The necessity of social security financing of bariatric surgery in Hungary

Csaba Dózsa[1,2], Lilla Illés[2], Attila Paszt[3], Elemér Mohos[4]
[1] University of Miskolc, [2] Med-Econ Human Service Ltd., [3] University of Szeged,
[4] Veszprém County Hospital

Obesity has a serious disease burden and economic impact as it significantly reduces quality of life and life expectancy, and leads to significant financial costs. Due to the continuous increase in the prevalence of obesity, emphasis should be placed on both prevention and the development and implementation of intervention strategies at an individual and social level. For obesity care, bariatric surgery is a therapeutic option that brings positive results in obesity and obesity-related diseases. In this article we propose the possibility of the public funding of bariatric surgery.

OBESITY IN THE MIRROR OF NUMBERS

According to the World Health Organization (WHO), the definition of obesity is excessive fat accumulation that presents a risk to health. It is one of the most significant public health challenges of the 21st century, as worldwide obesity has increased nearly threefold since 1975. In 2016, more than 1.9 billion adults (39%) were overweight and 650 million adults (13%) were obese [1]. Hungary has one of the highest rates of obesity in the OECD: in 2015, the number of obese adults was fourth highest, after the United States, Mexico and New Zealand. Nearly two-thirds of the adult population in Hungary is overweight (64%) with obesity rates of 30%, and morbid obesity rates of 3% (about 250,000 adults) [2, 3, 4, 5].

In terms of costs, the direct health expenditure resulting from obesity is significant, which includes the costs of prevention, diagnosis and treatment. In determining direct costs, the costs of treating other diseases caused by obesity should be also taken into account (e.g. nearly 80% of patients with obesity suffer from type II diabetes, T2DM) [6]. According to WHO, obesity is responsible for 2-8% of health spending in the European Region [7], and according to Swinburn et al., the cost of obesity accounts for 2-6% of health expenditures in Western European countries [8], see on figure 1.

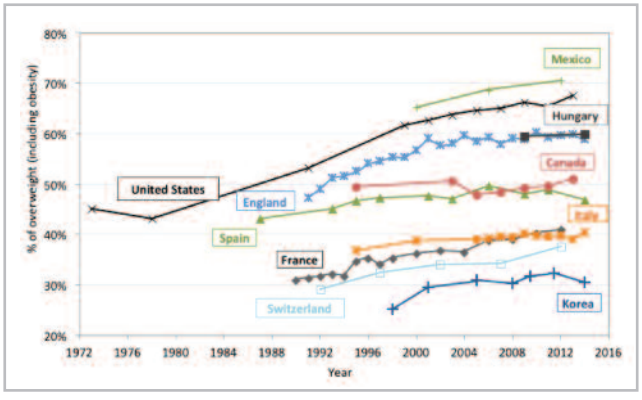

Figure 1.
Prevalence of overweight (including obesity), OECD: Obesity update 2017

METHODS

We searched the national and international literature for definitions, treatment options and morbidity data related to obesity. We analysed the cost structure of the two most-used bariatric surgery methods in Hungary based on hospital controlling data, reimbursement costs and fees of the National Health Insurance Fund (NHIF), and health professionals' consultations. Based on these calculations, we suggested the creation of new financing entities, according to the Diagnosis-related Group (DRG) and International Classification of Procedures in Medicine (ICPM), and possible reimbursement method for social security. With reference to specialist opinion, we estimated that 70% of procedures are LRYGB, and 30% are LGSR. Concurrently, based on capacity analysis, we estimated the number of bariatric surgery cases in the next 5 years and the number of centres which could be involved.

CONSERVATIVE TREATMENT OF OBESITY

In adults, body mass index (BMI) is generally used to classify overweight and obesity. When calculating the BMI, body weight in kilograms is divided by the square of the height in meters. According to the WHO classification, an individual with a BMI of 25-29.9 kg/m^2 is overweight, and with BMI of 30 kg/m^2 and above has obesity (Class I: BMI of 30-34.9 kg/m^2 ; Class II: BMI of 35-39.9 kg/m^2; Class III: BMI of 40 kg/m^2 and above) [9]. Obesity increases the chance of complications and is associated with diseases such as type II diabetes, metabolic syndrome, dyslipidaemia, ischemic heart disease, hypertension, non-alcoholic fatty liver, obstructive sleep apnoea, female infertility, polycystic ovarian syndrome, asthma, knee joint pain, reflux, depression and cancer.

