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HISTORY OF MEDICINE / ИСТОРИЈА МЕДИЦИНЕ

Development of bariatric/metabolic surgery in Vojvodina

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SUMMARY
The paper presents the chronological development of bariatric/metabolic surgery in Vojvodina, the region with the largest incidence of obesity in Serbia, and in which 13.2% of the population suffers from diabetes with a mortality of 15.7/100,000, which is one of the highest rates in Europe.
Bariatric surgery began in the 1950s in the United States, with the consecutive development of various restrictive, malabsorptive, and combined procedures, which are intensified by the adoption of laparoscopic techniques.
After initial, European knowledge and preparation of obese patients for surgery at the end of the 1970s, the first laparoscopic bariatric/metabolic interventions started in Vojvodina at the Clinical Center in Novi Sad in 2006. Next year, the multidisciplinary team for bariatric surgery was prepared in Slovenia and Austria, and the first interventions were performed in 2008 at the Clinic for Thoracic Surgery of the Institute in Sremska Kamenica, in the first-place laparoscopic sleeve gastrectomy. Since then, bariatric/metabolic surgery at this Institute have continuously been performed. By establishing international cooperation, three courses were held with demonstration operations in bariatric/metabolic surgery and the participation of eminent surgeons and other experts from the country and abroad. Several bariatric surgeries were performed on children (at the Children's Surgery Clinic in Novi Sad), as well as in Sremska Mitrovica. Their own experience in this field has been published in the international literature and through several regional meetings dedicated to metabolic surgery.
Keywords: bariatric surgery; laparoscopic sleeve gastrectomy; mini gastric bypass

INTRODUCTION

Bariatric surgery or weight loss surgery is considered different operative procedures with the aim of treating obesity. The word bariatric has origin from the Greek root of the two words which mean weight and treatment [1]. Obesity is a serious public health problem [2]. People who have elevated body mass index (BMI) have a significantly increased risk of developing cardiovascular, endocrine and infectious diseases, diabetes mellitus, cancer and asthma, as well as sleep apnea, musculoskeletal disease and sudden death [3, 4, 5]. In addition, obesity affects the social, economic and psychological function of a person in society. Although conservative treatment is first in the treatment of obesity and includes a diet, exercise, lifestyle change, and anti-obesity drugs, it is not successful in a long way [6]. Today, the surgical treatment of obesity and associated "metabolic syndrome" is recommended by the World Health Organization, but also by endocrine and other international associations [7, 8]. Due to the effects on metabolism, primarily on the metabolism of glucose and fat, bariatric surgery is also called metabolic surgery. Vojvodina is, according to the epidemiological and social medical indicators of the regions in Serbia and Europe, severely affected by obesity and associated metabolic syndrome, primarily diabetes and hypertension. According to the Institute of Public Health Institute of Serbia report from 2016, 13.2% of the adult population suffers from type 2 diabetes mellitus, with a mortality rate of 15.7 / 100,000, which represents the highest rate in Europe. Vojvodina and its "districts" (Bačka, Central Banat, and South Banat district) have the highest incidence of diabetes, over 160:100,000 [9, 10]. In the past decades sporadically and relatively constant in the last ten years, bariatric/metabolic surgery in Vojvodina has been performed.

The aim of the paper is to present the development of bariatric/metabolic surgery in Vojvodina.

THE HISTORY OF BARIATRIC/METABOLIC SURGERY IN THE WORLD

The development of open bariatric surgery began in the fifties of the last century, using the intestinal bypass [11]. In this procedure, the upper part of the intestine (jejunum) merged with the lower part of the small intestine (ileum), which left a large part of the small intestine to be excluded from digestion and caused weight loss by malabsorption [12]. Thereafter in the 1960s, a jejuno-colic bypass was made: the proximal small intestine is transected and anastomosed to the colon [13]. In 1967, on the basis of experiments

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in the laboratory, the "father" of bariatric surgery Edward Mason developed the original gastric bypass [14]. In 1977, following the work of Alden (who made gastro-jejunostomy – a surgical procedure in which an anastomosis is created between the stomach and the proximal loop of the jejunum), Griffen introduced Roux-en-Y anastomosis into bariatric surgery and this procedure became a gold standard in bariatric/metabolic surgery [11, 15].

As a combined restrictive and malabsorptive procedure, the Roux-en-Y gastric bypass was followed by dumping syndrome, iron deficiency and vitamin B12 deficiency. In the 1970s and 1980s, purely restrictive surgery, gastroplasty, was brought into bariatric surgery [16]. The procedures on the stomach and its reduction were followed by the set of rings or staples [17]. These operations showed fewer complications but were accompanied by minor weight loss.

The modern era in bariatric surgery begins with the operation of the biliopancreatic diversion performed by the Italian surgeon Nicola Scopinaro. The first report on 18 patients was published in 1979 [18]. He performed a horizontal hemi-gastrectomy with pouch drainage by a Roux limb of at least 250 cm in length, joining a long biliopancreatic limb to form 50 cm long common ileal segment, or channel. This procedure was converted by Marceau et al. [19] in Canada to a vertical sleeve gastrectomy with cross-stapling of the duodenum and an approximately 100 cm-long common channel.

