Surgical Treatment of Obesity

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Agenda

- Obesity – some facts

- Bariatric surgery
  - Types of bariatric surgery and complications
  - Weight loss

- Mortality and Morbidity

- Underwriting consideration
Obesity

Chronic condition of excessive body fat accumulation to the extent that health and well-being are affected.
## Obesity

**WHO Classification**

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
</tr>
<tr>
<td>Normal weight</td>
<td>18.5 - 24.9</td>
</tr>
<tr>
<td>Overweight (pre-obese)</td>
<td>≥ 25.0 - 29.9</td>
</tr>
<tr>
<td>Obese Class I (moderate)</td>
<td>30.0 - 34.9</td>
</tr>
<tr>
<td>Obese Class II (severe)</td>
<td>35.0 - 39.9</td>
</tr>
<tr>
<td>Obese Class III (very severe)</td>
<td>≥ 40.0</td>
</tr>
</tbody>
</table>

**Asian adults**

Overweight if BMI ≥ 23

Obese if BMI ≥ 27.5

Source: WHO Expert Consultation, 2004
Overweight/Obesity is the fifth leading risk for death worldwide

Almost 3 million adults die each year as a result of being overweight/obesity

Overweight/Obesity contributes to almost half of the global Diabetes mellitus burden, almost one fourth of the ischemic heart disease burden and between ~10 - 40% of the burden for certain cancers

Source: WHO factsheet
Obesity

Childhood

- In 2013 globally 42 million preschool children were overweight

- Nowadays, close to 35 million overweight children are living in developing countries

- Obesity in childhood is associated with increased risk of obesity, premature death and adulthood disability

- Typical problems with childhood obesity
  - breathing difficulties
  - increased fracture risk
  - hypertension
  - early markers of cardiovascular disease
  - insulin resistance
  - psychological effects

Source: WHO factsheet
By 2030, 86.3% adults will be overweight or obese; and 51.1%, obese

By 2048, basically all American adults would become overweight or obese

Total health-care costs attributable to obesity/overweight would double every decade to 860.7 - 956.9 billion US dollars by 2030, accounting for 16 - 18% of total US health-care costs

Obesity

Causes

- Diet
  - Energy input > Energy output
  - Calorie intake > Physical activity and metabolism of the body

- Sedentary lifestyle
  - transportation mode
  - less physical work/activity

- Endocrine disorders (all relatively rare), e.g.
  - Cushing’s Syndrome
  - Severe hypothyroidism

- Certain psychiatric disorders and medications

- Genetic factors
Obesity
Associated Complications

- Cardiovascular disorders (coronary artery disease, stroke, hypertension)
- Hyperlipidemia
- Type 2 diabetes mellitus
- Gout
- Sleep apnoea and respiratory problems
- Musculoskeletal disorders e.g. osteoarthritis in the knees, spine, hip
- Certain cancers (breast cancer, colorectal and others)
- GERD
- Psychological / Psychiatric problems
- and others

But: Minor obesity may even decrease mortality in the elderly (especially in women)
**Obesity**

**Therapeutic Options**

- Well Balanced Diet & Physical Activity (also within weight reduction programs)

- Medication (severe side effects not uncommon)

- Relapse (yo-yo effects) very common

- Surgery (usually resistant and more severe cases)
Some guidelines suggest that bariatric surgery is beneficial for patients with BMI of 30 to 35 with significant co-morbidities and for obese people with BMI of 35 to 40 with no co-morbidities.

Different types of bariatric surgeries

- Individual consideration which type of bariatric surgery is the most appropriate for the obese person.

Bariatric surgery can reverse complications such as Type 2 diabetes, sleep apnoea, high cholesterol and hypertension.

Patients have greater short-term weight loss and better intermediate glucose outcome if compared with non-surgical treatment.

Long-term studies shows long-term loss of weight.
### Number of Bariatric Surgeries

In Surveyed Countries/Regions (Selection out of >40)

Procedures globally: 2003 ~150,000 / 2008 ~345,000 / 2011 ~340,000

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>2008</th>
<th>2011 (% of population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US / Canada</td>
<td>~220,000</td>
<td>~100,000 (0.03%)</td>
</tr>
<tr>
<td>Japan</td>
<td>~80</td>
<td>~170 (0.0001%)</td>
</tr>
<tr>
<td>Belgium</td>
<td>~8,700</td>
<td>~8,500 (0.77%)</td>
</tr>
<tr>
<td>Taiwan</td>
<td>(no data)</td>
<td>~1,300 (0.0056%)</td>
</tr>
<tr>
<td>India</td>
<td>~1,200</td>
<td>~5,000 (0.0004%)</td>
</tr>
<tr>
<td>Germany</td>
<td>~2,100</td>
<td>~4,000 (0.005%)</td>
</tr>
<tr>
<td>Brazil</td>
<td>~25,000</td>
<td>~65,000 (0.03%)</td>
</tr>
<tr>
<td>France</td>
<td>~13,700</td>
<td>~27,600 (0.04%)</td>
</tr>
</tbody>
</table>