At present, only conservative therapies are used to treat obesity in Hungary, such as lifestyle changes, behavioural therapy and psychological care. The first line treatment of obesity is lifestyle change, calorie intake restriction (diet) and increased energy consumption (regular exercise, gymnastics). In 95% of cases, lifestyle changes only give a temporary

result. In behavioural therapy and psychological care, the main aim of the applied psychological methods is to support the power of the obese people to achieve and maintain a true body weight, body image correction, self-awareness, emotional self-acceptance, enhancement of adaptability and support for the achievement and retention of health [10].

Patients with obesity often have multiple complex comorbidities – this can make treatment of individual disease elements challenging. Based on consultations with medical specialist, in addition to diabetic, lipidologic, endocrinologic, and cardiologic examinations, there is a need for gastroenterological (reflux, GERD, fatty liver), pulmonological (asthma), musculoskeletal (arthrosis, osteoporosis), obstructive sleep apnoea, psychiatric (depression) and urological / gynaecological (polycystic ovarian syndrome) examinations. Furthermore, for each subdiscipline, this represents at least 2-3 consultations in the first year, and during the care it will last 2 to 4 consultations per year. In diabetes, it is necessary to monitor the patient every 3 months, and in hypertension, this may be more frequent (weekly or biweekly) during the drug setup period. According to a published study based on NHIF data from 2012, the annual cost per patient with obesity in Hungary is 246,316 forints (EUR 796.6) [11]. However, this amount may be much higher – given the high prevalence of T2DM or high blood pressure in patients with obesity (80% and 60%, respectively), as patient will became part of these DRGs, that could not be taken into account in this estimation [11].

SURGICAL PROCEDURES FOR TREATING OBESITY

Bariatric surgery is the most durable and effective method of treating morbid obesity. It has been shown to be an effective intervention to sustain weight loss in the case of failure of diet and drug therapy. It reduces the incidence of associated diseases, improves quality of life and long-term mortality. More recently, bariatric surgery has been recommended for the treatment of patients with T2DM as well as obesity, due to its demonstrated role in the full or partial remission of type II diabetes [12]. The induction of remission of associated diseases of morbid obesity is one of the most important goals of bariatric surgery. In Western European countries, the standardized indication for bariatric surgery is BMI of 40 kg/m^2 and above, or BMI of 35 kg/m^2 and above when severe or uncontrolled associated diseases are present. The two main surgical options are restrictive (reduced calorie intake) and malabsorptive (reduced nutrient absorption) interventions. In 2005, the European Association for Endoscopic Surgery [13] recommended five surgical options to treat morbid obesity: (1) laparoscopic Roux-en-Y gastric bypass, LRYGB (2) laparoscopic adjustable gastric banding (3) vertical banded gastroplasty, VBG 4) biliopancreatic diversion with duodenal switch (5) laparoscopic gastric sleeve resection (LGSR), see on figures 2 and 3. Vertical banded gastroplasty was a frequent weight loss intervention in the 1990s but has now lost its significance in bariatric surgery due to late complications, unsatisfactory quality of life and weight gain.

The laparoscopic Roux-en-Y gastric bypass (LRYGB) and the laparoscopic sleeve gastrectomy (LSG) are the most commonly used surgeries, and have developed in Hungary within the private healthcare services.

Figure 2.
Structure of the stomach after Roux-en-Y Gastric Bypass

Figure 3.
Structure of the stomach after Laparoscopic Sleeve Gastrectomy

SURGICAL EXPERIENCES IN HUNGARY

Since the efficacy and maintenance of effect of conservative treatment is limited, there is an increasing need for bariatric surgical interventions in our country. These procedures have been used for several years in some institutions as out of pocket financed services, mainly laparoscopic gastric bypass and laparoscopic sleeve resection. At the Veszprém County Hospital between February 2010 and September 2016, 514 laparoscopic Roux-en-Y gastric bypass surgery and 54 laparoscopic sleeve gastrectomies were performed. From these cases, randomly selected data of 40 patients with gastric bypass surgery and 15 sleeve resections were analysed. Based on their experience, both surgical interventions can be performed at with relatively low complication rates and are effective in the long run both in weight loss and in the improvement of co-morbidities [14].

INSTITUTIONAL NETWORK OF IMPLEMENTATION

Bariatric surgeries are only to be performed by a specialist, in a centre where the perioperative pathway is planned and optimized in detail. Postoperative care of patients is also a complex task, managed by a multi-disciplinary team (obesity specialist, internal medicine specialist, cardiologist, diabetologist, rheumatologist, dietician, physiotherapist, psychologist) [14]. Follow-up is at least as important as surgery itself, since vitamin deficiency states may occur – life-long follow-up is recommended. Procedures should be conducted by a multidisciplinary team, and obesity management centres (bariatric centres) should have adequate qualified staff and appropriate equipment.

In order to assess the impact of a range of possible increases in procedural numbers, an expert assessment of existing Hungarian epidemiological data was undertaken. The number of surgical centres with NHIF funding, and the asso-

ciate number of cases is shown by 3 scenarios in tables 1 and 2.

Bariátriai műtétek éves esetszám becslése					
Szcenáriók/időszak	**2019**	**2020**	**2021**	**2022**	**2023**
A szcenárió (alacsony)	146	278	454	622	732
B szcenárió (közepes)	**244**	**463**	**756**	**1 037**	**1 220**
C szcenárió (magas)	293	602	1 021	1 472	1 829

Table 1.
Number of cases (expert estimation based on Hungarian epidemiology data)

Bariátriai műtétet végző centrumok száma - NEAK finanszírozással					
Szcenáriók/időszak	**2019**	**2020**	**2021**	**2022**	**2023**
A szcenárió (alacsony)	2	3	3	4	4
1 centrumra eső műtéti szám	73	93	151	156	183
B szcenárió (közepes)	**3**	**4**	**5**	**6**	**7**
1 centrumra eső műtéti szám	**81**	**116**	**151**	**173**	**174**
C szcenárió (magas)	4	5	6	8	10
1 centrumra eső műtéti szám	73	120	170	184	183

Table 2.
Number of centers (expert estimation based on Hungarian epidemiology data)

A conservative approach was used to estimate the size of the potential patient population in Hungary. It was assumed that of the nearly 250,000 patients with severe obesity, only 10% are indicated to surgery, and surgery is performed on 5% annually (1233 cases). If the appropriate financing background, necessary diagnoses codes and fees were implemented by the end of 2018, the estimated annual number in scenario B could be reached by 2023. The starting number is 20% of the average annual surgical number to be reached in year 5 of the program (244 cases per year), with a moderate upward trend of 5 years. The number of surgical centres starts from 3 in 2019, followed by a gradual annual increase until the end of the 5 year period (8 centres).

CHALLENGES AND OPPORTUNITIES OF FUNDING

In order to improve equal access to healthcare and to reduce healthcare costs, we propose the construction and implementation of two new DRGs (with and without complications), to facilitate the public funding of LRYGB and LSG). The two surgical types have a different cost structure, caused primarily by deviation within the disposable high-value devices used or the average duration of the operation. The distribution of cost-per-acquisition is illustrated by the pie charts of figure 4 and 5:

The cost and proportion of total costs of disposable devices is very high (73-76%) based on real hospital controlling data, which plays an important role in determining the NHIF funding proposal. Subsequently, as a result of sectorial wage increases, the increase in the size and proportion of medical and professional wage costs might be expected, while as a result of the larger number of surgeries, the price of disposable assets can also be reached through public purchasing

