Perioperative results in the Canterbury pilot programme of public-funded weight loss surgery

In 2010 the Associate Minister of Health Tariana Turia announced a funding package that guaranteed 300 weight loss operations across New Zealand over 4 years. In response to this the Canterbury District Health Board committed to the development of a public-funded weight loss surgical service. Here we describe the initial perioperative results the pilot programme of a small cohort of patients undergoing laparoscopic adjustable gastric banding.

**Methods**—Patients were sourced from the Department of Endocrinology, Christchurch Hospital and selected by an independent committee that included a surgeon, a diabetologist, a GP liaison, and a hospital manager. The pre-surgical work-up consisted of a surgical, psychological and a dietician assessment before commencing a 2-week very-low-calorie diet (VLCD; up to 800 calories a day). All patients had a fitness plan designed in conjunction with an exercise specialist.

Laparoscopic adjustable gastric bands (LapBand AP, Allergan Inc., CA) were used for all patients and placed by a local surgeon (GC, RF, SK, RR) using a standard pars flaccida technique.

Perioperative complications were categorised as per the Clavien-Dindo classification system. Weight loss was expressed as mean total weight loss and percentage of excess body weight lost (using ideal body weight as per the Deitel & Greenstein formula). Glycaemic control was measured by the number of units of insulin used per 24 hour, HbA1c, C-peptide, and insulin resistance (using HOMA2 IR). The expenditure of insulin was used as a surrogate of potential health cost benefits of the programme. The cost of insulin usage was determined from PHARMAC Pharmaceutical Schedule September 2011.

All statistical analysis was performed by InStat version 3.0 (GraphPad Software Inc., San Diego, USA). All descriptive data is expressed as mean ± standard deviation.

This study was reviewed and approved by the New Zealand Health and Disability Ethics Committee (Upper South A Region/11/EXP/047).

**Results**—There were 13 patients (7 female; mean age was 39±6 years) that entered the pilot programme. The initial mean body weight was 131.0±15.0 kg, and initial mean body mass index was 43.3±2.3 kg/m².

Comorbidities are detailed in Table 1. There were nine patients (69%) taking regular insulin (mean total 70.1±38.5 units / 24 hour). Insulin was not used in the remaining four patients because of patient refusal (two patients), dangerous levels of non-compliance (one), and not clinically indicated (one). All but two patients were taking metformin. Only one patient was taking a thiazolidinedione preoperatively. The initial mean HbA1c was 7.9±1.7 %, mean C-peptide 1007.0±505.9 ng/mL, mean HOMA2 IR 2.8±1.8.
Table 1 Comorbidities in 13 patients in the pilot programme

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th>n</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Diabetes</td>
<td>13</td>
<td>100%</td>
</tr>
<tr>
<td>Retinopathy</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Nephropathy</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Neuropathy</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>9</td>
<td>69%</td>
</tr>
<tr>
<td>Polycystic ovary syndrome</td>
<td>5</td>
<td>71%*</td>
</tr>
<tr>
<td>Gastroesophageal reflux disease</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Hyperlipidaemia</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Depression</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Obstructive sleep apnoea</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Percentage of females.

All but one patient was compliant with the preoperative VLCD. Surgery was successfully completed in all 13 patients with no conversion to laparotomy. All patients were discharged to home the next morning.

Follow-up was complete for all patients at 6 weeks postoperative. There were no deaths during the study period, nor were there any grades 1 to 4 complications. There were no emergency department visits or any readmissions to hospital.

At 6 weeks all patients had experienced significant weight loss (Figure 1A and B) with a mean loss of 13.8±6.2 kg (mean 21±8 % excess body weight loss; p < 0.0001). The mean BMI at 6 weeks was 38.8 ± 2.6 kg/m².

Glycaemic control had significantly improved at 6 weeks (Figure 1C and D). Insulin usage decreased (70.1±38.5 units / 24 hour decreased to 12.7±16.9 units / 24 hour; p=0.0006) with five patients (55%) no longer taking insulin. There was no attempt to stop oral hypoglycaemics but the dosages were reduced; metformin usage was down from mean 2347±585 mg to 1694±1348 mg and glipizide usage had decreased from mean 20±17 mg to 2.5±5 mg. However neither of these reductions reached statistical significance (p=0.089 and p=0.0605 respectively). The HbA1c at 6 weeks had reduced by 1.0 % (down to 6.9±1.4 %; p=0.0127), insulin resistance had fallen by 32% (HOMA2 IR down to 1.9±1.0; p=0.0301). C-peptide remained relatively unchanged at 1091.5±397.4 (p=0.2647).
Figure 1. Weight loss and glycaemic control in 13 diabetic patients undergoing adjustable gastric banding

(A) Change in body weight for each patient.
(B) Change in body mass index for each patient.
(C) Change in HbA1c and insulin resistance for the entire cohort (mean + SD; initial = diagonal shading, 6 weeks postoperative = hatched shading).
(D) Change in insulin usage and metformin usage in the entire cohort (legend as per the previous graph).

The expenditure of insulin for the entire cohort of patients before surgery was $51.47 per day. At 6 weeks this had reduced to $14.28 a day. This equates to an ongoing saving of $1152.86 per month in insulin costs for this cohort of patients.

Discussion—This paper reports the initial perioperative findings of the Canterbury pilot programme of weight-loss surgery. The use of adjustable gastric bands resulted in no perioperative complications or deaths and induced significant early weight loss and diabetes control.

Our findings of good early results with no complications may be viewed with some incredulity but are consistent with published literature. In the Longitudinal Assessment of Bariatric Surgery study (LABS; a prospective, multi-centre observational study of 30-day outcomes following weight-loss surgery) there were no
deaths amongst 1198 patients having adjustable gastric bands. Only nine patients required re-operation and the rate of adverse events within 30 days was only 1%. The Michigan Bariatric Surgery Collaborative 2006–9 reports similar results with only 2 deaths amongst 5380 patients having laparoscopic adjustable gastric bands. In that series only 3% of patients visited the emergency department after their surgery; readmission rate was only 2% and re-operation rate just 0.63%. Similar results are described in European centres. However, it must be emphasised that some of the complications following adjustable gastric bands tend to occur several months after the surgery and can affect a significant proportion of patients. These will not be accounted for in this early report of perioperative results.

In conclusion the initial results of this pilot study are encouraging but are at a very early stage. Obesity surgery can be performed safely in the public setting but ongoing follow-up is needed to determine the long-term efficacy of this programme.

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References:


