

Bariatric Surgery in Asia in the Last 5 Years (2005–2009)

Davide Lomanto · Wei-Jei Lee · Rajat Goel · Jeannette Jen-Mai Lee · Asim Shabbir · Jimmy BY So · Chih-Kun Huang · Pradeep Chowbey · Muffazal Lakdawala · Barlian Sutedja · Simon K. H. Wong · Seigo Kitano · Chin Kin Fah · Hildegardes C. Dineros · Andrew Wong · Anton Cheng · Shanker Pasupathy · Sang Kuon Lee · Paisal Pongchairerks · Tran Binh Giang

Published online: 28 October 2011
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Abstract Obesity is a major public health concern around the world, including Asia. Bariatric surgery has grown in popularity to combat this rising trend. An e-mail questionnaire survey was sent to all the representative Asia-Pacific Metabolic and Bariatric Surgery Society (APMBSS) members of 12 leading Asian countries to provide bariatric

surgery data for the last 5 years (2005–2009). The data provided by representative members were discussed at the 6th International APMBSS Congress held at Singapore between 21st and 23rd October 2010. Eleven nations except China responded. Between 2005 and 2009, a total of 6,598 bariatric procedures were performed on 2,445 men and

These data have been presented at the 6th International Congress of the Asia-Pacific Metabolic Bariatric Surgery Society (APMBSS) held in Singapore between 21st and 23rd October 2010 and supported by APMBSS.

D. Lomanto · R. Goel (✉) · A. Shabbir · J. B. So
Department of Surgery, Minimally Invasive Surgical Centre,
National University Hospital,
5 Lower Kent Ridge Road,
119074 Singapore, Singapore
e-mail: goelrajat27@gmail.com

W.-J. Lee
Department of Surgery, Min-Sheng General Hospital,
Taipei, Taiwan

J. J.-M. Lee
Department of Epidemiology and Public Health, Yong Loo Lin
School of Medicine, National University of Singapore,
Singapore, Singapore

C.-K. Huang
Bariatric & Metabolic International Surgery Center,
E-Da Hospital,
Kaohsiung, Taiwan

P. Chowbey
Institute of Minimal Access, Metabolic & Bariatric Surgery,
Max Healthcare,
New Delhi, India

M. Lakdawala
Minimal Access & Bariatric Surgery, Saifee Hospital,
Mumbai, India

B. Sutedja
Department of surgery, R.S. Gading Pluit Hospital,
Jakarta, Indonesia

S. K. H. Wong
Department of surgery, Prince of Wales Hospital,
Hong Kong, China

S. Kitano
Department of surgery, Faculty of Medicine, Oita University,
Oita, Japan

C. K. Fah
Upper GI, Metabolic and Surgical Nutrition Unit,
MILES & Nutrition, University Malaya,
Malaya, Malaysia

H. C. Dineros
Section of Bariatric Surgery, St Luke's Medical Center,
Manila, Philippines

A. Wong
Department of UGI and Bariatric Surgery,
Changi General Hospital,
Singapore, Singapore

A. Cheng
Department of UGI and Bariatric Surgery,
Khoo Teck Puat Hospital,
Singapore, Singapore

4,153 women with a mean age of 35.5 years (range, 18–69 years) and mean BMI of 44.27 kg/m² (range, 31.4–73 kg/m²) by 155 practicing surgeons. Almost all of the operations were performed laparoscopically (99.8%). For combined years 2005–2009, the four most commonly performed procedures were laparoscopic adjustable gastric banding (LAGB, 35.9%), laparoscopic standard Roux-en-Y gastric bypass (LRYGB, 24.3%), laparoscopic sleeve gastrectomy (LSG, 19.5%), and laparoscopic mini gastric bypass (15.4%). Comparing the 5-year trend from 2004 to 2009, the absolute numbers of bariatric surgery procedures in Asia increased from 381 to 2,091, an increase of 5.5 times. LSG increased from 1% to 24.8% and LRYGB from 12% to 27.7%, a relative increase of 24.8 and 2.3 times, whereas LAGB and mini gastric bypass decreased from 44.6% to 35.6% and 41.7% to 6.7%, respectively. The absolute growth rate of bariatric surgery in Asia over the last 5 years was 449%.