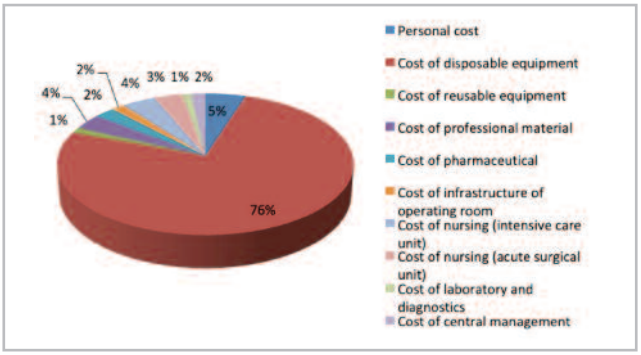

Figure 4.
Cost structure of LRYGB (Veszprém County Hospital Controlling data)

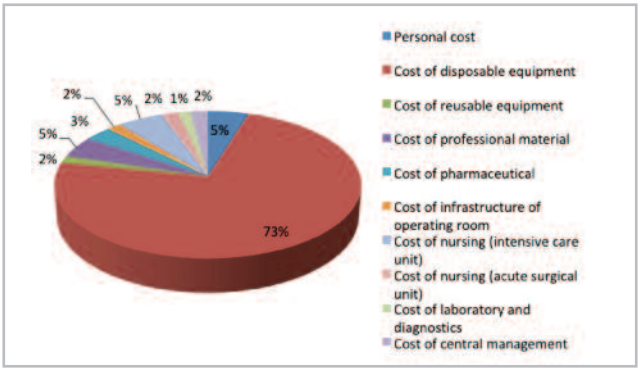

Figure 5.
Cost structure of LGSR, (Veszprém County Hospital Controlling data)

discounts. The two surgical types were taken into account in the calculation of the average cost of 70-30%, as a weighted average the cost of a surgery came to HUF 1.48 million. For the two surgical procedures, we recommend two new ICPM (OENO) codes for inclusion and two new DRGs. To determine the value of the new DRGs we need cost calculations that can be built on a case-by-case basis. Disposable devices required for the procedures would be financed within the framework of "Devices subject to specific financing" of NHIF. Disposable devices require HUF 1.21 million as financing by cases for gastric bypass surgery and HUF 0.89 million for gastric sleeve surgery based on list prices and hospital controlling data.

Based on these, the new code would be 06P 277 for DRG (laparoscopic metabolic surgeries for obesity). The cost of disposable devices was deducted from the total cost of the two procedures. We then took the weighted average of these two costs in the proportion of the performed surgeries (70-30%) and distributed with the officially published 198,000 HUF base fee by the NHIF, resulting in a DRG weight number of 1.86548. The other new code 06P 277 for DRG (laparoscopic metabolic surgery for obesity with a complication) is needed because there are perioperative or postoperative complications in about 2-5% of the cases. The greatest surgical risk is anastomosis insufficiency due to bleeding and intestinal tract anomalies. For calculating the cost of a complicated surgical procedure, “289B Gastrointestinal bleeding”

and “297L Esophagitis, gastroenteritis, and different gastrointestinal disorders over 18 years” (weight 0.48940) were used. This was added to the weight of DRG with complications, resulted the weight number of 2.35488.

SUMMARY

Due to the steady increase in the prevalence of obesity, it is necessary to use and publicly fund effective surgical procedures, in addition to ongoing investment in preventative policies and non-surgical therapeutic options. Obesity, in addition to the deterioration in the quality of life, carries a number of significant health risks, including an increased risk of T2DM, heart disease, hypertension, thrombosis and stroke. Based on international literature and our cost-effectiveness analysis, bariatric surgery is less costly and provides greater health benefits than conservative therapies in the medium and long term. Surgical procedures lead to positive health benefits with a relatively low risk, both in terms of weight loss and remission or improvement of associated diseases. In our country, these procedures have been applied for a number of years in out of pocket financed healthcare – most notably laparoscopic gastric bypass and laparoscopic sleeve gastrectomy. In this article, we have highlighted the importance of public funding for these procedures, and proposed a funding method. We recommend the design of two restrictedly used DRGs (one normal and one complicated one). For the high cost of high-value disposable devices, we consider the importance to provide case-based funding for these devices in entitlement centres.

The publication was implemented with the professional support of Johnson & Johnson Ltd.

