

## Obesity

### Laparoscopic adjustable gastric banding: A cost-effective treatment for type 2 diabetes



Jonathan Pinkney,  
Consultant Physician,  
Royal Cornwall  
Hospital, Truro, and  
Senior Lecturer,  
Peninsula Medical  
School

**K**eating et al (summarised alongside) report that adjustable gastric banding (AGB) appears to be a cost-effective treatment for type 2 diabetes in obese people. This is the first economic analysis to be undertaken using data gathered from a rigorously designed

and conducted randomised controlled trial that compared AGB with conventional medical therapy for type 2 diabetes, showing that 73% of the surgically treated patient group achieved remission of diabetes (Dixon et al, 2008).

In a sister paper, Keating et al (2009) constructed a model projecting that AGB would remain cost-effective over the person's lifetime. Together, these papers clearly show that AGB is a safe and cost-effective method of controlling and achieving remission in selected people with type 2 diabetes.

While economic analyses are always difficult to undertake and interpret, partly because of the assumptions that have to be made, no previous economic comparison has been reported of bariatric surgery and conventional medical

care for type 2 diabetes, based on data from a properly designed prospective trial. These data, therefore, represent a very important advance in this field. The data are provocative, raising as many questions as they answer, not least whether other more invasive forms of bariatric surgery that are acknowledged to be associated with significantly greater operative mortality and potentially difficult long-term metabolic side-effects can usually be justified.

There remains a need for much better long-term outcome data to determine how the natural history of type 2 diabetes is altered by bariatric surgery, and to resolve controversies in this field. In the meantime, for selected patients, AGB supported by appropriate education and long-term aftercare is very clearly by far the safest form of bariatric surgery, and one now also shown to offer cost-effectiveness in the long-term treatment of type 2 diabetes.

Dixon JB, O'Brien PE, Playfair J et al (2008) Adjustable gastric banding and conventional therapy for type 2 diabetes: a randomized controlled trial. *JAMA* **299**: 316–23

Keating CL, Dixon JB, Moodie ML et al (2009) Cost-effectiveness of surgically induced weight loss for the management of type 2 diabetes: modeled lifetime analysis. *Diabetes Care* **32**: 567–74

### DIABETES CARE

### Weight loss surgery is a cost-effective option for managing T2D in obese people

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

**1** This 2-year randomised controlled trial carried out in Australia compared the cost-efficacy of laparoscopic adjustable gastric band (LAGB) surgery relative to conventional medical therapy (weight loss and behaviour change) for remitting recently diagnosed type 2 diabetes (<2 years duration) in 60 obese people.

**2** Costs of LAGB surgery, mitigation of complications, outpatient medical consultations, medical investigations, pathology, weight loss therapies, and medications were obtained from the trial database and patient medical records.

**3** By study end, 22 of 30 surgical therapy patients and 4 of 30 conventional therapy patients achieved remission of diabetes (fasting glucose <126 mg/dL and HbA<sub>1c</sub> <6.2% [ $<44$  mmol/mol] while taking no blood glucose-lowering therapy).

**4** Mean 2-year intervention costs per patient were 13 400 Australian dollars (AUD) for surgical therapy and 3400 AUD for conventional therapy; 85% of the difference was attributable to LAGB. Incremental cost-effectiveness ratio for surgical therapy, relative to conventional therapy, was 16 600 AUD per case of diabetes remitted.

**5** Medication costs were 1.5 times higher for conventional patients; outpatient consultation costs were three times higher for surgical patients.

**6** Weight-loss surgery would appear to be a cost-effective option for managing recently diagnosed type 2 diabetes in obese people.

Keating CL, Dixon JB, Modie ML et al (2009) Cost-efficacy of surgically induced weight loss for the management of type 2 diabetes. *Diabetes Care* **32**: 580–4

### DIABETES, OBESITY & METABOLISM

### New action of DPP-4 inhibitors in adipose tissue

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓✓

**1** Dipeptidyl peptidase-4 (DPP-4) inhibitors are an important new drug class, but their action is not fully understood. Besides delaying inactivation of incretin hormones, they may have other effects, such as delaying inactivation of the hormone neuropeptide Y (NPY).

**2** The authors of this study aimed to explore the effect of DPP-4

inhibition on the action of NPY in adipocytes. The effect of NPY on human adipocytes was studied in the presence of a DPP-4 inhibitor.

**3** DPP-4 was shown to be present in human adipocytes. The action of NPY was to suppress lipolysis, and this effect was enhanced by treatment with the DPP-4 inhibitor.

**4** The action of NPY appears to be regulated by DPP-4 in human adipose tissue. DPP-4 inhibitors augment the antilipolytic effect of NPY. The authors speculate that the lack of weight loss in people with type 2 diabetes treated with DPP-4 inhibitors might be explained by this new effect.

