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ACADEMIC: REVIEW

Changing the shape of the nation:

Should bariatric surgery be publicly funded in New Zealand?

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ABSTRACT

Obesity is a growing health problem and bariatric surgery promises to be an effective treatment. Both medical and economic evidence seem to support the effectiveness of bariatric surgery. New Zealand can benefit greatly from more publicly funded bariatric surgery if given appropriate political support.

INTRODUCTION

In November 2009, Tariana Turia, a co-leader of the Maori party, underwent a gastric bypass operation at Wakefield hospital in Wellington.¹ She has since shown strong support for more publicly funded bariatric operations in New Zealand. Turia claims that as well as losing nearly 20 kilograms within three months, she stopped taking her diabetic medications almost instantly!¹

The issue of publicly funded bariatric surgery has multiple dimensions. It is not only a medical issue but a social, economical and political issue as well. Through literature research, this article has attempted to answer the question; should bariatric surgery be publicly funded in New Zealand?

BACKGROUND

Epidemiology

There are more than one billion people in the world who are clinically obese at present.² In 2008, for the first time in history, there were more

obese people than malnourished people in the world.² Not surprisingly, obesity is the second leading cause of preventable deaths in developed countries, second only to smoking.^{3,4,5}

Statistics from the United States of America (USA) estimated that 20 to 35% of Americans are obese.^{6,7,8} This is a considerable increase compared to the obesity rate of 13% in the early 1960s.⁸ Obesity has affected both the richest and the poorest, with the gap between obesity rates in different socioeconomic groups narrowing in recent years.⁸ In Canada, the prevalence has increased from 5.6% in 1985 to 14.8% in 1998.³ Reports from the United Kingdom (UK) estimated that by 2050, 60% of male and 50% of female adults in the UK will be obese, as well as 25% of children under the age of 16.²

In New Zealand, the prevalence of obesity has increased from 11% in the 1970s to 26.5% in 2007. Unlike in the USA, obesity has hit our lower socioeconomic group disproportionately, with 40% of those living in the most disadvantaged regions classified as obese.⁹

Effects

Effects of obesity are not only restricted to the well-known health-related problems such as cardiovascular diseases, Diabetes Mellitus (DM), obstructive sleep apnoea (OSA), arthritis and lowered life expectancy.^{3,4,7} Obesity has significant impacts on patients, both socially and psychologically. Obese individuals have higher rates of unemployment and benefit claims.^{2,10} Traditionally, societies attributed two of the Seven Deadly Sins to obesity: sloth and gluttony.⁹ In more recent years, however, major public opinions have been that obesity is the result of self-neglect and an individual's problem, not something that tax payers have to pay for.¹⁰

Currently, there is no dietary, behavioural or medication therapy that has been shown to be effective in long-term weight control for clinically obese individuals.^{2,10,11,12}

Economics

Obesity has been estimated to cost over \$90 billion per year in the USA, which is almost 10% of their total healthcare expenditure.⁵ In the UK, obesity costs the National Health Service £5 billion per year, and is expected to double to £10 billion by 2050.² Here in New Zealand, at least \$125 million, or 2.5% of the total healthcare cost, was estimated to be attributed to obesity in 1997.¹⁰

There is little doubt that obesity is a major health problem that has multi-dimensional implications on the patient as well as the public. It is also clear that the problem is getting worse. So, the question arises: is Turia right? Is publicly funded bariatric surgery the answer to obesity in New Zealand? There are two parts to this question: Firstly, is bariatric surgery medically effective? Secondly, is bariatric surgery economically effective?

SURGICAL EFFECTIVENESS

More than 170,000 bariatric surgeries are performed in the USA each year.^{7,9} In fact, bariatric surgery has become the most common elective abdominal operation performed in the USA.²

Procedures

The National Institute of Health in the USA recommended in 1991 that bariatric surgery should be considered for patients with BMI over 40 (35 with co-morbidity). The National Institute of Clinical Excellence (NICE) in the UK adopted the same recommendation in 2002. This guideline is gaining more and more acceptance in the Western medical world.¹⁰

Gastric bypass and gastric banding operations are currently the two most commonly practiced procedures for bariatric surgery in the world.² The former seems to be slightly more successful in weight loss and resolution of co-morbidity.² However, there have been few randomised trials conducted to directly compare these two. Most surgeons feel that randomisation is neither ethical nor realistic, given that patient/surgeon/cultural preferences

have strong influences on deciding which procedure to undergo.² As such, the author has made a deliberate attempt not to distinguish between different types of procedures in this essay.

Weight Loss

Adams et al¹³ compared three groups of morbidly obese patients: surgical (n=420), non-surgical (n=415) and non-intervention groups (n=321) in Utah, USA. The non-surgical group was defined as those who were willing to have bariatric surgery but were denied, mainly due to financial reasons. The non-intervention group was recruited from the community and consisted of those who have not had or wanted to have bariatric surgery. At the two year follow up, the surgery group had a mean weight loss of 44.83kg (31.1%) which was significantly greater than the non-surgical group (2.23kg or 1.5%) and non-intervention group (0.29kg or 0.2%).

