

Obesity Treatment by Bariatric Surgery and Some of the Pharmacoeconomical Aspects in the Czech Republic

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Abstract

Background: Obesity affects one in four people in the Czech Republic and its incidence is growing worldwide. In this article we focused on evaluation of treatment of obesity in diabetic patients by bariatric surgery and we also tried to evaluate the costs of the surgery and antidiabetics.

Methods: The total number of patients was 200 and 30 of them with type 2 diabetes mellitus. In the 1-year follow-up we evaluated remission or compensation of diabetes in patients after particular bariatric methods. We also calculated the decrease of average costs for pharmacotherapy by antidiabetics after 6 and 12 months and the costs for the bariatric surgery.

Results: We found that costs for the treatment by antidiabetics were reduced nearly 3× already in the 6th month after the surgery. Insurance companies currently do not take in consideration different costs for the partial surgery methods and the payment is in one package for approx. 60 thousands CZK.

Conclusion: The positive effect of the surgery appeared in the 6th month of the follow-up. However, to achieve more accurate results we need to evaluate the data after 3 years of the follow-up.

Keywords

Diabetes mellitus, pharmacoeconomics, body mass index, bariatric surgery

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1 Introduction

Obesity affects one in four people in the Czech Republic and its incidence is growing worldwide. Conservative treatment does not lead to the desired effect with long-term weight reduction.

One of the most successful methods of treatment with long-lasting effect is the bariatric surgery, which is indicated in specialized centers in patients with severe obesity [1].

In this article we focused on treatment of obesity in diabetic patients by bariatric surgery and tried to evaluate the costs of the surgery and antidiabetics.

This topic is not widely elaborated in the Czech Republic probably due to partly unclear system of payment for the bariatric surgery by an insurance companies and partly due to historical reasons, when the effectiveness of the healthcare system was not so important.

2 Definition of Obesity

Obesity is defined as an excessive storage of energy as a fat. It is stored mainly under the skin which can lead to serious metabolic diseases and also in the abdominal organs it leads to the failure of their functions. From the other point of view, fat stored on the buttocks and thighs are actually protecting the internal organs of the human body and are not associated with metabolic risks. Obesity is always an imbalance in the intake and energy expenditure, which occurs due to many factors, genetic predisposition and social situation of the patient [2].

Obesity with fat stored in the abdominal cavity is called the central obesity and is characteristic in men. In contrast, excessive fat stored in the buttocks and thighs is typical in women and leads to the peripheral obesity. The type of the obesity was in the past years calculated by the ratio of waist to hip circumference and it is called waist to the hip ratio. Abdominal obesity was then defined as a value greater than 0.85 in women and greater than 0.9 in men [3]. Nowadays we use only the waist circumference.

Classification of obesity is done using variable "body mass index" (BMI), which is calculated from weight (kg) and height (m). Classification of individual values shows Table 1.

Table 1: Categories of obesity.

BMI (kg/m ²)	Category of obesity
18.5 – 24.9	normal weight
25 – 29.9	overweight
30 – 34.9	obesity – degree I
35 – 39.9	obesity – degree II
>40	obesity – degree III

Obesity leads to a higher incidence of various chronic diseases, such as:

- Diabetes.
- Gallbladder disease.
- Arthritis.
- Arthrosis.
- Cancer of the ovary, uterus, breast, or colon.

Primarily store fat in the abdominal cavity and the upper half of the chest is associated with diseases, such as:

- Hypertension.
- CHD - coronary heart disease.
- Sudden stroke.
- Insulin resistance.

3 Methods of Treatment of Obesity

Obesity is currently mostly treated conservatively, i.e. pharmacologically, changing diet and lifestyle consulted with clinicians and psychologists. In this article we focus on the treatment of obesity by bariatric surgery, which offers several options with different results. Bariatric surgery is currently one of the most effective methods to help patients reduce their high mass and thus significantly reduce the risk of death or one of the diseases listed above. We can measure success of treatment by this method by reducing patient's weight, reducing a number of antidiabetics using for treatment or disappearance of some of the following diagnoses:

- Type 2 diabetes.
- Hypertension.
- Hypertriglyceridemia.
- Low HDL cholesterol.
- Hypercholesterolemia.

Additionally, in case the patient suffers from diabetes for a long time, the success in treatment of obesity is decreased [4].

3.1 Bariatric Treatment

Today there are implemented various types of bariatric surgery which can reduce patient's stomach volume. Basically, the patient eats smaller portions of food after the intervention and feels satisfied. Malabsorption can be also performed, which reduces the absorption of nutrients and this method is mainly combined with the bariatric surgery.

Current types of bariatric interventions are as follows:

A) Restrictive:

- Adjustable bandage: Stomach is divided into upper and lower parts by a strap with a thin connecting tube which can be adjustably filled up by water and thus decrease the circumference of the strap.
- Sleeve gastrectomy: Performs resection of greater curvature of stomach. This technique is irreversible and it decreases the circumference of the stomach in its whole length.
- Gastric plication: Also called "Laparoscopic greater curvature plication". It reminds sleeve gastrectomy without resection. A portion of greater curvature is decreased by taking in tuck. This type of bariatric surgery is reversible and can be given back to original proportions also using the fibroscopy.

B) Malabsorption:

- Based on the effect of decrease of intake of nutrients. This is done by gastric bypass. The bypass prevents nutrients passing the stomach.

C) Combinations of restriction and malabsorption:

- Biliopancreatic diversion: Combination of gastric resection and creation of 3 shorter bypasses from small intestine.