Kos K, Baker AR, Jernas M et al (2009) DPP-IV inhibition enhances the antilipolytic action of NPY in human adipose tissue. *Diabetes Obes Metab* **11**: 285–92

ARCHIVES OF  
INTERNAL MEDICINE**Even in later life,  
combined lifestyle  
factors lower the  
risk of diabetes**

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

**1** The combined impact of lifestyle risk factors on incidence of diabetes in older people is largely unknown.

**2** This large, prospective, cohort study investigated the relationship between combined lifestyle risk factors and incident diabetes over a 10-year period (1989–98) in a general population of older adults in the US.

**3** Participants comprised 4883 men and women ≥65 years enrolled in the Cardiovascular Health Study.

**4** Lifestyle factors evaluated were physical activity level, dietary habits, smoking habits, alcohol use and adiposity.

**5** The main outcome measure was incident diabetes (defined as new use of insulin or oral antidiabetes drugs), determined at annual visit.

**6** Each lifestyle factor was independently associated with new-onset diabetes after adjustment for age, sex, race, educational level and annual income.

**7** Each additional low-risk lifestyle factor lowered the incidence of diabetes by 35%. Participants with physical activity level and dietary, smoking and alcohol habits in the low-risk group had an 82% lower incidence of diabetes than all other participants.

**8** Ninety per cent of new-onset diabetes appeared attributable to these five basic lifestyle factors.

**9** Even in later life, combined optimal lifestyle factors markedly lower the incidence of diabetes.

Mozaffarian D, Kamineni A, Carnethon M et al (2009) Lifestyle risk factors and new-onset diabetes mellitus in older adults. *Arch Intern Med* **169**: 798–807

## DIABETES CARE

**All vegetarian diets  
protect against  
type 2 diabetes**

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

**1** This large North American study compared BMI and prevalence of type 2 diabetes in people following different types of vegetarian diet (vegan and lacto-ovo, pesco and semi-vegetarian) and non-vegetarians.

**2** Data were obtained from questionnaires completed by almost 60 000 Seventh-day Adventists.

**3** Mean BMI and prevalence of type 2 diabetes increased incrementally through the dietary groups, being lowest in vegans (23.6 kg/m<sup>2</sup>; 2.9%) and highest in non-vegetarians (28.8 kg/m<sup>2</sup>; 7.6%).

**4** All types of vegetarian diet were associated with a markedly lower risk of type 2 diabetes and lower BMI compared with non-vegetarian diets.

Tonstad S, Butler T, Yan R, Fraser GE (2009) Type of vegetarian diet, body weight, and prevalence of type 2 diabetes. *Diabetes Care* **32**: 791–6

AMERICAN JOURNAL OF  
CLINICAL NUTRITION**Low-fat vegan diet  
vs. conventional diet  
in type 2 diabetes**

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓✓

**1** This 74-week, randomised controlled trial compared the effects of a low-fat vegan diet and conventional diabetes diet (based on 2003 American Diabetes Association guidelines) on HbA<sub>1c</sub>, body weight and plasma lipids.

**2** Adults with type 2 diabetes were randomly assigned to a low-fat vegan diet (*n*=49) or conventional diet (*n*=50).

**3** Both groups achieved significant and similar weight loss, which was related to changes in HbA<sub>1c</sub> (*P*=0.001). HbA<sub>1c</sub> changes from baseline to last available value or last value before any medication adjustment were −0.40 and 0.01 for vegan and conventional diets, respectively (*P*=0.03).

**4** Both diets were associated with long-term reductions in weight and plasma lipids.

**5** After controlling for medication changes, the authors concluded that the vegan diet appeared to be more effective in controlling glycaemia and plasma lipids than the conventional diabetes diet.

Barnard ND, Cohen J, Jenkins DJA et al (2009) A low-fat vegan diet and a conventional diabetes diet in the treatment of type 2 diabetes: a randomized, controlled, 74-wk clinical trial. *Am J Clin Nutr* **89**(Suppl 1): 1588S–96S

## THE LANCET

**BMI strong predictor  
of overall mortality**

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓

**1** In this collaborative analysis of data from 57 prospective studies involving almost 900 000 adults, mortality was lowest at BMI 22.5–25 kg/m<sup>2</sup> in both sexes.

**2** Above this range, each 5 kg/m<sup>2</sup> higher BMI was associated with

about 30% higher all-cause mortality (40% for vascular; 60–120% for diabetic, renal and hepatic; 10% for neoplastic; and 20% for respiratory and for all other mortality).

**3** Obesity was strongly associated with diabetes, with sex-specific prevalence rising more than 5-fold over the full BMI range.

**4** BMI appeared optimal at 22.5–25 kg/m<sup>2</sup> in both sexes, and was a strong predictor of overall mortality above and below this range.

Prospective Studies Collaboration (2009) Body-mass index and cause-specific mortality in 900,000 adults: collaborative analyses of 57 prospective studies. *Lancet* **373**: 1083–96

**“All types of vegetarian diet were associated with a markedly lower risk of type 2 diabetes and lower BMI, compared with non-vegetarian diets.”**