REFERENCES

[1] WHO: Obesity and overweight. http://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight (megtekintve 2018. július 31-én)
[2] OECD: Obesity Update 2017. http://www.oecd.org/health/obesity-update.htm (megtekintve 2018. július 31-én)
[3] Rurik I: Obesitas és obezitológia Magyarországon. Metabolizmus, 2015, február, XII. évfolyam. 1. szám. 67–72.
[4] Balogh S, Kékes E, Császár A: Estimation of cardiovascular risk factors within primary care practices, 2014.
[5] Martos É, Kovács VA, Bakacs M et al.: Hungarian diet and nutritional status survey – the OTAP2009 study, Orvosi Hetilap, 2012, július 15;153(28):1106-17.
[6] Császár A: Obesitás. Elmélet és Klinikum. (Józwiak-Hagymásy J, Kaló Z. Az obesitás betegségterhe 269-280. old, Alföldi Nyomda, 2010.).
[7] WHO/Europe: Obesity. http://www.euro.who.int/en/health-topics/noncommunicable-diseases/obesity/obesity (megtekintve 2018. július 31-én)
[8] Swinburn et al.: The global obesity pandemic: shaped by global drivers and local environments, Lancet, 2011, Aug 27; 378 (9793): p. 804-14.
[9] WHO: BMI classification. http://apps.who.int/bmi/index.jsp?introPage=intro_3.html (megtekintve 2018. július 31-én)
[10] Benedix F, Frank Meyer F, Klose S, Stroh C, Lippert H: A sebészet helye a 2-es típusú cukorbetegség kezelésében, Orvostovábbképző Szemle, XXI. évf. 9. szám, 2014, (szeptember) 59.oldal.
[11] Iski G, Rurik I: Becslések a túlsúly és az elhízás hazai gazdasági terheiről, Orvosi Hetilap, 2014, 155. évfolyam 35. szám.
[12] Schauer PR, Bhatt, DL, Kirwan JP, Wolski K, Aminian, A, Brethauer SA, Navaneethan SD, Singh RP, Pothier CE, Nissen SE, Kashyap SR: Bariatric Surgery versus Intensive Medical Therapy for Diabetes — 5-Year Outcomes, The New England Journal of Medicine 2017, 376:641-51.
[13] Sauerland S, Angrisani L, Belachew M, Chevallier JM, Favretti F, Finer N, Fingerhut A, Garcia Caballero M, Guisado Macias JA, Mittermair R, Morino M, Msika S, Rubino F, Tacchino R, Weiner R, Neugebauer EA: Obesity surgery: evidence-based guidelines of the European Association for Endoscopic Surgery (EAES), Surgical endoscopy, 2005, Feb;19(2):200-21.
[14] Fried M, Yumuk V, Oppert J-M, Scopinaro N, Torres AJ, Weiner R, Yashkov Y, G Frühbeck: Interdisciplinary European Guidelines on Metabolic and Bariatric Surgery, Obes Facts, 2013, 6:449–468.
[15] NICE. Surgery for obese adults. www.pathways.nice.org.uk/pathways/obesity (megtekintve 2018. július 31-én).
[16] Society of American Gastrointestinal and Endoscopic Surgeons. Guidelines for clinical application of laparoscopic bariatric surgery. www.sages.org/publications/guidelines/guidelines-for-clinical-application-of-laparoscopic-bariatric-surgery (megtekintve 2018. július 31-én).
[17] Mohos E, Nagy A, Szabados Gy, Szabó L, Szabó L, Gál , Kiss M, Réti Gy, Kovács T, Jánó Z, Berki Cs, Mohay J, Bene K, Bognár G, Horzov M, Mohos P, Sándor G, Tornai G, Szenkovits P, Nagy T, Orbán Cs, Herpai V: Metabolikus sebészeti tevékenységünk, 2010–2016 (Magyar Sebészet 2016;) Eredeti Közlemény (173-177).
[18] Mohos E: A kóros kövérség kezelése laparoscopos Roux Y gastric bypass műtéttel (PhD – értekezés Pécsi Tudomány Egyetem, Általános Orvosi Kar, Pécs 2011). http://docplayer.hu/10037850-A-koros-koverseg-kezelese-laparoscopos-roux-y-gastric-bypass-mutettel.html (megtekintve 2018. július 31-én).