

Morbid obesity:

Why diets don't work and the role of surgery

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Background

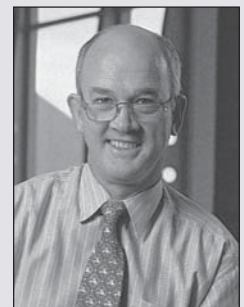
Many medical professionals are still skeptical about weight loss surgery, regarding it as the 'easy way out'. Hopefully this article will dispel those notions.

It is vital to realise that morbid obesity appears to be a poorly understood disorder and that it appears to be different from simple obesity. In both disorders appropriate dieting and exercise will lead to weight loss, but in morbid obesity, patients always plateau and then regain their weight loss, usually ending up heavier than when they started their diet (i.e. a staircase weight gain). Also, no-one can diet then return to their previous bad lifestyle and expect their weight to remain stable. The lifestyle changes must be permanent. For a variety of complex genetic and biochemical abnormalities, patients who have developed morbid obesity are unable to maintain those changes in lifestyle. Powerful neuroendocrine mechanisms defend body fat stores and drive behavioural and dietary decisions to ensure maintenance of fat levels.

Thus morbid obesity could be defined as: *A breakdown of the complex genetic and neurohumoral control of weight, (or fat stores).*

This mechanism normally ensures that our weight remains steady, despite the daily imbalance of calories consumed and calories used. This is a survival mechanism, and has probably developed to maintain fat reserves to get us through the 'bad winters and

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poor hunts'. As with all survival mechanisms, there is a limit as to how long willpower can override this urge to eat. In morbid obesity it seems that the brain has been rewired and normal has been set at a higher fat percentage. Any fat loss will then cause the brain to panic and set physiology into motion that causes fat to be rebuilt up to the previous abnormal level.

Exercise is also affected in this condition. Insulin resistance in morbid obesity is common, and in this situation, muscles are unable to metabolise fat effectively. The arthralgia that commonly accompanies morbid obesity may further limit the ability to exercise and usually patients are very self conscious of their size and are embarrassed to be seen exercising. It is possible that insulin resistance may be one factor responsible for the fatigue that these patients experience with exercise.¹

Yet there is also evidence that exercise reduces insulin resistance.² Thus diet and exercise will only work short-term in the morbidly obese, with inevitable uncontrollable weight regain.

How do we define morbid obesity?

The definition is derived from the observation that, as the BMI rises, there is an increasing incidence of morbidities. For some reason the incidence of illnesses (morbidities) rises sharply at a BMI of 35. Hence the definition of morbid obesity. However, there are several problems with this definition. It does not take into account the amount of muscle or fat. Thus athletic muscular athletes such as members of the All Blacks will have a very high BMI and, in fact, could fall into the definition of morbidly obese if judged solely by their BMI. Similarly, a localised high fat content such as that in a large breasted woman might contribute to an alarmingly high fat percentage. Age differences and race differences have to be adjusted as well. Many patients will also have a serious health problem with a lower BMI. Consider the short female Asian patient with diabetes, ischaemic heart disease, hypertension and sleep apnoea, who has a BMI of 33. She was refused

health insurance coverage for her surgery even though she qualifies by Asian figures for morbid obesity.

What is the point of weight loss?

The reason is that morbid obesity is associated with a reduced life expectancy, poor health because of associated morbidities (Table 1), loss of self-esteem,³ and poor quality of life.⁴ Reversal of morbid obesity has a profound beneficial effect on these, irrespective of the type of surgery.

Then there is the financial burden to society. In New Zealand, the World Health Organization estimates that we spend over \$300 million dollars per year on obesity-related health problems.

There is a large body of evidence showing the benefits of weight loss and the degree of weight loss is disproportionate to the improvement in morbidity, i.e. moderate weight loss has a profound benefit on serious health issues. The Finnish and USA Diabetes Prevention trials demonstrate the profound effect of lifestyle changes in achieving weight loss.^{5,6} Interestingly, those who lose weight and reduce their BMI will have better measurable outcomes (biochemistry and quality of life) than people with a similar BMI who have not lost weight.⁷

Treatment options

If diet and exercise did not work in the past, they will not work in the future. Properly constructed trials, such as that undertaken by O'Brien and Dixon in Melbourne,⁸ have shown that a regimented lifestyle programme is nowhere near as effective in maintaining weight loss, nor in correcting the associated morbidities as surgical intervention. Thus the only two remaining options are medication and surgery.

Results of pharmacological treatment of obesity have been disappointing. A recent meta-analysis showed a mean weight loss after one year of only 2.9kg for orlistat, and 4.5 kg for sibutramine.⁹ These are obviously inadequate for a morbidly obese 200kg patient.

At present, weight loss surgery is the only treatment option that can cause significant weight loss and enable a patient to maintain it.

So why is there so much resistance to surgery when there is overwhelming proof of its effectiveness? Even with provocative publications in recognised peer reviewed medical journals such as *'Who would have thought it? An operation to cure diabetes.'*^{10, 11}

Probably because of the consequences of weight loss operations that were abandoned in yesteryear, many of which had severe health consequences including death, or long-term failure in weight loss. The procedures available today are different from many of those. There is now a large body of evidence that proves the effectiveness of weight loss surgery (bariatric surgery) for reversing morbidity, sustained weight loss, and improving quality of life.

So who should be considered for surgery?

The accepted definition is:

- a. A BMI greater than 35, with at least two significant co-morbidities
- b. A BMI greater than 40
- c. Most centres would consider a patient with a BMI <35 if there was significant morbidity present, particularly Type 2 diabetes.

The decision as to whether to consider surgery rests on considering several factors (Table 2) to estimate what might happen to a patient's health in the future. In many cases the decision is made to proceed with surgery now, rather than wait for morbidity to occur.

However, note that surgery is not indicated for a patient who has a lifestyle problem and has never attempted weight loss in the past. Nor is it a cosmetic procedure as part of a total body makeover that seems to be popular in today's society.

Surgical approaches

1. Intra-gastric balloon

An inflatable balloon is placed into the stomach of a sedated (intravenous)

Table 1

Morbidities associated with obesity

1. Shortened life expectancy
2. MI
3. Stroke
4. Obstructive sleep apnoea
5. Hypertension
6. Type 2 diabetes
7. Arthralgia
8. Stress incontinence
9. Higher incidence of some cancers
10. Job discrimination
11. Social discrimination
12. Poor quality of life
13. Non alcoholic fatty liver disease
14. Others

Table 2

Factors considered whether surgery indicated:

1. Family history
 - a. Obesity
 - b. Early death, diabetes, hypertension, heart disease
2. Personal history
3. Morbidities
4. Biochemical abnormalities.
5. Lifestyle and quality of life
6. Risk of surgery vs risk of not operating

patient using a fiberoptic gastroscope. The balloon is inflated under endoscopic vision with either air or saline with dye added (Figure 1). Due to the corrosive environment, the balloon is removed endoscopically after six to 12 months, as a leak with subsequent deflation might cause bowel or airway obstruction. Hence the dye, which will colour the urine should a leak develop.

Its main use has been to downsize the super morbidly obese prior to surgery, but it has also been used as a primary treatment for treatment resistant obesity. The reports are varied and confusing, but it appears that a small but significant number of patients will sustain a >10% weight loss after one year.

However, lifestyle changes during the balloon treatment are essential.¹²

2. Bariatric operations

The weight loss operations of today are quite different from those of yesterday, and many previously published results should be viewed with caution.

In most countries, the two most common procedures are gastric banding (Figure 2) and gastric bypass, with biliopancreatic diversion (BPD) and duodenal switch being performed less frequently.

Over the last five years, gastric sleeve (tube) resection has gained popularity.

In Australia and New Zealand, gastric bypass and gastric banding are the most commonly performed procedures.

All are usually done laparoscopically, and all have much the same weight loss. (ASERNIPS reviewing evidence contrasting gastric banding and gastric bypass, 2002).

Determining which operation is better is confused by a minefield of opinions, bias, ignorance, and limitations of obtaining 'evidence-based medicine' and the limitations of 'randomised controlled trials' in bariatric surgery.¹³

Another common problem is that many respected reviews do not have a surgeon on the panel.¹⁴

Gastric banding, gastric sleeve resection, and gastric bypass have different mechanisms for causing weight loss. They all have a restrictive component and, remarkably, they all alter neuro-endocrine and gut-endocrine responses. The result is that the ab-

normal drive to eat is gone immediately, so it is easy for patients to make the right decisions. The difference between the operations is in the time taken to achieve their desirable weight, dietary restrictions, side effects, failure rates, and complications.

Gastric banding is different from other bariatric procedures in that the follow-up has a direct impact on the weight loss and many authoritative articles still regard it as a purely restrictive procedure.¹⁵

Also, training in bariatric surgery is still in its infancy, with few surgeons trained in the operation, and even fewer doctors in the management of the morbidly obese.

Which bariatric procedure has the best results?

If there was a superior procedure, the whole world would be performing just that one.

Although biliopancreatic diversion has the best weight loss, it also has a high complication rate, so is not usually regarded as a first line choice of operation.

