene, cecal necrosis, intraperitoneal leakage, fistula
- Recurrence of 2 to 14%.
- Mortality rates: 0 to 40%.
- Cecostomy and cecopexy are advised in cases where the cecal wall is healthy and of normal thickness.
- Combined cecopexy and cecostomy has been performed with no recurrence and no mortality, 7 cases reported.
## Outcome of Resection in pts with cecal volvulus

<table>
<thead>
<tr>
<th>Author</th>
<th>n</th>
<th>Overall mortality %</th>
<th>n</th>
<th>Viable mortality</th>
<th>n</th>
<th>Nonviable mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before 1990</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ballantyne 1985</td>
<td>39</td>
<td>17</td>
<td>24</td>
<td><strong>12</strong></td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Anderson 1986</td>
<td>33</td>
<td>32</td>
<td>14</td>
<td><strong>21</strong></td>
<td>19</td>
<td>37</td>
</tr>
<tr>
<td>Pahlman 1989</td>
<td>17</td>
<td>24</td>
<td>14</td>
<td><strong>4</strong></td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td><strong>After 1990</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geer1991</td>
<td>11</td>
<td>0</td>
<td>ns</td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Hiltunen1992</td>
<td>11</td>
<td>9</td>
<td>2</td>
<td><strong>0</strong></td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Gupta1993</td>
<td>11</td>
<td>18</td>
<td>2</td>
<td><strong>0</strong></td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Tuech1996</td>
<td>22</td>
<td>9</td>
<td>10</td>
<td><strong>0</strong></td>
<td>12</td>
<td>17</td>
</tr>
</tbody>
</table>
Cecal Volvulus

- Conclusion:
- Emergency operation is more the rule, because nonoperative decompression is not usually possible.
- Resection and anastomosis is the favored option for both gangrenous and viable bowel.
- Cecostomy and cecopexy seem poorer alternatives although they have a role to play in unstable high risk pts.
Cecal bascule

- Bascule: (French seesaw) describes a type of balanced drawbridge
- The redundant mesentery or the hypofixation, in combination with massive distention allows the cecum to fold on itself.
- Subsequently adhesions form between the anterior abd wall of the cecum and ascending colon resulting in basculation.
- The presence of previous abd surgery especially appendectomy, is more often associated with cecal bascule.
Cecal bascule

- The cecum rotates in a horizontal plane anteriorly upward with the obstruction at the point of folding.
Cecal Bascule

- Massively dilated cecum extending from the right lower abdomen across the midline toward the left side.
- Neither the typical coffee-bean sign associated with cecal volvulus nor the bird’s beak sign of sigmoid volvulus are present because there is no axial torsion of the bowel.
Transverse colon volvulus

- It was first reported in 1932 by Kallio.
- 1 to 4% of colonic volvulus.
- Younger population in their fourth decade.
- Twofold female predominance.
- Previous abdominal surgery and a history of chronic constipation.
- Preoperative diagnosis is difficult.
- Redundant transverse colon segment is noted at surgery.
- Colonoscopic decompressions have been reported.
- Operative strategy: resection or some form of colopexy, to the abdominal wall and/or pelvis.
Splenic flexure volvulus

- The least common site of volvulus
- 1 % in published American series
- Congenital absence of any of the ligaments or injury to them during abdominal surgery predispose the pt to volvulus.
- Complete absence of all three ligaments was reported in two pts
- Fixation or resection of the splenic flexure
- Colopexy of the splenic flexure has not been reported
- Splenic flexure colostomy which provided decompression and fixation