In 1998, Hess and Hess [20] in the USA made a duodenal switch, by performing a sleeve gastrectomy, with pyloric preservation, duodenal division, a proximal duodeno-ileostomy, and a common channel of approximately 100 cm. In this version of the biliopancreatic diversion called "biliopancreatic diversion with duodenal separation" (BPD-DS), which began to be performed laparoscopic, the volume of the stomach was reduced to about 200 milliliters, drawing the future sleeve gastrectomy.

Kuzmak [21] introduced a silicone tape in 1986 that could be filled through the subcutaneous chamber and "adjusted" with clamping around the cardia area, preventing excessive filling of the stomach. Forsell et al. [22] first set up a laparoscopic "adjustable gastric band" in 1993.

Laparoscopic sleeve gastrectomy (LSG) or vertical gastric resection was first performed by Michel Gagner in 1999 within the BPD-DS. In 2003, the same surgeon did the LSG as the first stage of two-stage Roux-en-Y gastric bypass (RYGB) surgery in patients at high risk and BMI higher than 50 kg / m^2. Shortly after this description, the articles followed in which the LSG was performed as an independent and sufficient procedure for the treatment of obesity and metabolic disorders due to good results [23, 24]. Today, this operation is the most commonly performed procedure in metabolic surgery in the whole world [25].

DEVELOPMENT OF BARIATRIC/METABOLIC SURGERY IN VOJVODINA

The first theoretical knowledge on bariatric surgery and the first preparation of patients were done in Novi Sad by the associate professor of surgery Borislav Savić, who worked in the Surgical Clinic from 1979 to 1981. He came from Germany as an affiliated surgeon and author of the book "Septic Surgery", published in Stuttgart [26]. The cooperation of surgeons and internist-endocrinologists was done on the Faculty of Medicine in Novi Sad. The sudden death of Professor Savić stopped the realization of the first bariatric interventions, but the idea continued to live in the followed generations of surgeons and internists. The first laparoscopic interventions on biliary tract were carried out in 1996 in Sremska Kamenica at the Clinic for Cardiovascular Surgery by Professor Branislav Daničić and Dr Miroslav Ilić, who were abdominal surgeons (equipment for laparoscopic procedures was only available to this institution). After the introduction of laparoscopic methods in the Clinical Center of Vojvodina at the Clinic for Abdominal and Endocrine Surgery and the complete experience in this surgery (laparoscopic adrenalectomy, laparoscopic reparation of hiatal hernia, laparoscopic appendectomy), the first operation of setting up a Swedish adjustable gastric band (SAGB – Johnson & Johnson®) was performed by Professor Radovan Cvijanović with his team in 2006. He continued this procedure to work in Parks Dr Dragi Special Surgical Hospital in Novi Sad. In 2007, after obtaining the necessary equipment for bariatric procedures at the Institute for Lung Diseases at the Clinic for Thoracic Surgery, the multidisciplinary team (surgeons, psychologist, nutritionist, anesthesiologist, nurses) was in Slovenj Gradec (Slovenia) for conducting bariatric operations under the management of Dr Brane Breznikar.

Immediately afterward, courtesy of Johnson & Johnson® medical company, Dr Miroslav Ilić was at the Clinic for Bariatric Surgery under the mentorship of Associate Professor Karl Miller (Head of the Surgical Department, Hallein Clinic, Austria), where he was educated primarily for the SAGB procedure and Roux-en-Y gastric bypass.

The first bariatric/metabolic laparoscopic procedures were performed at the Clinic for Thoracic Surgery of the Institute of Pulmonary Diseases of Vojvodina on October 31, 2008, with the guidance of Dr Miller, two SAGB procedures and one LSG on a mega-obese patient (BMI 70 kg/m^2) [27]. At the same time, Professor Miller held a public lecture about bariatric medicine and surgery in front of representatives of provincial authorities in order to point out the financial advantages of early treatment of obesity and metabolic syndrome.

The first accredited two-day multidisciplinary Alma Mons course (Continuing Medical Education) was held in October 2013 with lecturers from Serbia, Bosnia and Herzegovina, Croatia, Romania and Turkey, with live performance and monitoring with the possibility of asking questions to surgeons during the procedure. The lecturers were: internist endocrinologists Professor Edita Stokić (Novi Sad, Serbia), Dr Snežana Polovina (Belgrade, Serbia), internist pulmonologist Assistant Professor Ivan Kopitović, anesthesiologists Dr Milana Komarčević (Sremska Kamenica, Serbia) and surgeons Professor Miroslav Bekavac-Beslin (Zagreb, Croatia), Assistant Professor Fuad Pašić (Tuzla, Bosnia and Herzegovina), Professor Catalin



Figure 1. Dr Robert Rutlage and Professor Miroslav Ilić

Copăescu (Bucharest, Romania), Professor Alper Celik (Istanbul, Turkey), Assistant Professor Miloš Koledin and Professor Miroslav Ilic (Sremska Kamenica, Serbia). The following operations were performed: laparoscopic "resleeve" gastrectomy and laparoscopic ileal interposition. Both of these operations were first performed in Serbia.