*Buchwald H, Oien DM, Metabolic/bariatric surgery worldwide 2011*  

Types of Bariatric Surgery
Primarily Restrictive/Malabsorptive Procedure

- Roux-en-Y gastric bypass (RYGB)

- Other RYGB: banded – long limb

2008 and 2011 at > 40% (relatively stable)
Types of Bariatric Surgery
Primarily Malabsorptive Procedure

- Biliopancreatic Diversion (BPD)
- Biliopancreatic Diversion with Duodenal Switch (BPD/DS)

2008 >1%, 2011 >2%
Types of Bariatric Surgery
Predominantly Restrictive

- Adjustable Gastric Banding
  - Stomach opening can be tightened or loosened over time to change the size of the passage
  - Pouch

  2008 >40%; 2011 <20%

- Vertical Banded Gastroplasty (VGB)
  - Band and staples are used to create a small stomach pouch
  - Pouch

  2008 >1%; 2011 <1%
Types of Bariatric Surgery
Predominantly Restrictive

- Sleeve Gastrectomy

2008 >5%; 2011 >30%
Bariatric Surgery
Complications

- Short term surgery complications
  (can sometimes be severe / less complications with experienced surgeons)

- Dumping syndrome (pending on surgery) and possible nutrition problems

- Further surgeries (re-operation, plastic surgery)

- Psychological/psychiatric problems

- Cardiovascular diseases

- and others
Plastic Surgery After Successful Bariatric Surgery

- If bariatric surgery works well additional plastic surgery may be needed
  - typically, non-surgical interventions reach weight loss of 7-10%
  - Bariatric surgery + lifestyle changes reach typically ~30%

- Often seen:
  large folds of excess loose skin / loose muscles / localized pockets of fat tissue

- Plastic surgery aims to
  - reduce skin irritation, infections, pain
  - improve appearance (and hopefully self-esteem)

- Side Effects
  - Operation risks, scars, psychological and others
  - Costs (can be relatively expensive)
Mean percent weight change during a 15-Year period in the control group (N = 2037) and the surgery group (N = 2010), according to the method of bariatric surgery.

Excess Weight Loss after Laparoscopic Sleeve Gastrectomy

▶ Comparison of long-term weight loss results after LSG published in literature with well documented short-term and mid-term results found in 16 studies from Europe (8), US (6), ASIA (1) and Latin America (1)

▶ Total of 492 patients were analyzed with follow-up of 5 years at least after LSG

▶ Average mean preoperative BMI = 49.2 kg/m²

▶ Effect on co-morbidities such as
  • Hypertension
  • Hyperlipidemia
  • Sleep Apnoea
  • Type 2 Diabetes Mellitus

Source: Review of long-term weight loss results after laparoscopic sleeve gastrectomy; Theodoros Diamantis, et al; Surgery for Obesity and Related Diseases, Volume 10, Issue 1, Pages 177-183 (January 2014), DOI: 10.1016/j.soard.2013.11.007
Excess Weight Loss after Laparoscopic Sleeve Gastrectomy

Mean % EWL

Source: Review of long-term weight loss results after laparoscopic sleeve gastrectomy; Theodoros Diamantis, et al; Surgery for Obesity and Related Diseases, Volume 10, Issue 1, Pages 177-183 (January 2014), DOI: 10.1016/j.soard.2013.11.007
Bariatric Surgery vs. Obese Control Groups
There is evidence that bariatric surgery may decrease mortality and morbidity if compared with obese people who did not have surgery - Examples

- Utah: All cause long-term mortality in the surgery group decreased by 40% (as compared with that in the obese control group) – but accidents and suicides were 58% higher in surgery group
  
  Source: Long-Term Mortality after Gastric Bypass Surgery  

- Sweden (SOS): Bariatric surgery appears to be more efficient than usual care in the prevention of type 2 diabetes in obese persons (Hazard Ratio 0.17)
  
  Source: Bariatric surgery and prevention of type 2 diabetes in Swedish obese subjects.  

- Meta-Analysis on Bariatric Surgery: Effective weight loss was achieved and a substantial majority of patients with diabetes, hyperlipidaemia, hypertension, and obstructive sleep apnoea experienced complete resolution or improvement
  
  Source: Bariatric surgery: a systematic review and meta-analysis.  
  [http://www.lapspecialists.com/Buchwald_Article_Meta_analysis.pdf](http://www.lapspecialists.com/Buchwald_Article_Meta_analysis.pdf)
Veterans Affairs Centers: In older severely obese patients with high baseline mortality the use of bariatric surgery compared with usual care was not associated with decreased mortality during a mean 6.7 years of follow-up.


Sweden (SOS): Bariatric surgery was associated with reduced cancer incidence in obese women but not in obese men.

