How soon do we achieve glycemic control after bariatric surgery? A comparative study among laparoscopic sleeve gastrectomy, mini gastric bypass, and diverted sleeve gastrectomy with ileal transposition

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Background

Type 2 diabetes mellitus became a global problem during recent decades, and unfortunately medical treatment fails to provide adequate control in many obese diabetics.

We aimed to perform a prospective comparative cohort study to investigate how soon patients achieve glycemic control after three different surgical options [sleeve gastrectomy (SG), mini-gastric bypass (MGB), diverted sleeve gastrectomy with ileal transposition (DSIT)] within the first 30 days postoperatively.

Methods

Medical charts of 251 obese, type 2 diabetic patients with a mean age of 52.84±8.52 were used to assess daily changes in weight and plasma glucose levels. Patients had a mean diabetic duration of 13.09±7.54 years, mean HbA1c of 8.82±1.58%, and a mean BMI of 36.04±5.76 kg/m². Surgery types consisted of SG (n=49), MGB (n=93) and DSIT (n=109). Primary end point was the day of mean fasting plasma glucose levels reaching below 126 mg/dl within 30 days after surgery.

Results

In the morning of surgery, mean fasting plasma glucose levels was 177.63±51.3 mg/dl, while on the 30th day, it was 131.35±28.7 mg/dl (p<0.05). According to the type of surgery, SG group did not achieve a mean plasma glucose level<126 mg/dl within the first 30 days, postoperatively. Mean plasma glucose level reaching < 126 mg/dl was achieved on day 29 for DSIT (124.36±20.21 mg/dl) and on day 30 for MGB (123.61±22.51 mg/dl).

Conclusion

We observed differences in glycemic control following different types of surgery within the first 30 postoperative days. Patients in the SG group did not achieve a mean plasma glucose level<126 mg/dl. Mean fasting plasma glucose levels<126 mg/dl were achieved on day 29 for DSIT and on day 30 for the MGB. Multivariate logistic regression analysis identified preoperative BMI and postprandial C-peptide level as independent predictors of postoperative glycemic control in the DSIT group.

Table 1: Type of medications used in all groups before surgery

<table>
<thead>
<tr>
<th>Medication</th>
<th>DSIT (n=109)</th>
<th>SG (n=49)</th>
<th>MGB (n=93)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAD only</td>
<td>21 (19.2%)</td>
<td>28 (57.1%)</td>
<td>17 (18.3%)</td>
</tr>
<tr>
<td>Insulin only</td>
<td>17 (15.6%)</td>
<td>4 (8.2%)</td>
<td>9 (9.7%)</td>
</tr>
<tr>
<td>OAD + insulin</td>
<td>71 (65.2%)</td>
<td>17 (34.7%)</td>
<td>67 (72%)</td>
</tr>
</tbody>
</table>

DSIT = Diverted sleeve gastrectomy with ileal transposition; SG = Sleeve gastrectomy; MGB = Mini-gastric bypass.

80.8% of patients in DSIT, 42.9% of patients in SG, and 81.7% of patients in MGB group were using insulin with/without oral antidiabetics (OAD) (p=0.001 for SG vs. MGB and DSIT, p=0.426 for DSIT vs. MGB). Note: 1 patient in the DSIT, and 4 patients in the MGB group were using OAD + insulin + GLP-1 analogue (Liraglutide).

Keywords

Bariatric surgery; glycemic control; sleeve gastrectomy; mini-gastric bypass; diverted sleeve gastrectomy with ileal transposition.