Depending on the type of bariatric procedure, certain complication may be attributed to it. Most complications are found in the adjustable bandage:

- Bandage failure.
- Ulcers.
- Narrowing or blockage of the stomach.
- Higher risk of nutritional deficiencies.

These complications may lead to new intervention and surgery corrections [5].

Table 2: Comparison of the impact of bariatric surgery on the remission of diabetes in patients with diabetes.

Type of operation	No. of patients	% Remission of diabetes (HbA1c <4.8% IFCC)	% Compensation of diabetes
Gastric bandage	17	33%	66%
Gastric bypass	6	29%	71%
Sleeve Gastrectomy	7	91%	9%

4 Results

In our research, we studied patients operated in 2007-2009. The total number was 200. Indication for bariatric surgery was as follows:

- Obesity: BMI > 40 kg/m² or obesity associated with Diabetes type 2 or hypertension: BMI > 35 kg/m² (in rare cases connected with complications the BMI can be also lower than 35 kg/m²).
- Failure during treatment by conservative methods.
- Patient is always cooperative, suitable for long-term follow-up and not suffering from bulimia.

From this group 30 patients suffered from type 2 diabetes mellitus. In this subgroup of 30 patients we focused on monitoring the phenomenon of disappearance of diabetes or compensation. Average age of patients was 51.3 years and BMI 45.87 kg/m². Length of follow-up was 1 year. The parameter of diabetes disappearance was decrease of glycosylated hemoglobin (HbA1c) under 4.8% IFCC. We do not use as the parameter of successful surgery end of treatment by antidiabetics because patients are always treated by the metformin during the follow-up.

Table 2 shows that surgical methods differ significantly. These numbers correspond to foreign experience as Buchwald meta-analysis of 130,000 patients, or slightly lower [6].

4.1 Basic Pharmacoeconomical Analysis

We calculated data of 25 patients who were followed for 1 year and we were able to obtain all necessary data (i.e. number of antidiabetics used per day, etc.). Average age in this group of patients was 53.9 years and BMI 47.2 kg/m². Although it is known that bariatric surgery is currently the most beneficial in diabetic patients, this treatment is performed far less in the Czech Republic than in the world [2].

We calculated the decrease of average cost of pharmacotherapy by antidiabetics after 6 and 12 month after the

surgery. After 6 months the decrease of cost was 3/4 and almost 2/3 after 12 months. This corresponds to the experience that diabetes remission is usually not permanent.

This decrease in daily cost of treatment was reduced nearly 3× in the 6th month of the follow-up. This may be confronted with the prices of bariatric surgery procedures in the Czech Republic. After consultation with bariatric centers we summarized the costs into several groups:

- Payment for preoperative examination before surgery, including sonography, gastrofibroscopy, ECG, spirometry and other outpatient examinations, including blood tests, etc.
- Payment of the surgery, including eventually used staplers, implants, anesthesia, etc.
- Payment of post-operative care, including hospitalization and possibly stay in the ICU.
- Outpatient care within 30 days after surgery - wound care, controls, etc.

However, it is very hard to calculate the cost of the bariatric surgery in the Czech Republic. Insurance companies currently do not take in consideration different costs of partial surgery methods and the payment is in one package for approx. 60 thousands CZK. This number also differs in each of the insurance companies. However, the Czech Society for the Study of Obesity and the Czech Surgical Society stated that valid cost for the particular methods including procedures listed above should be as follows:

- Gastric bandage: 60-70 thousands CZK.
- Gastric plication: 75 thousands CZK.
- Sleeve gastrectomy: 75-80 thousands CZK.
- Gastric bypass: 85-90 thousands CZK
- Biliopancreatic diversion: 110 thousands CZK.

25 CZK = approx. 1 EUR

Table 3: Number of antidiabetics and costs in CZK.

	BMI	Blood sugar (mmol/l)	HbA1c % IFCC	Number of antidiabetics	CZK / day
Before operation	47.2	8.44	6,84	1.2	19.2
6 months	41.1	7.06	5,56	0.9	5.8
12 months	40.1	6.76	5,60	1.0	7.5

25 CZK = approx. 1 EUR

Those prices would be used in near future, but it depends on the discussion between insurance companies and societies. Implementing this real cost for bariatric surgery can lead to better comparison of the particular methods together with the medical results.

5 Conclusion

In the 1-year follow-up we achieved remission of type 2 diabetes especially in patients treated by the Sleeve Gastrectomy method. The positive effect of the surgery appeared in the 6th month of the follow-up and does not changed significantly after the 12th month of the follow-up. Our results are influenced by the fact that diabetologists do not indicate the bariatric surgery in diabetic patients as it would be optimal. If the indication is positive, it is after long prevalence of the diabetes.

We found out that the cost of the antidiabetics are decreased nearly 3× after 6 month from the surgery. Common follow-up after bariatric surgery is 29 months in the Czech Republic [7] and we are now focusing on evaluation of the cost for a longer period which would give us more accurate results.

6 Discussion

10 years ago, there were 200 to 300 bariatric procedures per year indicated in the Czech Republic. Nowadays, this number has increased to about 1650 per year [7]. Because bariatric surgery provides also excellent results in the treatment of diabetes [8], we assume that the number of diabetic patients indicated for surgery will be increased in near future. Development of this trend certainly helps diabetics prolong their life or significantly re-

duce their risk of complications or chronic diseases. It brings to patients also significant increase of their life's quality because a successfully treated patient can actively return to the full productive life.

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