Review

Does closure of the mesenteric defects during antecolic laparoscopic gastric bypass for morbid obesity reduce the incidence of symptomatic internal herniation?

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Abstract

A best evidence topic in surgery was written according to a structured protocol. The question asked was whether the closure of the mesenteric defects during laparoscopic gastric bypass via antecolic approach for morbid obesity reduces the incidence of symptomatic internal herniation. 251 papers were found using the reported search strategy of which three papers best represented the answer to the question. All three studies showed that by closing the mesenteric defects, resulted in a reduction in the incidence of symptomatic internal hernias. One study showed there to be new complications arising from primary closure, but this was undetermined statistically. The evidence still however remains limited regarding the need for closure of mesenteric defects in gastric bypass operations. We recommend there is a need for large scale randomized control trials with suitable follow up for patients.

1. Introduction

A best evidence topic was constructed according to a structured protocol. This is fully described in a previous publication in the International Journal of Surgery.1

2. Clinical scenario

You are assisting your consultant in a laparoscopic antecolic Roux-en-Y gastric bypass operation on a morbid obese patient and observe your consultant not performing a closure of the mesenteric defects. You are aware that a major complication from laparoscopic gastric bypass is the formation of internal hernias and wonder whether the risk could be reduced by closing the mesenteric defects. After the procedure you resolve to check the literature to determine whether closing the mesenteric defects reduces the incidence of internal hernias in this patient group.

3. Three-part question

Does closure of mesenteric defects during antecolic, antegastric bypass reduce the incidence of symptomatic internal hernias?

4. Search strategy

Medline search (1950 to present) and Embase (1980 to present) was performed on the Advanced Healthcare Databases. Search was carried out freely with the words ‘gastric bypass and internal hernias’ and ‘gastric bypass and mesenteric defects’ and ‘gastric bypass and Petersen’s hernias’, and without any restrictions on the search as the category ‘any field’ was selected. The search was limited to English papers and included randomized and non-randomized trials. The search was current as of the 1st September 2012.

5. Search outcome

251 papers were found using the reported search. 109 were completely irrelevant, 100 articles discussed internal hernias and gastric bypass but not about prevention, 10 articles discussed formation of Petersen’s hernias as a consequence of gastric bypass, eight articles discussed prevention of internal hernias without closing the mesenteric defects and seven discussed the management of internal hernias after gastric bypass. Of the remaining 17 articles of which five were duplicates, six were abstracts, three were case reports so were all excluded, resulting in three articles representing the best evidence to answer the clinical question.

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6. Results

The results of the three papers (two prospective, one retrospective studies) are summarised in Table 1.

7. Discussion

Laparoscopic Roux-en-Y gastric bypass has a number of long term sequelae. One of these is internal hernias through mesenteric defects. For an antegastric, antecolic bypass the potential sites of herniation are at Petersen’s space (between Roux limb and the mesocolon) and at the mesenteric defect at the level of the jejunojejunostomy. These defects are thought to enlarge over time as the patients lose weight and herniation of the small bowel through these defects can result in obstruction, bowel ischaemia and perforation. In an attempt to reduce the incidence of these potential complications some surgeons advocate internal hernial defects should be closed. Others propose that closing defects itself can result in post-operative complications such as mesenteric bleeding and is, in any case, ineffective in preventing the herniation.

Rodriguez et al. carried a prospective study involving 359 patients who underwent laparoscopic Roux-en-Y gastric bypass over a four year period. In Group 1 (n = 187) patients underwent gastric bypass involving division of the jejunum and wide dissection of the jejunal mesentery. They closed the mesenteric defect after completion of the jejunojejunostomy but Petersen’s space was left open. In group 2 (n = 172) the jejunum was divided without dividing the mesentery. The jejunal mesenteric folds were nonetheless sutured together and Petersen’s space was closed. In group 1 there was a higher number of internal hernias causing small bowel obstruction than in group 2. The authors concluded that by closure of all defects significantly decreased the incidence of internal hernias.