Keywords Gastric banding · Asia · Sleeve gastrectomy · Gastric bypass · Epidemiology

Introduction

The epidemic of obesity has escalated globally over the past few years [1]. The WHO reports that globally in 2008, approximately 1.5 billion adults (over the age of 20) were overweight (BMI > 25 kg/m²), and of these, over 200 million men and nearly 300 million women were obese (BMI > 30 kg/m²) [2]. Overweight and obesity are independent risk factors for diabetes, cancer, cardiovascular disease, and premature death [3, 4]. The health burden of obesity, as measured by quality-adjusted life years lost, has more than doubled from 1993 to 2008 [5]. Obesity has thus become one of the greatest public health concerns, and Asia has not been spared. The different fat distribution in Asian patients and their susceptibility to

obesity-related disease at lower BMI have led to a reduction in BMI threshold to 23 kg/m² and above for overweight and 27.5 kg/m² and above for obesity [6]. For obese individuals, bariatric surgery has emerged as the most effective and viable tool for sustainable weight loss [7, 8]. Bariatric surgery has significantly decreased overall mortality with a marked survival advantage [9, 10]. The growth of the laparoscopic approach to bariatric surgery has made it more acceptable to patients in the Asia-Pacific region, prompting increased numbers of cases and making it important to audit the state of bariatric surgery [11] by answering certain basic questions regarding the number and details of bariatric procedures being performed.

Keeping this in mind, we discussed the data for bariatric surgery for the past 5 years with representative Asia-Pacific Metabolic and Bariatric Surgery Society (APMBSS) members of leading Asian countries at the 6th International APMBSS Congress held in Singapore from 21st to 23rd October 2010. We thus present a bariatric surgery audit for the past 5 years (2005–2009), with year 2004 as comparison in an Asian context based discussions during the congress.

Methods

Questionnaire

An e-mail survey, consisting of three questions (Table 1), was sent to representative APMBSS members practicing bariatric surgery in 12 Asian countries. The following procedures were queried: open and laparoscopic sleeve gastrectomy (LSG), open and laparoscopic adjustable gastric banding (LAGB), open and laparoscopic standard Roux-en-Y gastric bypass (LRYGB), laparoscopic mini-gastric bypass (LMGB), open and laparoscopic long-limb and very long-limb gastric bypass (>100 cm), open and laparoscopic biliopancreatic diversion (Scopinaro procedure), open and laparoscopic duodenal switch, open and laparoscopic vertical banded gastroplasty, intragastric balloon, electronic pacers, and others. If deemed necessary, a second e-mail was sent for further data and clarifications. The individual members (listed in the Acknowledgements) did their local survey and provided the data discussed *vide infra*.

Data Analysis

A tabular and graphic presentations of the data received were prepared and certain derived data were calculated. The data were collected and analyzed using SPSS software.

S. Pasupathy
Department of UGI and Bariatric Surgery,
Singapore General Hospital,
Singapore, Singapore

S. K. Lee
Division of Bariatric Surgery, Seoul St. Mary's Hospital,
Seoul, South Korea

P. Pongchairerks
Department of Surgery, Bumrungrad Hospital,
Bangkok, Thailand

T. B. Giang
Department of Surgery, Vietduc University Hospital,
Vietduc, Vietnam

Table 1 Questionnaire

1. Approximate no. of bariatric operations performed during 2005–2009 in your country and their demographic profile?
2. Approximately how many surgeons performed the bariatric procedure in your country during this period?
3. What are the relative percentages of the types of procedures performed in your country, considering the total percentage to be 100?

Results

Response Rate

Out of potential 12 APMBSS representatives of major Asian nations, there were 11 responders (91.6%). Except China, all major Asian nations responded (Table 2).

Number of Procedures

In response to the first question, the Asian total came out to 6,598 procedures during a 5-year period from 2005 to 2009, with Taiwan and South Korea performing more than 4,000 procedures in total (Table 2). These procedures were performed on 2,445 men and 4,153 women with mean age at surgery of 35.5 years (range, 18–69 years) and mean BMI of 44.27 kg/m² (range, 31.4–73 kg/m²).

Number of Metabolic/Bariatric Surgeons

In response to the second question, the Asian total came out to be 155 surgeons (Table 2). India ($n=50$) and South Korea ($n=23$) have the most number of bariatric surgeons.