In Canada, Christou et al⁴ at the McGill University Health Centre (MUHC) performed an observational cohort study comparing mortality and morbidity of 6781 morbidly obese patients. The surgery group consisted of 1035 patients who underwent bariatric surgery with 5746 patients matched for in the controlled group. In this study, the surgery group had an initial mean percent weight loss of 67.1% and a mean percent BMI reduction of 34.6% (both at $p < 0.001$). This percentage corresponded to 47.6kg of weight loss in the first year following operation. The percentage weight loss was shown to have been sustained at the level above 60% for at least 15 years in this study. Unfortunately, the paper failed to report the weight reduction rate for the control group.

In a non-randomised, intervention study titled Swedish Obese Subjects (SOS) Study¹², Sjostrom et al compared the surgical group (n=851) and the control group (n=852) at two and ten year follow up points. The management of the control group was not standardized and ranged from strict lifestyle changes to no instruction at all. At the two and ten year points, the surgery group had a mean percentage weight loss of 23.4% and 16.5% respectively. Although these reductions were not as remarkable as the two other studies cited above, they were nevertheless significant as the mean percentage weight loss for the control groups were -0.1% and -1.6% at those respective points, meaning that participants in the control group actually put on weight.

Additional Benefits

Adams et al¹³ found that, in addition to the weight loss, the surgery group had significantly more favourable outcomes for hypertension, dyslipidaemia and DM. Resolution of hypertension, dyslipidaemia and DM occurred in 37.6%, 54.2% and 78.7% of the surgical group compared to 1.3%, 7.2% and 0% in the non-surgical group, and 3.7%, 13.9% and 4.7% in the non-intervention group respectively.

Likewise, Christou et al⁴ found that the surgery group had significantly lowered relative risks ($p < 0.05$) in all but one of the complications compared. Reductions were most significant in cancer, cardiovascular disease and endocrine conditions. The only complication that did not show a significant reduction ($p = 0.230$) was haematological conditions.

However, the additional benefits were not as remarkable in the SOS study.¹² Reductions in hypertriglyceridaemia, DM and hyperuricemia incidents were statistically significant at both two and ten year follow up points. A reduction in HDL cholesterol level was statistically significant at two year follow up point, but not at ten year point. Reductions in hypercholesterolemia and hypertension were not significant at either follow up point.

Complications

Welbourn et al² quote the mortality rate of bariatric surgery to be less than 0.5%. However, they stress that this number depends on the technique, pre-operative risks and the surgeon's experience. Christou et al⁴ found the mortality rate in the surgical group to be significantly less than the control group (0.68% v 6.17%) at five year follow up point.

In the SOS study¹², 5 out of 2010 patients who underwent surgery died

postoperatively (0.25%). In total, 153 patients (13.0%) had postoperative complications. These included pulmonary complications (6.1%), deep infection – leakage or abscess (2.1%), wound complications (1.8%), embolism or thrombosis (0.8%) and bleeding (0.5%). Re-operations were required in 2.2% of the patients.

New Zealand

He and Stubbs¹⁰ audited 310 consecutive patients at Wakefield Hospital who underwent bariatric surgery between 1990 and 2002. The mean follow up period was 3.5 years.

Mean weight loss percentages at one, two, three, four and five years post operation were 72.7%, 73.1%, 66.1%, 63.9%, and 58.9%.¹⁰

Out of 52 patients who had type II DM prior to the operation, 49 were cured (92.4%) post operatively – meaning they no longer required treatment for diabetes as their fasting glucose and HbA1c levels fell back within the normal range. Furthermore, there were statistically significant improvements in dyslipidaemia (in 214 patients: 48.3% cured and 38.6% improved), high blood pressure (in 114 patients: 62.2% resolved and 24.3% improved), asthma (in 82 patients: 61.8% cured and 27.6% improved) and OSA (in 60 patients: 85.0% resolved and 13.3% improved).¹⁰

Serious post operative complications included pulmonary embolism (0.3%), congestive heart failure (0.3%), deep vein thrombosis (0.3%) and chest infection (2.3%). Re-operations were required in 15.8% of patients during the follow up period.¹⁰

Another bariatric surgery programme has been running at North Shore Hospital since 2001. No paper has been published so far, but these data will show patient outcomes in the public system where the patient characteristics may differ from Wakefield Hospital.¹⁴

Limitations

In a strict epidemiological sense, the evidence for bariatric surgery is not of the highest quality. There is no randomised control study conducted to date.

Clearly, one could not perform double blinded studies on bariatric surgery. Also, single blinded studies – putting patients under anaesthetic and not telling them whether or not surgery has been performed – will be unethical. Randomisation of patients into surgical and non-surgical groups is again, unrealistic and unethical due to the importance of the patient selection for bariatric surgery and other influencing factors such as public funding and private insurance. For these reasons, the evidence for bariatric surgery relies heavily on non-randomised intervention studies or observational studies.