The second Alma Mons course was held in November 2014 with the participation of surgeons from the Netherlands, Croatia and Serbia. The lecturers were Dr Arlond van de Laar, Head of Bariatric Surgery at the Slotervaart Hospital in Amsterdam (the Netherlands), the European Center of Excellence for Bariatric Surgery, with associates Dr Yair Acherman and Dr M. Hoen, whose focus was on Roux-en-Y gastric bypass, then Professor Davor Štimac (Rijeka Clinical Hospital Center, Croatia) – about intragastric balloons. Cooperation and meeting with Professor Bešlin-Bekavac (Sestre Milosrdnice University Hospital Center, Zagreb, Croatia) and Assistant Professor F. Pašić (Tuzla University Clinical Center, Tuzla, Bosnia and Herzegovina). The third Alma Mons course was dedicated to only one surgeon and surgery: Dr Robert Rutlegde (Center for Excellence in Laparoscopic Obesity Surgery, Henderson, USA) and his metabolic laparoscopic procedure – "mini-gastric bypass" (MGB/OAGB). This course was held on May 30, 2016, with the theoretical part and the performance of two MGB/OAGB operations carried out by Dr Robert Rutlage and Professor Miroslav Ilić (Figure 1). These interventions were performed for the first time in the region of Southeast Europe.

Since 2008, bariatric/metabolic surgeries are continuously performed at the Clinic for Thoracic Surgery in Sremska Kamenica under the leadership of Professor Miroslav Ilić [28].

According to the data from the operational protocols and electronic patient records, in the period from 2008 to 2020, about 500 bariatric procedures were performed.

The most commonly performed procedure is LSG with 380 operations. Complications included three postoperative bleeding, four anastomotic leaks, two chronic fistulas and one neofundus that were resolved surgically and one fistula that was treated conservatively.

Other bariatric procedures have been performed: 18 SAGBs, nine laparoscopic mini-gastric bypass, five Roux-en-Y gastric bypass, three laparoscopic "resleeve" gastrectomy, one laparoscopic ileal interposition, two single anastomosis sleeve ileal bypass, one more open LSG, and one mini-gastric bypass.

Professor Radoica Jokić, a pediatric and abdominal surgeon, has performed several bariatric interventions on children (LSG), with his colleague Professor Dragan Kravarušić (Schneider Children's Medical Center, Israel), with excellent results at the Children's Surgery Clinic in Novi Sad. Attempts to carry out the SAGB bariatric procedure were also recorded at the General Hospital of Sremska Mitrovica by Dr Goran Ivić in 2010 but without further continuity.

Dr Srđan Putnik (Vršac General Hospital) has presented the results of his own experiences and guest appearances abroad in several publications, as well as doctoral theses, in which the general surgeon from Vršac was very diligent [27, 28, 29].

Apart from Vojvodina, bariatric surgery is also performed at the University Clinical Center of Serbia. Thanks to Academician Professor Dragan Micić, the Multidisciplinary Center for Obesity Treatment was opened in 2010. Of the bariatric procedures, RYGB and LSG are the most common. According to the data from the literature, about 100 Roux-en-Y gastric bypass were performed [30].

Other centers in Serbia are also showing great interest in this type of increasingly popular surgery.

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Развој баријатријске/метаболичке хирургије у Војводини

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САЖЕТАК

У раду је дат хронолошки развој баријатријске/метаболичке хирургије у АП Војводини, регији која има највећу инциденцу гојазних особа и у којој 13,2% популације болује од шећерне болести са морталитетом од 15,7/100.000 становника, што је једна од највиших стопа у Европи.

Баријатријска хирургија почиње педесетих година прошлог века у САД, са консекутивним развојем различитих рестриктивних, малапсорптивних и комбинованих захвата који се интензивирају усвајањем лапароскопских техника.

Након почетних, европских сазнања и припреме гојазних болесника за операцију крајем седамдесетих година, прве лапароскопске баријатријске/метаболичке интервенције започињу у АП Војводини у Клиничком центру у Новом Саду 2006. године постављањем „шведске прилагодљиве траке". Следеће године мултидисциплинарни тим за баријатријску хирургију припрема се у Словенији и Аустрији, те се прве интервенције лапароскопске рукавне ресекције желуца изводе 2008. године на Клиници за грудну хирургију Института у Сремској Каменици. Од тада се баријатријска/метаболичка хирургија на овом месту изводи у континуитету. Успостављајући међународну сарадњу, одржана су три курса са показним операцијама из баријатријске/метаболичке хирургије и учешћем еминентних хирурга и других експерата из земље и иностранства. Неколико баријатријских операција изведено је у Сремској Митровици, као и код деце на Клиници за дечју хирургију у Новом Саду.

Сопствена искуства из ове области публикована су у међународној литератури и представљена на великом броју регионалних састанка посвећених метаболичкој хирургији.

Кључне речи: баријатријска хирургија; лапароскопска рукавна ресекција желуца; мини желудачно премошћавање