Cost-utility of bariatric surgery for morbid obesity in Finland
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective was to evaluate the cost-effectiveness of bariatric surgery, compared with ordinary treatment, for patients with morbid obesity in Finland. The authors concluded that surgery for morbid obesity improved health-related quality of life, reduced the number of further treatments, and reduced the health care costs, compared with non-surgical treatment. The methods were satisfactory and they and the results were generally well reported. Despite some limitations, the authors' conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to evaluate the cost-effectiveness of bariatric surgery, compared with ordinary treatment, for patients with morbid obesity in Finland.

Interventions
Three methods of bariatric surgery (gastric bypass, gastric banding, and sleeve gastrectomy) were compared with usual care, which ranged from brief advice to intensive conservative treatment. There was a higher prevalence of type II diabetes in patients undergoing gastric banding, so usual care was subgrouped into those with baseline characteristics similar to gastric bypass and sleeve gastrectomy patients, and those with characteristics similar to gastric banding patients.

The analysis was conducted for all bariatric surgery patients, for each surgical technique, for usual care, and for the two usual care subgroups.

Location/setting
Finland/secondary care.

Methods
Analytical approach:
A decision tree was constructed, for the first year after the intervention, and a Markov model was used for the second to tenth years, to synthesise the effectiveness and cost data for morbidly obese patients, aged 43 years (35% men), from a population of five million people. The Markov model had four health states: dead, reoperation, abdominoplasty, and alive with no abdominoplasty and no reoperation. The time horizon was 10 years and the authors stated that the perspective was that of the health care provider.

Effectiveness data:
The effectiveness evidence came from relevant studies, hospital discharge registers, a large representative population survey, and expert opinion. The main clinical effectiveness estimates were the patients' reduction in body mass index (BMI), reduction in type II diabetes, recovery from sleep apnoea, and reoperation rates and mortality following surgery and abdominoplasty. The estimates for weight loss and reduction in BMI after surgery were from a published systematic review and meta-analysis. The rates of abdominoplasty were from hospital discharge registers, and the recovery from sleep apnoea was from a population health survey, in 2000. The reoperation rates, proportion of operations using each surgical technique, and surgical mortality were estimated by experts.

Monetary benefit and utility valuations:
The utility values were from the Finnish cross-sectional population health survey, in 2000, which used the 15-dimension health-related quality of life (15D) questionnaire. Regression analysis was used to account for potential confounders, including age, gender, BMI, prevalence of type II diabetes, and sleep apnoea.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the measure of benefit and they were discounted at an annual rate of 3%.

Cost data:
The cost categories included the average costs of the procedures and the annual average health care costs (excluding medications). Health care costs were based on data from the population health survey, in 2000, and regression analysis was used to account for potential confounders. The procedure costs were diagnosis-related group data from the National Institute for Health and Welfare. The price year was 2010 and all costs were presented in Euros (EUR). Future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
One-way and two-way sensitivity analyses were conducted to assess the impact on the results of uncertainty in the key parameters. A worst-case scenario was evaluated. The results were presented in tables.

Results
The estimated total health care costs were EUR 33,870 for bariatric surgery, EUR 33,379 for gastric bypass, EUR 34,594 for gastric banding, EUR 34,934 for sleeve gastrectomy, EUR 50,495 for usual care, EUR 42,070 for usual care matched to gastric banding, and EUR 50,667 for usual care matched to bypass and gastrectomy.

The total QALYs were 7.63 for bariatric surgery, 7.67 for gastric bypass, 7.39 for gastric banding, 7.57 for sleeve gastrectomy, and 7.05 for usual care, 7.19 for usual care matched to gastric banding, and 7.04 for usual care matched to bypass and gastrectomy.

Compared with usual care, the surgical interventions were dominant, as they were less costly and more effective. These results were robust to the variations in the sensitivity analyses and the worst-case scenario.

Authors' conclusions
The authors concluded that surgery for morbid obesity improved health-related quality of life, reduced the number of further treatments, and reduced the health care costs, compared with non-surgical treatment.

CRD commentary
Interventions:
The interventions were well described and all the relevant options appear to have been included; they were the three most common surgical techniques in Finland. These options and the comparator (usual care without surgery) are likely to be relevant in other settings.

Effectiveness/benefits:
The sources for the effectiveness data were referenced, and included randomised controlled trials and a meta-analysis, which should have been of high quality. They appear to have been relevant to the study setting, but the methods used to identify and select them were not reported, making it unclear whether the best available data were used. Few details of the sources were reported, and the original studies should be consulted to assess the validity of the data. The authors acknowledged that the 10-year time horizon might not have been sufficient to capture all the differences in costs and effectiveness. QALYs were an appropriate measure of benefit, as they capture morbidity and mortality and they allow comparisons with other diseases. The source and method used to derive the utility values were reported, but no further details were given.

Costs:
The cost data were from sources that appear to have been relevant to the Finnish setting. The costs appear to have been relevant to the stated health care perspective, but the costs of medications for surgical and medical morbidities were excluded. The authors acknowledged this might have underestimated the costs. Some costs were reported in tables, but the individual cost components and their resource quantities would have been useful for interpreting and replicating the
analysis. The time horizon, discount rate, currency, and price year were all reported.

Analysis and results:
The model structure was clearly reported, with the key modelling assumptions and a diagram. An incremental analysis was appropriate for synthesising the relative costs and benefits of the treatment options. The impact of uncertainty on the results was explored in one- and two-way sensitivity analyses, but a probabilistic sensitivity analysis could have more thoroughly investigated the overall uncertainty. The main results were well reported, but the sensitivity analysis results were not fully reported. The authors compared their results with those of other published studies that generally had similar findings. The results might be transferable to other settings with similar cost structures. The authors highlighted some key limitations of their study.

Concluding remarks:
The methods were satisfactory and they and the results were generally well reported. Despite some limitations, the authors' conclusions appear to be appropriate.

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