Table 2 Number of bariatric surgery procedures and number of surgeons performing the procedure (2005–2009)

Country	No. of procedures	No. of surgeons
Japan	353	12
Singapore	280	12
Taiwan	2,468	9
Vietnam ^a	45	NDA
Thailand	420	12
South Korea	1,643	23
Philippines	479	15
Malaysia ^b	17	12
Indonesia ^a	50	NDA
India ^b	530	50
Hong Kong	313	10
Total	6,598	155

^a Incomplete data

^b No data available

Types of Procedures Performed

In response to our third question, the distributions of bariatric procedures during the last 5 years, from 2005 to 2009, are shown in Table 3. The four most commonly performed procedure were LAGB (35.9%), LRYGB (24.3%), LSG (19.5%), and laparoscopic mini-gastric bypass (15.4%), respectively.

Classification of Procedures Performed

Almost all bariatric procedures were done laparoscopically (99.8%).

Type of Procedure

Fifty-eight percent of bariatric procedures were purely restrictive (AGB, SG, vertical band gastroplasty (VBG), intragastric balloon), 41% of procedures were restrictive and malabsorptive (RYGB, mini-gastric bypass, long-limb bypass), and only 1% of the procedures were primarily malabsorptive (duodenal switch, BPD; Table 3).

Table 3 Distribution of bariatric procedures (2005–2009)

Distribution of bariatric procedures	Percentage
Laparoscopic sleeve gastrectomy	19.5
Open sleeve gastrectomy	<0.1
Laparoscopic adjustable gastric banding	35.9
Open adjustable gastric banding	<0.1
Laparoscopic Roux-en-Y gastric bypass	24.3
Open Roux-en-Y gastric bypass	0.1
Laparoscopic mini-gastric bypass	14.7
Laparoscopic long-limb and very long-limb gastric bypass (>100 cm)	<0.1
Open long-limb and very long-limb gastric bypass (>100 cm)	0
Laparoscopic biliopancreatic diversion (Scopinaro procedure)	<0.1
Open biliopancreatic diversion (Scopinaro procedure)	0
Laparoscopic duodenal switch	0.5
Open duodenal switch	0
Laparoscopic vertical banded gastroplasty	1.4
Open vertical banded gastroplasty	<0.1
Electronic pacers	0
Others (intra-gastric balloon + redo + DJ bypass)	3.1
Total	100

Asian Trends

Comparing the 5-year trend from 2004 to 2009, the absolute number of procedures for all bariatric surgeries in Asia over the last 5 years increased from 381 to 2,091, an increase of 5.5 times (Fig. 1). LSG increased from 1% to 24.8% and LRYGB from 12% to 27.7%, thus a relative percentage increase of 24.8 and 2.3 times, respectively. However, LAGB and mini-gastric bypass decreased from 44.6% to 35.6% and from 41.7% to 6.7%, respectively (Fig. 2). The absolute growth rate of bariatric surgery in Asia over the last 5 years was 449%.

Discussion

The Asian perspective of bariatric surgery was first discussed in the 1st Asia-Pacific Bariatric Consensus Meeting held in Taipei, 27 February 2005, by the Asia-Pacific Bariatric Surgery Group (APBSG) founded in Seoul, Korea, on October 6, 2004 [12]. It was found that bariatric surgery in Asia has undergone a paradigm shift since Taiwan performed the first bariatric surgery, Jejuno ileal bypass in the 1970s, followed by VBG in 1981. Laparoscopy in the form of LVBG was first started in 1998 in Taiwan, followed by the first LAGB in Singapore in 1999 and LRYGBP and LMGB in Taiwan in 2000 and 2001, respectively [12]. The 2005 APBSG Consensus Meeting modified the indication for bariatric surgery for Asian people to: obese patients with BMI>37, obese patients with BMI>32 with the presence of diabetes or two significant obesity-related comorbidities, patients unable to lose or maintain weight loss by dietary or medical measures, and patients >18 and <65 years of age. LAGB and LRYGB were the two most common procedures performed at that time in Asia.

This survey reports the recent 5-year trends of bariatric surgery in Asia from 2005 to 2009 and documents the number and types of bariatric procedures being performed. The data obtained from individual APMBSS representa-

