Resolution And Improvement Of Type 2 Diabetes Mellitus After Rygb

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Abstract

Introduction: Several studies have reported a dramatic improvement in type 2 diabetes mellitus (T2DM) just days after bariatric surgery, with a reduction of fasting glucose, serum insulin and rate of progression of the disease. Not all bariatric procedures are equally effective in resolving or improving T2DM. Bilio pancreatic diversion (BPD) series have reported a rate of 98.9%; Roux en Y gastric bypass (RYGB) series have reported a rate of 83.7% and a rate of 71.6% has been reported after Laparoscopic Adjustable Gastric Banding (LAGB). The aim of this study was to see rate of resolution and improvement of T2DM after RYGB. Materials and Methods: We performed a retrospective review and telephone survey of patients with a preoperative diagnosis of T2DM that underwent RYGB by two surgeons from 2001 to 2006 at our institution. 32 patients were successfully contacted and agreed to participate. We inquired in a short survey their current health status, weight, diabetes medications and other co-morbidities. The medical records were reviewed to gather additional information regarding hemoglobin A1c (HbA1c) and years diagnosed with T2DM. Results: 25 of 32 patients (78%) reported complete resolution, 6 of 32 patients (19%) reported improvement and 1 of 32 patients (3%) reported no effect. HbA1c decreased from 7.6±1.6 preoperatively to 5.5±1.6 postoperatively. p Conclusion: Bariatric surgery provides a significant and durable weight loss. Procedures like RYGB provide a dramatic improvement of T2DM. Patients in our study experienced a rapid resolution and improvement of T2DM with a decreased in the number of hypoglycemic agents used to treat the disease and lower HbA1c value.

Introduction

Type 2 Diabetes Mellitus (T2DM) is a chronic disorder characterized by hyperglycemia and associated complications. The worldwide prevalence has risen in the past few decades to almost epidemic proportions. The Centers for Disease Control and prevention (CDC) has reported that the prevalence in the United States has tripled in the quarter century between 1980 and 2005 and it’s estimated, that almost 7% (24 million) of the United States population suffers from this condition. There is a close association between T2DM and obesity. 80-90% of newly diagnosed diabetics are obese. Obese type 2 diabetics manifest a predominant insulin resistant profile, which is evident by a decreased expression of insulin receptors. Bariatric surgery has had the greatest impact in the treatment of obesity. Interestingly, obese type 2 diabetics have reported complete resolution of the disease within days after surgery. 80-98% of patients had a complete resolution of diabetes with Roux en Y-gastric bypass (RYGB) [1] or after biliopancreatic diversion with duodenal switch (BPD-DS)[2] while 70% of patients report resolution or improvement of T2DM after laparoscopic adjustable gastric banding (LAGB)[3,4]. The aim of this study was to see rates of resolution and improvement of T2DM in patients undergoing RYGB.

Methods

We performed a retrospective chart review and telephone survey on patients that underwent RYGB and had an associated diagnosis of T2DM between 2001 and 2006. 73 patients were deemed eligible to be included in the study. 32 patients had complete data and were included. The telephonic survey consisted of 9 different questions regarding complications related to the procedure, current health status, diabetic complications, current diabetic pharmacological treatment, weight, and status of other co-morbidities. Charts of patients included were reviewed for changes in levels of HbA1c, years diagnosed with T2DM and complications related to the procedure. T test was used to determine statistical difference in the studied variables before and after surgery.

Results

Mean age was 46±10 years, 10 were men and 22 were women, 17 patients were Caucasian, 10 were African American, 4 patients were Hispanic and 1 patient was Asian. All 32 patients underwent successful RYGB. 4 patients reported major...
complications related to the procedure that required prolonged hospital stay (anastomotic leak that required re-operation, internal hernia that required re-operation, anaphylactic reaction to the anesthetic that required intubation and pneumonia). No mortality was reported. Overall patients had 5.8±4.9 years diagnosed with T2DM and the pharmacological treatment included between 1 to 3 different hypoglycemic agents. The prevalence of obesity associated co-morbidities is summarized in table 1. After RYGB 78% of patients (25 of 32) reported complete resolution of T2DM, while 19% reported improvement (6 of 32) and only 3% (1 patient) reported no effect. The number of medications used to treat T2DM decreased from a mean of 1.8 ±1 medications to 0.3±1 (p ). Glycemic control improved dramatically in the study group evidenced by a decrease in HbA1c from 7.6±1.6 to 5.5±1 (p ).
Prevalence of obesity associated co-morbidities

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 2 diabetes mellitus</td>
<td>32</td>
<td>100%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>24</td>
<td>75%</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>16</td>
<td>50%</td>
</tr>
<tr>
<td>Obstructive Sleep Apnea</td>
<td>17</td>
<td>53%</td>
</tr>
<tr>
<td>Gastroesophageal Reflux Disease</td>
<td>5</td>
<td>16%</td>
</tr>
<tr>
<td>Joint Disease</td>
<td>11</td>
<td>34%</td>
</tr>
<tr>
<td>Asthma</td>
<td>5</td>
<td>16%</td>
</tr>
<tr>
<td>Depression</td>
<td>5</td>
<td>16%</td>
</tr>
</tbody>
</table>

The net weight loss observed was 45.3±23 kg and the change in BMI was 16±7.1 Kg/m².
The overall percentage of excess weight loss (%EWL) was 59.8±18 over a follow up
period of 43.8±27 months. Refer to table 2 for changes in weight after RYGB.
### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Pre-operative</th>
<th>Post-operative</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total weight</td>
<td>149.8±30.2</td>
<td>94.5±24</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>BMI</td>
<td>49.3±8.2</td>
<td>33.3±6</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
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