Gastric partitioning for morbid obesity

D L MORRIS FRCS
Surgical Research Registrar
J R LEE FRCS
Consultant Radiologist
R M BADDELEY FRCS
Consultant Surgeon, The General Hospital, Birmingham

Key words: OBESITY; SURGERY; GASTRIC PARTITIONING

Summary
A consecutive series of 33 grossly obese individuals treated by gastric partitioning is described. There was no operative mortality. Weight loss at one year was 19% of original body weight and little loss occurred thereafter. Radiological assessment of the proximal compartment demonstrated progressive postoperative enlargement.

Introduction
The justification of surgical management of gross obesity is based more on the failure of dietary regimes than the success of surgery. Jejuno-ileal bypass (1) produces weight loss of around 30% of original body weight at one year rising to 36% at two years (2). The overall mortality is about 3% (3). The procedure has been criticised for a high risk of potential side effects such as hepatic dysfunction, diarrhoea, electrolyte disturbance, polyarthralgia and urinary calculus formation. Over the past 15 years gastric surgery has become increasingly employed as an alternative. Mason (4) in Iowa pioneered the field using a gastric bypass procedure which excludes 90% of the stomach, the proximal compartment emptying via a gastrojejunostomy; in the grossly obese it is technically a difficult operation. From it evolved gastroplasty (4, 5) in which the stomach is incompletely partitioned, the upper compartment draining via a narrow stoma to the remainder of the stomach. Gastric partitioning is a variant of this operation (6).

Method
All patients were investigated to confirm the simple nature of their obesity. Prophylactic anti-embolism stockings and subcutaneous heparin were used. The surgical technique involved transverse stapling of the stomach just below the cardia, the stoma being created by removing a total of three staples from each TA90 cartridge to produce a 1 cm gap in the staple line. The 50 ml volume of the upper compartment was measured prior to stapling with a balloon catheter passed by mouth. Two separate applications of the TA90 staples were made, particular care being taken to align the stoma site. A Salem sump tube was fed through the stoma to drain both compartments.

During the first six weeks after operation patients were given an 800 calorie high protein low carbohydrate fluid diet with iron and vitamin supplements. A similar solid diet was then introduced. As well as routine blood screening, repeated barium meal examinations were performed to assess upper compartment size.

Results
There were no deaths during the period of hospitalisation. The only death occurred 3 months postoperatively in a 32 year old male (preoperative weight — 267 kg). Post mortem examination revealed the stomach to be intact, and the stoma diameter was 2.2 cm. Death was ascribed to acute cardiac failure, not attributable to the operation.

The most serious postoperative morbidity was perforation of the anterior wall of the upper compartment, which is a relatively specific complication of gastric partitioning (7). This patient suddenly developed peritonitis on the fifth postoperative day but was successfully managed by simple closure. A negative laparotomy was done during the first postoperative day in another patient with suspected intraperitoneal bleeding. He made an uneventful recovery.

The weight reduction achieved is shown in Table 1. Mean preoperative weight was 123.5 kg and at one year post-operatively was 92.8 kg, a reduction of 19.4% of original mean body weight. After the first year however little further weight loss occurred (Fig).

Vomiting occurred frequently in those who defaulted on the fluid regimen but otherwise very few patients experience any problems. Quite severe epigastric pain sometimes radiating to the back was also often due to dietary indiscretion. One patient with severe gastro-oesophageal reflux with a pre-existing hiatus hernia responded well to a Collis type of repair done six months postoperatively. In marked contrast to the jejun-ileal bypass patients there have been very few late postoperative problems. Low serum iron levels were seen in 8 patients and low folate in seven. Liver function tests have on no occasion shown any deterioration; in all except one case a progressive improvement was seen. This supports the belief that this operation allows improvement of existing fatty change (8).

Table 1 Weight reduction following gastric partitioning

<table>
<thead>
<tr>
<th>Months post-operation</th>
<th>Pre-operation</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>28</td>
<td>23</td>
<td>13</td>
<td>18</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Mean wt (kg)</td>
<td>123.5</td>
<td>105.9</td>
<td>94.6</td>
<td>90.7</td>
<td>92.8</td>
<td>91.7</td>
</tr>
<tr>
<td>Mean wt loss (kg)</td>
<td>17.3</td>
<td>20.0</td>
<td>19.0</td>
<td>20.8</td>
<td>22.5</td>
<td>20.5</td>
</tr>
<tr>
<td>% of original wt lost</td>
<td>14.5</td>
<td>17.4</td>
<td>18</td>
<td>19.4</td>
<td>18.8</td>
<td></td>
</tr>
</tbody>
</table>
Radiological assessment of the proximal compartment was possible in 31 cases. The area (2 dimensional estimate) at up to 3 months postoperatively was 48.3 cm² (SD 17.2), whilst at 6 months it was 64.6 cm² (SD 12.7) and 83.6 cm² (SD 16) at 9 months. Of the 21 stomas measured the mean diameter was 12.3 mm, we could not demonstrate increase in stoma size with time although we suspect that it occurred in other members of the series.

Discussion
Gastric partitioning using the TA90 suture gun is technically easy, has fewer potential complications than jejuno-ileal by-pass and no postoperative metabolic sequelae. The weight reduction achieved however has not been as great and has ceased earlier than that associated with intestinal bypass. This may be explained by our radiological data which showed that the upper compartment increased in size with time thus allowing increasing quantities of food to be eaten.

The constant nibbling of high carbohydrate foods and drinks will always defeat the purpose of the operation in the poorly motivated patient. Hence the importance of careful case selection has to be emphasised.

The two most important facets of gastric surgery for obesity are the creation of a small gastric reservoir, constituted by the proximal compartment, and a small outflow stoma. Surgeons experienced in this field are agreed that the proximal compartment should have a capacity of 50 ml or less (8). The stoma should be no greater than 1.2 cm in diameter to ensure delay in emptying. To achieve this we now follow the technique of Laws (9) supporting the stoma with a ring of silastic tubing. Partitioning vertically, that is from the cardia parallel with the lesser curve, is more attractive than the transverse stapling used in the present series as it allows easier dilatation by endoscopy should it become stenosed.

Narrowing of the stoma may be as great a disadvantage as dilatation. The former will result in dilatation of the proximal compartment which allows greater food intake. This may cause vomiting but on the other hand may result in a gradual but steady stream of food into the gastrointestinal tract and premature cessation of weight loss.

Thus gastric plication, or gastroplasty, is an unforgiving procedure which demands careful case selection and strict attention to operative detail.

References