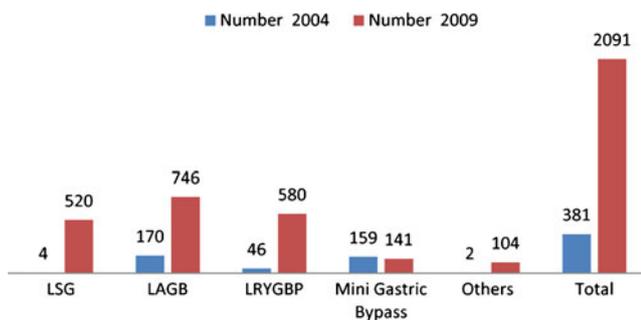


Fig. 1 Total number of bariatric procedures

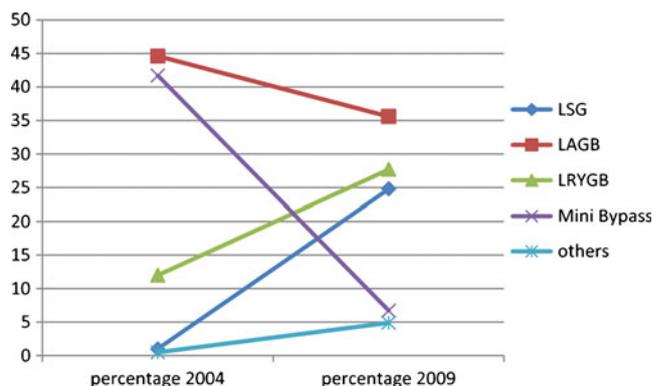


Fig. 2 Trends of bariatric procedures (%)

tives of the leading Asian countries were discussed and clarified at the 6th International APMBSS Congress held in Singapore. Overall, there was a 5.5 times increase in bariatric surgery with an increase in LSG and LRYGB procedures, but a decrease in LAGB and mini-gastric bypass procedures. Considering the absolute numbers, the total number of procedures being performed has increased from 381 in 2004 to 2,091 in 2009 (Fig. 1 and Table 4), an absolute growth rate of 449%. The percentage of adjustable gastric banding decreased from 44.6% in 2004 to 35.6% in 2009. This may be because of the failure of gastric banding to produce the desired long-term weight loss and associated complications like erosion, ulceration, and band migration. Moreover, the gastric band needs frequent adjustments, requiring multiple visits incurring cost and lifelong follow-up not welcomed by patients [13, 14]. LSG increased from 1% in 2004 to 24.8% in 2009. The rise in the number of sleeve gastrectomies that is seen in Asia parallels global trends [15]. The reason for this may be because of the ease and speed of this procedure compared with other bariatric procedures and no foreign body and good early results [16]. Long-term follow-up data may, however, influence the popular appeal for this procedure. LRYGB has increased in number and mini bypass has decreased. Compared with global trends, it is seen that in USA/Canada, LRYGB is losing its fame and LAGB is again gaining popularity,

Table 4 Trends in number and percentage of bariatric procedures

	Number (%) 2004	Number (%) 2009	Percentage change (n ₂₀₀₉ - n ₂₀₀₄ /n ₂₀₀₄)	Relative percentage change (%2009/%2004)
LSG	4 (1)	520 (24.8)	+12,900	24.8
LAGB	170 (44.6)	746 (35.6)	+339	0.8
LRYGBP	46 (12)	580 (27.7)	+1,160	2.3
Mini Gastric Bypass	159 (41.7)	141 (6.7)	-11.3	0.2
Others	2 (0.5)	104 (4.9)	+5,100	9.8
Total	381 (100)	2,091 (100)	+449	

whereas in Europe the trend parallels Asia with an increase in LRYGB and a decrease in LAGB [15].

The main weakness of this survey is that data from China were not available. Due to the nature of the survey, as opposed to a registry, the data provided may be incomplete. Despite missing data, the clear trends indicate a significant rise in bariatric surgical procedures in Asia. The survey appears to be representative, with a response rate of 91.6% and 11 out of 12 APMBSS member representatives, except China, responding. To increase the accuracy and reliability of the data, it is important to establish a registry with compliance from all representative APMBSS surgeons of all Asian nations practicing bariatric surgery.

Acknowledgments We thank the following individuals and individual country obesity surgical societies for providing the data for this survey: India—Pradeep Chowbey and Muffazal Lakdawala; Indonesia—Barlian Sutedja; Hong Kong—Simon K. H. Wong; Japan—Seigo Kitano; Malaysia—Chin Kin Fah; Philippines—Hildegardes C. Dineros; Singapore—Andrew Wong, Anton Cheng and Shanker Pasupathy; South Korea—Sang Kuon Lee; Taiwan—Wei-Jei Lee and Chih-Kun Huang; Thailand—Paisal Pongchairerks; Vietnam—Tran Binh Giang.

Disclosure All authors declare that they have no competing interest and no relevant financial interest.

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