

Executive summary

1. Objectives

Based on the national representative survey data, Korean National Health and Nutrition Examination Surveys (KNHANES), the prevalence of obesity has been increasing in South Korea. The prevalence of obesity defined as having a BMI ≥ 25 kg/m² increased from 26.0percent in 1998 to 31.3percent in 2009. During the same period, the prevalence of severe obesity as having a BMI ≥ 30 kg/m² increased markedly (from 2.4 percent to 4.7 percent). It is well known that obesity is more common in people with lower socioeconomic status, but social support has been very limited. All health services for the treatment of obesity including bariatric surgery are not covered by national health insurance in South Korea. Therefore, the purpose of this study was to evaluate the cost-effectiveness as well as effectiveness and safety of bariatric surgery in severely obese Korean people. In addition, we assessed the overall social difficulties on people living with obesity. This study would be helpful to understand the need of social support for people with severe obesity.

2. Methods

1) Effectiveness and safety of bariatric surgery

We used the retrospective cohort design using medical chart review to investigate the effectiveness and safety of bariatric surgery compared with conventional therapy. We identified the 261 patients who underwent bariatric surgery and 224 patients who were treated by conventional therapy such as weight control medication and lifestyle modification therapy in tertiary medical center from Jan 2008 to Feb 2011. To investigate the weight loss, the percent weight change from baseline,

excess weight loss, excess Body Mass Index (BMI) loss, and absolute weight loss over time were calculated. The recovery from co-morbidity such as diabetes, hypertension, and dyslipidemia and the complication rates for bariatric surgery were also investigated.

The quality of life was investigated for the patients who re-visited the medical centers from Jul 2011 to Oct 2011 among patients who included in the retrospective cohort study. The instruments for quality of life were EuroQol-5D (EQ-5D), Impact of Weight on Quality of Life-Lite Questionnaire (IWQOL-Lite), Obesity-related Problem scale (OP-scale), and Moorehead-Ardelt Quality of Life Questionnaire II (M-AQoLQII).

2) Cost-effectiveness study for bariatric surgery compared with conventional therapy

The cost-effectiveness analysis was conducted using two models: decision model and decision-markov model. Model 1 was the decision model with a one year time horizon, and Model 2 was the decision-markov model over a lifetime horizon. Two models used different outcomes: effectiveness associated with weight loss in the Model 1 and quality adjusted life years (QALY) in the Model 2. In the decision-markov model, the starting age of cohort was 30 years old, and the health status was consisted of five states such as no comorbidity, mild/moderate comorbidity, severe comorbidity, death due to CVD, and death due to other cause. The cost data was collected from the survey of medical doctor who had conducted these obesity treatments and Korean national health insurance statistics. The effectiveness data of Model 1 was collected from retrospective chart review, and that of model 2 was collected from the data from literature, KNAHES, Korean death statistics as the input data of transition probability for five status and utility weight. Incremental cost-effectiveness ratio (ICER) of bariatric surgery compared to non-surgery interventions was calculated in severely obese people.

3) Impact of obesity on co-morbidities and suicide attempt

We applied cross-sectional design using 2007-09 KNHANES data was intended to see the impact of obesity for co-morbidities and suicide attempt. Co-morbidities were determined on the basis of self reports of having been diagnosed by a physician. Suicide attempts were investigated by asking those who acknowledged suicidal ideation whether they had ever attempted to commit suicide. Responses to the question were treated as dichotomous variables ("yes" or "no").

4) Qualitative research for obesity and Study of the knowledge, attitude, and practices in general practice

The qualitative research was conducted in 10 people with severe obesity to assess the cause of obesity, the social difficulties on people living with obesity, and the risk factors exaggerating the obesity. For this qualitative research, focus group interview and face-to-face interview were used. In addition, the survey of 100 general practitioners was conducted to see the knowledge, attitude, and clinical practice for the obesity treatment.

3. Results

1) Effectiveness and safety of bariatric surgery

The bariatric surgery consisted of Roux-en Y gastric bypass (RYGB) of 28.0 %, Laparoscopic Adjustable Gastric Banding (LAGB) of 27.6%, and Sleeve Gastrectomy (SG) of 44.4%. The percent weight change from baseline at 18 month was significantly higher in bariatric surgery group (22.6%, 95%CI: 19.1-26.0%) than conventional therapy group (6.7%, 95%CI: 4.4-9.1%). This pattern was consistent with other outcomes for weight loss. The recovery from co-morbidity such as diabetes, hypertension, and dyslipidemia was better in surgery group. The complication rate among bariatric surgery was reasonable; one case of death (0.38%) occurred in RYGB. The improvement in quality of life was significantly higher among bariatric surgery group compared with the

conventional therapy group.

2) Cost-effectiveness study for bariatric surgery compared with conventional therapy

Both models showed that bariatric surgery was cost-effective. In particular, cost-effectiveness study over lifetime indicated that bariatric surgery had higher costs (Incremental costs: USD1,521) and higher QALY (Incremental QALY : 0.86) through the base case analysis. Incremental cost effectiveness ratio (ICER) was USD1,771. Through the sensitivity analysis under a variety of assumption, robustness of the study results was also demonstrated.

3) Impact of obesity on co-morbidities and suicide attempt

Among 17,310 Korean adults, severely obese people showed significantly higher Odds Ratio (OR) for suicide attempt (OR: 2.14, 95%CI: 1.12-4.09) and for having a disease (OR:1.76, 95% CI:1.42-2.19), when compared with normal weight people.

4) Qualitative research for obesity and Study of the knowledge, attitude, and practices in general practice

Obese people thought that their own will to control weight, support from family and health care professionals, and social support such as national medical insurance were essential to control obesity. Through the survey of 100 general practitioners, they showed a reasonable level of interest in participating in obesity prevention and management, but they rarely conduct it for even severely obese people in clinical practice. They thought that the social support was very limited for severely obese people and the national medical insurance was essential method as the social support. But half of them could not distinguish the bariatric surgery from liposuction which has been used for cosmetic surgery to reform the body shape and most of them had lack of knowledge about the effectiveness and safety of bariatric surgery. Korean obesity guideline

recommends bariatric surgery as the unique treatment for severe obesity. The appropriate training for the obesity management is needed for better practice.

4. Discussion and conclusion

In conclusion, bariatric surgery had significant weight loss and improvement of quality of life, when compared with conventional therapy in patients with severe obesity. The recovery from co-morbidity such as diabetes, hypertension, and dyslipidemia was better in surgery group. The complication rate of bariatric surgery was reasonable; one case of death (0.38%) occurred in RYGB. The cost-effectiveness study over lifetime indicated that bariatric surgery was cost-effective alternative to conventional therapy, providing substantial lifetime benefits in severely obese people. In addition, both severely obese people and health care professionals thought that social support for severe obesity was very limited. Considering gaps between obesity management guideline and knowledge levels among general practitioners, the appropriate training for the obesity management is needed for better practice among general practitioners.