Table 1

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type and level of evidence</th>
<th>Key results</th>
<th>Outcomes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodriguez et al. 2010</td>
<td>Total – 359</td>
<td>Level III Prospective, non-randomised</td>
<td>Internal hernias causing SBO (%)</td>
<td>Prospective outcomes (O vs C)</td>
<td>Time from LRYGB to bowel obstruction, months (15 vs 12.3, P not stated)</td>
</tr>
<tr>
<td>Mexico</td>
<td>O-187 (closure of jejuno-jejunal mesenteric defect-non-absorbable suture in running fashion, Petersen’s defect open) C-172 (closure of mesenteric folds-interrupted non-absorbable suture, closure of Petersen’s space-interrupted non-absorbable sutures)</td>
<td></td>
<td>(14.4% vs 1.1% P = 0.0001) Jejunojejunostomy hernias (n) (17 vs 2, P not stated) Petersen space, hernias (n) (10 vs 0, P not stated)</td>
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<tr>
<td>De La Cruz-Munoz et al. 2011</td>
<td>Total – 2079</td>
<td>Level IV Retrospective non-randomized</td>
<td>Incidence of symptomatic internal hernias (36 vs 1, P &lt; 0.001) Jejuno-jejunal defect (35 vs 0, P not stated) Petersen’s defect (6 vs 1, P not stated)</td>
<td>Retrospective outcomes (O vs C)</td>
<td>Incidence of small bowel obstruction (total) (%) (15.5% vs 1.1%, P not stated) Patients with internal hernias who presented with pain or bowel obstruction [5 (13.8%) vs 1, P not stated] Patients with internal hernias who presented with chronic, postprandial colicky upper abdominal pain [31 (86.2%) vs 0, P not stated]</td>
</tr>
<tr>
<td>Florida America</td>
<td>O-352 (open jejunojejunal defect, Petersen’s defect open) C-1727 (closure of the jejuno-jejunal defect-non-absorbable continuous suture, Petersen’s defect open)</td>
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<tr>
<td>Aghajani et al. 2012</td>
<td>Total – 4102</td>
<td>Level IV Prospective, non-randomized</td>
<td>Incidence of symptomatic internal hernias (4.7% vs 0%, P not stated) Jejunojejunostomy hernia (46 (3%) vs 0, P not stated) Petersen’s defect (28 (24%) vs 0, P not stated) Mesenteric defect without overt herniation but intermittent internal hernias (43 vs 0, P not stated)</td>
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<tr>
<td>Sweden</td>
<td>O-2472 (no defect closure) C-1630 (Petersen’s defect and jejunal mesenteric defect closure with Endo Universal stapler)</td>
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</table>
causing small bowel obstruction. The authors comment on the longer follow up in group 1 than group 2 resulting in limitations of the study, but justify this by the observation that most episodes of small bowel obstruction presented in the first 20 months. Although this study claimed to be testing the impact of closure of the Petersen’s defect, the lack of standardisation in regards to the management of the jejuno-jejunal mesenteric defect is a potentially significant confounding factor.

De La Cruz-Munoz et al.3 performed a retrospective review of 2079 laparoscopic Roux-en-Y gastric bypass operations performed from 2001 to 2009. From 2001 to 2003 patients had not received closure of mesenteric defects or Petersen’s defect. From 2003 to 2009 patients had complete closure of the jejuno-jejunal mesenteric defect using non-absorbable continuous suture but the Petersen’s space was left open. The authors found a significant increase in symptomatic internal hernias in group 1 than 2. The majority of these hernias were associated with jejunojejunal anastomotic mesenteric defects – which the authors prevented in group 2 using their technique of closure.

Aghajani et al.4 devised a prospective study involving 2472 patients who underwent laparoscopic gastric bypass from September 2005 to June 2010 who did not undergo any defect closure. A further 1630 patients were operated on between 2010 and 2011 where they were subjected to a new technique of closing both the Petersen’s and the jejuno-jejunal defects using an Endo Universal stapling device (Autosuture). The authors conclude that primary closure reduces the incidence of internal hernias but closure itself was associated with new complications; specifically an increased rate of obstruction at the entero-anastomosis. Limitations regarding the study include the limited follow up in the primary closure group in comparison to the open group. They mention the study as being ongoing and therefore will publish their long term results when follow-up duration has become appropriate for analysis.

The three studies showed there to be adverse effects from using their technique in closing the mesenteric defect however the statistical significance of this was unquantified.

8. Clinical bottom line

Although the majority of studies performed have shown there to be a reduced incidence of internal hernias in those patients who have had their mesenteric defects closed intra-operatively, there remains to be a need for high quality studies to truly establish a benefit from this technique.

Ethical approval
Not applicable.

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Author contribution
Nimalan Sanmugalingam: Literature search, analysis, writing.
Shiyam Nizar: Editing of manuscript.
Georgios Vasilikostas: Editing of manuscript.
Marcus Reddy: Editing of manuscript.
Andrew Wan: Editing of manuscript.

Conflict of interest
None declared.

References