The amount of weight loss is much the same for most commonly used procedures, but there is too much emphasis on weight loss, rather than improvement in physical and mental health. This led to the BAROS (Bariatric Analysis and Reporting of Outcomes System) system in 1997, but this is not frequently used in the medical literature.

Gastric banding has the lowest mortality and is the safest procedure but it involves inserting a foreign body that stays in place forever, and

thus has the possibility of long-term complications. However, the complications are not usually life threatening and can usually be dealt with laparoscopically (erosion, infection, slippage). It is the only procedure that is reversible.

Gastric bypass has a far more rapid rate of weight loss, but has higher morbidity and mortality and has dietary restrictions. There are also lifelong possible complications (bowel obstruction, stenosis, ulceration, entero-enteric fistulae, malabsorption). It probably has better outcomes for insulin dependent type 2 diabetics.¹⁶

Gastric sleeve resection has a higher operative complication (leak) rate than gastric banding and the consequences appear to be more drastic than with a bypass (personal observation). However, once healed, there are almost no ongoing problems. It has the least restriction in what patients can eat, but the long-term results are not known.

There is an overwhelming abundance of evidence to support bariatric surgery to improve physical and psychological health. All operations lead to the reversal, remission, or improvement of obesity-related comorbidities. The difference is often how effectively or how rapidly these are achieved, and what the patient's motivation and goals are.

The choice of the operation is therefore best left as a decision between the patient and a bariatric surgeon.

Conclusion

Morbid obesity appears to be a different entity to simple obesity, whereby there has been a breakdown in complex neuro- and gut-physiology that controls weight and appetite. When this occurs, surgery is the only effective treatment that allows adequate and sustained weight loss with improvement in physical health and quality of life.

Competing interests

None declared.

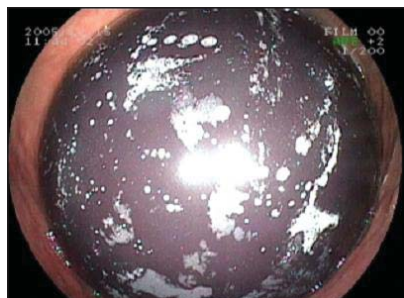


Figure 1

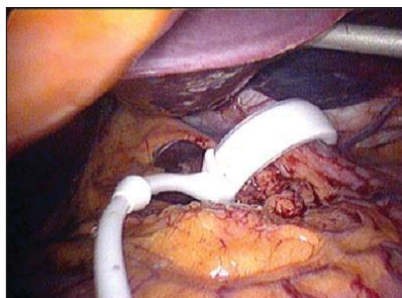


Figure 2

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P4P and patient-centred care

'Pay-for-performance programs are growing, but little evidence exists on their effectiveness or on their potential unintended consequences and effects on the patient-physician relationship. Pay-for-performance has the potential to help improve the quality of care, if it can be aligned with the goals of medical professionalism. Initiatives that provide incentives for a few specific elements of a single disease or condition, however, may neglect the complexity of care for the whole patient, especially the elderly patient with multiple chronic conditions. Such programs could also result in the deselection of patients, "playing to the measures" rather than focusing on the patient as a whole, and misalignment of perceptions between physicians and patients. The primary focus of the quality movement in health care should not be on "pay for" or "performance" based on limited measures, but rather on the patient.'

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The cost of the N Z Family Physician

'The cost of publishing the New Zealand Family Physician (NZFP) was a continual worry. In 1982 Council committed itself to supporting only the next four issues. At the same time it decreed that ways of increasing advertising revenue and decreasing publishing costs should be sought, "before there is any economy of quality". At various times it has been policy to distribute the NZFP to all general practitioners. That had the advantage of increasing advertising rates through a larger circulation, as well as promoting the College, but it did considerably increase costs. It was decided to revert to the policy of distributing the journal to College members and subscribers only from 1984.'

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Statistics and decision-making

'Most of the statisticians I know...have excellent clinical knowledge, and will spend a good deal of time with clinicians thinking through study questions and converting these into statistical hypotheses. Yet the results of testing these hypotheses are all too often put in terms of P values, hazard ratios, regression coefficients, concordance indices, and a whole slew of other numbers that have little meaning to either the patient or the doctor. To be clinically relevant, statistics have to be expressed in terms that mean something in the clinic – treatments, recurrences, days of survival – and that can be used in decisions – for example, absolute differences rather than ratios; means rather than medians. It is only by using such statistics that we will be able to move from math back to biology and realize fully the potential of medical research to improve patient care.'

Vickers AJ. Does medical research help us make better clinical decisions? http://www.medscape.com/viewarticle/564710_1 Accessed 29/11/07.