ECONOMIC EFFECTIVENESS

The 2002 NICE Guideline for bariatric surgery estimated the cost per quality adjusted life year (QALY) of bariatric surgery to be between £6,289 and £8,527, well below the £30,000 mark which they considered as a cost effective intervention.² Similarly, Salem et al⁵ simulated a deterministic, payer-perspective model to assess the cost-effectiveness of different types of bariatric surgery in the USA. Using case scenarios, they estimated the cost of bariatric surgery to be between \$8,878 and \$18,547, much less than the \$25,000 per QALY mark they considered to be a cost effective intervention.

Sampalis et al² at the MUHC looked at both the average total cost per 1,000 patients per year and the cumulative cost at each year of the 5 year follow up. They found that although the initial cost of the surgery group was much larger (\$12,461,938 v \$3,609,680 at year one), from year two onwards the average cost for the surgery group became consistently less than the control group. This was mainly due to the initial steep decline in the cost for the surgery group between year one and year two, as well as the continuous decrease in cost thereafter for this group, while the cost for the control group remained relatively unchanged. In terms of the

cumulative cost, the surgery group was more expensive than the control group up until the three year follow up point. At the four year follow up point, the absolute difference swayed towards the control group and the gap increasing at the five year point, making the surgery more than \$5 million per 1000 patients cheaper than the control group.

Cremieux et al⁷ identified 3,651 patients who underwent bariatric surgery from more than 5 million medical claims between 1999 and 2005 in the USA. They estimated the health care cost of the study subjects by looking at health insurance claims from 6 months before the surgery date until the end of their enrolment. Due to privacy issues, the control patients were matched based on age, sex, residential state, co-morbidities and healthcare cost claim, rather than body weight or BMI. They calculated the peri-operation cost of bariatric surgery to range from \$17,000 to \$26,000. Cremieux et al observed that it took 25 to 53 months to fully recover the initial increase in cost of the surgery group owing to the savings from decreased health care claims when compared to the control group.

On a much smaller scale, Gallagher et al⁶ evaluated the cost effectiveness of bariatric surgery in the Veterans Administration (VA) healthcare system, a non-profit organisation in the USA. A group of 25 veterans were included in the study: 18 of them were male with the average age of 52 years and the average BMI of 52. These patients underwent bariatric surgery and the health care cost before and the peri-operation costs were compared. Before the surgery, the mean health care cost per person was \$10,558. Peri-surgery expenses per person, including the cost for the surgery itself, amounted to \$23,600 in the first year. After surgery, the number of annual outpatient clinic visits reduced significantly from 55 per patients to 18 after surgery ($p < 0.001$), reducing the cost by almost \$8,000. Gallagher et al⁶ concluded that the bariatric surgery was a cost effective treatment for morbid obesity and recommended the initiation or maintenance of such service in the VA health system.

There is no cost effectiveness study on bariatric surgery in New Zealand to date.

DISCUSSION

The Ministry of Health currently recommends 915 bariatric procedures per year in New Zealand.⁹ Given that more than one million of us are classified as clinically obese, this recommendation only reaches 0.5% of the severely obese population.

Should bariatric surgery be publicly funded in New Zealand to a much larger extent? Let us first answer the two sub-questions.

Is it medically effective?

The evidence shows that bariatric surgery is effective at losing weight which ranged between 16.5% and 73.1% in the studies cited above, and the results are consistent up to 15 years following surgery. Furthermore, the improvement in or the resolution of obesity-related diseases such as dyslipidaemia and DM have consistently been established after surgery. Like any other medical intervention, bariatric surgery carries with it many risks and complications, but the mortality rate is less than 1%.

Is it economically effective?

Bariatric surgery is deemed cost effective under both the NICE guideline and the American insurance simulation model. Studies show that the initial cost of surgery is completely recovered in two to five years. In the long term, improved general health leads to less health care cost.

So, should bariatric surgery be publicly funded in New Zealand to a much larger extent? This author believes so, at least in an ideal world where the medical literature can convince the politicians and the public.

There are three major issues to overcome before extensively public-funded bariatric surgery becomes reality. First is the funding. But as we have seen, cost effectiveness studies show that if we think in a time frame that goes beyond a Government term, we can in fact save tax payers' money by doing

more bariatric surgery. The second issue is the lack of surgeon training. It is tricky, but the fact remains that the surgical trainees will not have adequate exposure to this type of procedure unless there are more procedures performed in the public system. The last and the most challenging issue, is to change the public's opinion about bariatric surgery. To convince those who think that there is no need for hard working tax payers to help lazy, greedy and fat people to lose weight. Such issue is outside the scope of this article and needs more than a trainee intern to find a convincing evidence for the solution.

CONCLUSION

It may not be the magic wand that Turia promises, but patience and a long term vision, New Zealand as a nation may be able to benefit from publicly funded bariatric surgery both medically and economically.

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