Conclusion:

There is evidence that bariatric surgery may decrease certain mortality and certain morbidity if compared with obese people who did not have surgery.
Mortality/Morbidity after Bariatric Surgery
Bariatric Surgery vs. Obese Control Groups

- For underwriting, however, such results are of less significance.

- The main question is here:
  Compared to the normal population is the risk still increased?

- And even more so: is the risk increased compared to the ‘insured’ population
  (because rates of insured population are usually lower than normal population)
Mortality after Bariatric Surgery
Population Based Studies: Western Australia

- Western Australia analysis using data from 1988 - 2004 from 1403 patients and comparing with general population

- At 5 years, the relative survival rate in bariatric patients was the same as the survival rate in the general population
  At 10 years, the relative survival was only slightly lower than general population norms (98.3%)

- This seemingly unproblematic result has still u/w consequence since compared to insured population mortality would be higher

Mortality after Bariatric Surgery
Population Based Studies: Pennsylvania (1)

- Bariatric operations (n = 16,683, 440 deaths) performed on Pennsylvania residents between January 1, 1995, and December 31, 2004
- Age-specific death rates were higher in men than in women
- Age- and sex-specific death rates after bariatric surgery were substantially higher than comparable rates for the age- and sex-matched Pennsylvania population
- The 1-year case fatality rate was approximately 1% and nearly 6% at 5 years. Less than 1% of deaths occurred within the first 30 days
- Higher rate of suicide was observed (expected deaths 2 - observed 16) especially seen in the young, in females and most occurred after > 1 year after surgery (14 cases of drug overdose not included)
- Substantial excess of deaths owing to suicide and coronary heart disease

Source: Death rates and causes of death after bariatric surgery for Pennsylvania residents, 1995 to 2004
Omalu et al Archives of Surgery, 2007 Oct;142(10):923-8;
## Mortality/Morbidity after Bariatric Surgery
### Population Based Studies: Pennsylvania (2)

<table>
<thead>
<tr>
<th>Age</th>
<th>Death Rate Ratio (Cases vs population)</th>
<th>Death Rate Ratio (Cases vs. popul. / excluding deaths first 30 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 - 34</td>
<td>8.3</td>
<td>6.2</td>
</tr>
<tr>
<td>35 - 44</td>
<td>6.4</td>
<td>4.4</td>
</tr>
<tr>
<td>45 - 54</td>
<td>4.7</td>
<td>3.5</td>
</tr>
<tr>
<td>55 - 64</td>
<td>3.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 - 34</td>
<td>10.6</td>
<td>4.9</td>
</tr>
<tr>
<td>35 - 44</td>
<td>7.0</td>
<td>3.1</td>
</tr>
<tr>
<td>45 - 54</td>
<td>8.7</td>
<td>5.5</td>
</tr>
<tr>
<td>55 - 64</td>
<td>5.6</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Source: Death rates and causes of death after bariatric surgery for Pennsylvania residents, 1995 to 2004
Omalu et al Archives of Surgery, 2007 Oct;142(10):923-8;

### Ratios against ‘insured population’ should be considerably higher!
Mortality/Morbidity after Bariatric Surgery
Population Based Studies: Sweden

- Bariatric operation (n = 13 273) in Sweden from 1980 to 2006

- Overall hazard ratios were still increased for myocardial infarction, angina pectoris, stroke, hypertension, diabetes and death compared with the general population

- However, gastric bypass cases no longer had a higher risk of diabetes (HR 1.23) or myocardial infarction (HR 0.78) whereas morbidity remained increased after restrictive surgery in 7855 patients

- The adjusted mortality remained higher after both gastric bypass and restrictive surgery

Source: Morbidity and mortality before and after bariatric surgery for morbid obesity compared with the general population
Mortality/Morbidity after Bariatric Surgery
Population Based Studies - Conclusion

- Only few studies investigated mortality increase after surgery compared to overall population - the larger studies did find an increased mortality.

- Cardiovascular disease (and cancer) are important mortality predictors; in one population based study suicide rates were strongly increased.

- One morbidity study showed increase of cardiovascular risks after operation if compared to the general population; gastric bypass cases had no longer a higher risk of diabetes mellitus and myocardial infarction.
Underwriting Considerations

- Age at operation // Detailed Reports incl. follow-up reports
- Gender: Male have higher mortality than female (gender may not be taken into account in EU)
- Time since operation
- Duration of severe BMI and comorbidity in the past
- Type of operation
- Complications after operation
- Time off-work after operation
- End organ affected? (heart, kidneys, eyes etc.)
- Amount of weight loss - ? Weight increase after initial weight loss
- Current comorbidity
- Psychological/psychiatric problems (Past and present such as suicide, strange accidents, depression, compulsive disorders in the past etc.)

- Type of cover: **Death Benefits vs. Living Benefits**!

Assess whole case constellation – definitely don‘t just rate BMI
Thank You

Questions / Comments / Remarks ?