Postoperative suture insufficiency in bariatric surgery: frequency, management and socio-economic effect.

Poster No.: C-1510
Congress: ECR 2012
Type: Scientific Exhibit
Authors: E. Laurencikas, K. Lind; Stockholm/SE
Keywords: Gastrointestinal tract, Abdomen, Stomach (incl. Oesophagus), CT, Fluoroscopy, Dynamic swallowing studies, Barium meal, Fistula, Acute, Cavitation
DOI: 10.1594/ecr2012/C-1510
Purpose

Obesity is a global and steadily increasing problem in a modern western society. It has been growing exponentially and it has reached epidemic proportion during past two decades. According to the World Health Organization globally in 2005 there were 1.6 billion overweight and at least 400 million obese people (1). Western societies are affected more severely. Approximately two thirds of individuals living in the United States are overweight and about a half of those are obese (2). In England overall 24% individuals were obese in 2006 (3). In Australia the prevalence of obesity is similar estimating approximately 22% or 2.9 million adults (4).

There is a number of far reaching co-morbidities associated with obesity including hypertension, diabetes mellitus, ischemic heart disease, osteoarthritis and psychological morbidity. Obesity is a multi-factorial disease that is generally refractory to the diet and drug therapy but it responds well to the bariatric surgery, which is recognized as the only effective treatment for morbid obesity (2, 5). Several different surgical procedures including gastric banding, Roux-en-Y gastric bypass and sleeve gastrectomy has been used for morbid obesity. Laparoscopic Roux-en-Y gastric bypass is by far most widely accepted and used bariatric procedure that demonstrated several advantages including less blood loss, less pain medication, shorter hospitalization time, shorter return to daily activities and fewer complication as compared with open procedure and other surgical techniques (6). Several studies also showed that this procedure provides better weight loss and co-morbidity improvements (7).

Roux-en-Y gastric bypass procedure has, however, several complications. One of the most severe and potentially devastating complications associated with high morbidity and mortality is anastomotic leakage. The incidence of anastomotic leakage varies between 0 and 5.6% and accounts for approximately 37.5% of cases of death after bariatric surgery (8).

With this retrospective study we aimed to review the frequency, diagnostic procedures and management of anastomosis insufficiency after bariatric surgery in our institution. We also reviewed costs for diagnostic imaging and management of patients with postoperative anastomotic leakage.
Methods and Materials

Patients:

- Total 427 patients - 87 males and 340 females
- Mean age 41.3 years (range 20 to 67 years)
- Mean body mass index BMI = 44 kg/m$^2$ (range 37 to 57 kg/m$^2$)
- All patients operated with gastric bypass Roux-en-Y procedure (Fig 1.) during 2006-2007.

Patients' case histories including operation reports were retrospectively reviewed. Patients with postoperative anastomotic leakage underwent radiological workout of different extension including upper GI series and abdominal CT. We also retrospectively reviewed all these radiological examinations in close postoperative period.

Costs of the diagnosis and management of postoperative complications have been calculated. We also looked at the costs of the surgical obesity management in general and its socio-economic impact on the society.

Students T-test was used to calculate significance between laparoscopic and open surgery groups.
Fig. 1: Schematic presentation of Roux-en-Y gastric bypass procedure.

Results

Sixteen patients (3.7%), 4 males and 12 females, have suffered from postoperative suture insufficiency. Nine of these patients were operated with laparoscopic and 7 patients with open procedure. Average body mass index (BMI) of the group was 44 kg/m$^2$ (ranging between 37 and 57 kg/m$^2$).

The anastomotic leakage was diagnosed at the average time of 5 days (range between 1 and 14 days) after operation either by upper gastrointestinal series (UGIS) (n=12) or abdominal CT (n=4) as demonstrated in Fig 2 and 3. In 7 patients complications were demonstrated at the first examination either with UGIS (n=5) or CT (n=2). In 9 patients initial examination including UGIS in 7 and abdominal CT in 2 patients failed to demonstrate anastomotic leakage. The complication in these patients was detected later with repeated abdominal CT (n=3) and UGIS (n=6). On average, our patients underwent 4 radiological examinations (ranging between 1 and 8) to diagnose postoperative suture insufficiency.

There was no significant difference between patients after laparoscopic and open surgery regarding BMI, age, time of the postoperative anastomotic leakage or extension of postoperative diagnostic imaging. Postoperative stay at the hospital for management of the complication was longer for the patients after open procedure (mean n= 25 days) compared with patients after laparoscopic surgery (mean n= 14.5 days), the difference, however, did not reach statistical significance (p=0.1).

The complication was treated by repeated surgery (n=10) including re-suturing, resection of necrotic bowel loop, laparoscopic gluing of the anastomosis (n=4), stenting of anastomosis (n=7), ultrasound-guided drainage (n=3), and conservative treatment with antibiotics (n=3) as presented in Table 1.

