Cost-effectiveness analysis of laparoscopic gastric bypass, adjustable gastric banding, and nonoperative weight loss interventions

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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 two surgical procedures compared with non-surgical weight loss interventions. The authors concluded that both surgical procedures were cost-effective. Some aspects of the study were well done, but it is not clear if the authors’ conclusions were appropriate, because the data identification methods and the results were not reported in sufficient detail.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to evaluate the cost-effectiveness of two surgical procedures compared with non-surgical weight loss interventions in morbidly obese patients, with a body mass index (BMI) of 40 to 60kg/m^2, aged 35 to 55 years, and without obesity-related co-morbidity.

Interventions
The two surgical procedures were laparoscopic adjustable gastric banding (LAGB) and laparoscopic Roux-en-Y gastric bypass (LRYGB). These were compared with non-surgical weight loss interventions and with each other.

Location/setting
USA/secondary care.

Methods
Analytical approach:
The authors used a decision analytic model derived from a published model (Craig, et al. 2002, see ‘Other Publications of Related Interest’ below for bibliographic details) to determine the clinical outcomes, complications, and costs associated with each intervention. The model described the possible pathways in the first three years after surgery and projected the life expectancy and lifetime costs.

Effectiveness data:
The effectiveness data were derived from published evidence and supplemented by expert opinion. The major clinical endpoints were survival and weight loss.

Monetary benefit and utility valuations:
The utilities for each patient gender, age, and BMI were derived from the 1997 National Health Interview Survey.

Measure of benefit:
The measure of benefit was the quality-adjusted life-year (QALY) and future QALYs were discounted at 3%.

Cost data:
The medical costs associated with surgery were analysed. These included surgical fees, treatment of post-operative complications, follow-up care, and treatment of obesity-related diseases such as coronary heart disease, stroke, and type 2 diabetes. The cost data came from published literature, hospital charges derived from a national database (Healthcare Cost and Utilization Project), or expert opinion. All costs were reported in US dollars ($) and the price year was 2004.
Future costs were discounted at 3%. Cost estimates were adjusted for inflation using the Medical Care Component of the Consumer Price Index for All Urban Consumers.

Analysis of uncertainty:
- Deterministic one- and two-way sensitivity analyses were undertaken by varying the model inputs through ranges, some of which were taken from the literature and others were defined by the authors.

Results
In the LAGB base case (aged 35 years, with a BMI of 40kg/m\(^2\)) the incremental cost-effectiveness ratio (ICER) per QALY was $11,604 for men, and $8,878 for women. In the LRYGB base case, the ICER was $18,543 for men and $14,680 for women.

The results of the sensitivity analysis were presented graphically. The ICER was most influenced by the extent of weight loss, operation costs, rate of operative mortality, and frequency of band removal. In all cases, the ICER was less than $25,000 per QALY.

Authors' conclusions
The authors concluded that both operative interventions for morbid obesity were cost-effective and that LAGB was more cost-effective than LRYGB.

CRD commentary
Interventions:
A justification was given for the comparators used and they appear to have been relevant, in the authorsâ€™ setting.

Effectiveness/benefits:
- A comprehensive literature review, which is potentially a good source, was used for the clinical evidence, but no details of this review were reported. The methods used to select the published evidence were also not reported. Therefore it is difficult to ascertain if the best available evidence was used. Similarly, few details were reported on the method used to value the utilities. The transition probabilities were clearly reported and referenced. The benefit measure, QALYs, allows cross-disease comparisons to be made.

Costs:
All the relevant cost categories for the stated perspective appear to have been included. The unit costs and the resource quantities were presented separately and a breakdown of the cost items was reported. This will help with replicating the analysis in other settings. The sources of the cost data were reported for all categories. The sensitivity analysis investigated the issue of uncertainty surrounding the cost estimates. The price year was reported and discounting was appropriately performed.

Analysis and results:
The model structure was presented graphically. The incremental approach was appropriate for combining the costs and benefits, but the expected costs and benefits associated with each strategy were not reported. The impact of uncertainty was explored through one- and two-way sensitivity analyses, but probabilistic sensitivity analysis might have been more appropriate, given the range of uncertainty in multiple parameters. Some limitations of the analysis were also pointed out, such as the fairly short follow-up period and the potential overestimation of treatment effectiveness.

Concluding remarks:
Some aspects were well done, but it is not clear if the authors' conclusions were appropriate, because the data identification methods and the results were not reported in sufficient detail.

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