All patients survived the bariatric surgery and recovered from this complication spending on average 19.2 days (ranging from 2 to 50 days) at the hospital for management of early anastomotic leakage.

We also calculated costs of diagnostics and management of postoperative extraluminal anastomotic leakage as well as preliminary short time costs of treatment of obesity. Data is presented in Table 2.
Fig. 1: Schematic presentation of Roux-en-Y gastric bypass procedure.

### Table 1: Frequency, diagnostics and management of anastomotic leakage

© Radiology Dept., Danderyds Hospital - Stockholm/SE

<table>
<thead>
<tr>
<th>Frequency of anastomotic leakage</th>
<th>16 / 427 (3.7%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage diagnosed with:</td>
<td></td>
</tr>
<tr>
<td>Upper GI series</td>
<td>11/16 (69%)</td>
</tr>
<tr>
<td>Abdominal CT</td>
<td>5/16 (31%)</td>
</tr>
<tr>
<td>Management:</td>
<td></td>
</tr>
<tr>
<td>Surgical reoperation</td>
<td>10/16 (63%)</td>
</tr>
<tr>
<td>Gluing</td>
<td>4/16 (25%)</td>
</tr>
<tr>
<td>Stenting</td>
<td>7/16 (44%)</td>
</tr>
<tr>
<td>US guided draining</td>
<td>3/16 (19%)</td>
</tr>
<tr>
<td>BMI</td>
<td>44 (37-57) kg/m²</td>
</tr>
<tr>
<td>Stay at the hospital</td>
<td>19 (2-50) days</td>
</tr>
</tbody>
</table>

### Table 2: Costs of management. * - numbers regard 16 patients with postoperative anastomotic leakage; ** - number regards all patients in the study.

<table>
<thead>
<tr>
<th>Total costs of management of complication (thousands euro)*</th>
<th>205</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>14.7 / 2.5 – 29.8</td>
</tr>
<tr>
<td>Per patient, average/range</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs of obesity management (thousands euro)*</th>
<th>381</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>23.8 / 11.6 – 44.4</td>
</tr>
<tr>
<td>Per patient, average/range</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs of diagnostic imaging (thousands euro)*</th>
<th>23.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1.5 / 0.4 – 2.8</td>
</tr>
<tr>
<td>Per patient</td>
<td></td>
</tr>
</tbody>
</table>

| Hypothetical costs of routine postoperative upper GI series (thousands euro)** | 84.6 |

* - numbers regard 16 patients with postoperative anastomotic leakage; ** - number regards all patients in the study.
**Fig. 2:** Extraluminal anastomotic leakage showed by upper GI series.

© Radiology Dept., Danderyds Hospital - Stockholm/SE
Fig. 3: Postoperative anastomotic leakage and significant intraperitoneal accumulation of the contrast media demonstrated by abdominal CT.

© Radiology Dept., Danderyds Hospital - Stockholm/SE
Conclusion

1. **Complications after bariatric surgery are not uncommon.**
2. **Diagnostics and management of complications are expensive.**
3. **Early diagnosis and right choice of management are crucial for improvement of therapeutic outcome and cost-effectiveness.**

Frequency of postoperative suture insufficiency in our study was 3.7%, which is consistent with previously published data reporting the frequency varying from 0 to 5.6% (8-12). No death cases were registered in early postoperative period. Our study, however, demonstrated that diagnostics and management of postoperative complications of bariatric surgery, in particular postoperative anastomotic leakage is important medical and socio-economic issue with growing number of obese patients. Our estimation shows that management of postoperative suture insufficiency may cost up to 30 000 euro per single patient. This number increases dramatically when calculating total costs of obesity management including bariatric surgery, diagnostics and management of complication, absent income and production during hospitalization and rehabilitation.

The method of choice to diagnose the anastomotic leakage was UGIS. Sometimes abdominal CT was required to diagnose the leakage, its extension and also other postoperative complications. Abdominal CT, however, carries additional costs and radiation. Some authors suggested routine postoperative examination of upper gastrointestinal tract as a useful and cost-effective measure (12). There are several controversial issues regarding routine postoperative upper GI examination including technical and methodological limitations, additional costs and difficulty to monitor contrast in the GI tract in extremely obese patients (6). An issue of additional radiation dose must be also considered. Our preliminary calculations imply that costs for routine UGIS for all patients in our study would be less than a half of the costs of the management of postoperative anastomotic insufficiency in our 16 patients. A randomized study could be warranted to assess the real economic effect.

Postoperative complications after bariatric surgery have not only an impact on general health and wellbeing of the patient and temporarily reduces the quality of life but also may increase the risk for late complications in a form of bowel obstruction due to post-inflammatory stenosis and adhesions.

Early diagnosis of complication, right choice and timing of therapeutic intervention is crucial to improve management results and cost-effectiveness.
References


Personal Information

Evaldas Laurencikas MD, PhD

e-mail: evaldas.laurencikas@ki.se