Updates in Surgery (2021) 73:1509–1514
https://doi.org/10.1007/s13304-021-01013-7

ORIGINAL ARTICLE

Bariatric surgery in Mexico: training, practice and surgical trends

Carlos Zerrweck[1] · Nelson R. Rodríguez[2] · Hugo Sánchez[3] · Luis C. Zurita[4] · Michelle Márquez[5] · Miguel F. Herrera[6] on behalf of the CMCOEM

Received: 27 December 2020 / Accepted: 22 February 2021 / Published online: 9 March 2021

Abstract

Bariatric surgery is extremely safe and effective, but several factors need to be addressed to obtain such results. Patient selection, type of training, accreditation, type of practice, and surgical trends and technique are involved in this process. Local and global standardization are ill-advised, especially in countries with high obesity prevalence, and where the bariatric practice is fast growing.An online survey with 22 questions was sent to bariatric surgeons in Mexico. Only participants with the active practice were included, and the aim was to obtain for the first time insight in bariatric surgery training, characteristics of current practice and surgical trends.Complete responses from 114 surgeons were obtained. Most were male, under 50 years-old, ≤ 10 years of experience, and practice in low-volume hospitals. Less than half had a 12-month formal training. Gastric bypass and sleeve gastrectomy were the most common procedures. Practice trends like leak tests, use of drains, preoperative weight loss, routine endoscopy, and pharmacological tromboprofilaxis are common. In surgical technique, the gastric bypass and sleeve gastrectomy confection was more homogenic when compared to the one-anastomosis gastric bypass.Complete responses from 114 surgeons were obtained. Most were male, under 50 years-old, ≤ 10 years of experience, and practice in low-volume hospitals. Less than half had a 12-month formal training. Gastric bypass and sleeve gastrectomy were the most common procedures. Practice trends like leak tests, use of drains, preoperative weight loss, routine endoscopy, and pharmacological tromboprofilaxis are common. In surgical technique, the gastric bypass and sleeve gastrectomy confection was more homogenic when compared to the one-anastomosis gastric bypass. An important number of bariatric surgeons in Mexico are young, male, and with < 10 years of practice. The most common techniques performed are gastric bypass and sleeve gastrectomy. Several practices and technique trends are similar to global consensus. Fellowship programs and Board Certification in bariatric surgery are major advances in our country, thus standardization and high-quality practice can be achieved.

Keywords Bariatric surgery · Mexico · Bariatric surgery training · Surgical technique · Sleeve gastrectomy · Laparoscopic gastric bypass · One-anastomosis gastric bypass · CMCOEM

Background

Bariatric surgery is currently considered one of the safest, most effective, and most common surgical procedures around the world [1]. It has been a long way of continuous evolution in developing new procedures, different approaches, incorporating technological advances, and gaining experience to achieve adequate results with negligible complications [2]. The creation of the concept of "centers of excellence" stimulated the use of registries and data report that help to establish indicators of quality that Bariatric centers should meet [3, 4]. As a result in the last decade the bariatric practice radically changed [5]. Among the aspects that we still need to perfect are the Standardization of procedures,

✉ Miguel F. Herrera
miguelfherrers@gmail.com

1 Hospital General Tláhuac, Mexico City, Mexico

2 Hospital Puerta de Hierro, Guadalajara Jal, Mexico

3 Hospital General de Zona 1, IMSS, Mexico City, Mexico

4 Hospital Ángeles México, Mexico City, Mexico

5 Hospital Adolfo López Mateos ISSSTE, Mexico City, Mexico

6 Instituto Nacional de La Nutrición Salvador Zubirán, Vasco de Quiroga #15, Tlalpan 14, 000 Mexico City, Mexico

practice guidelines, and training programs. We believe this is essential to increase the safety and confidence of patients and clinicians on bariatric surgery.

Mexico has a high prevalence of obesity and Type 2 diabetes mellitus (T2DM) [6]. Many patients would benefit from bariatric surgery and the Mexican College of Bariatric and Metabolic Surgery (CMCOEM from its name in Spanish) is deeply interested in helping to enhance the practice of Bariatric Surgery. As a first step, we decided to learn on the current status and the purpose of the present study is to analyze the current training, surgeon´s profile, and practice of Bariatric Surgery in México.

Methods

A cross-sectional study was performed using a blind online survey (www.SurveyMonkey.com) that was sent to bariatric surgeons registered in the data base of the CMCOEM. Inclusion criteria was that they were in practice at least 1 year. The survey, consisted of 22 questions divided in three sections: bariatric surgery training, characteristics of current practice and surgical trends (Annex 1). The time allowed to complete the survey was 3 months (April–June 2019). Incomplete surveys or duplicated answers were excluded.

Statistical analysis

Data was expressed as mean ± standard deviation (SD), values and/or percentages. Analysis was performed using NCSS 2007 (NCSS, Kaysville, Utah, USA).

Results

In a 3 months period, 138 surveys were obtained out of 334 (41.3%) potential responders. There were 24 cases where the responders did not meet the inclusion criteria, or forms were incomplete, so the final analysis was based on 114 responders (82%). As it is shown in Table 1, most surgeons were male (89.5%), 71.8% under 50 years old, and 56% had ≤ 10 years performing bariatric surgery. Only half were board-certified in bariatric surgery at the moment of the survey. Most of the practices are performed in low-volume hospitals (59.1% in hospitals with 51–100 beds), and less than half (37.7%) had a formal 12-month fellowship. Half of the surgeons operate national patients without private insurance. The complete data can be observed in Table 1.

In terms of surgical trends, 42.9% of surgeons perform between 50 and 150 surgeries per year. The most common surgery was Roux-en-Y gastric bypass (RYGB), but almost equal to sleeve gastrectomy (SG), with 45.6% vs 44.7% of cases, respectively. Most surgeons (> 70%) performed a leak test, left drains and request preoperative weight loss. Complete surgical trends are shown in Table 2. Selecting only surgeons performing each specific procedure, surgical details of the three most common surgical techniques were analyzed in 98 of SG responders, 111 of RYGB, and 43 of one-anastomosis gastric bypass/mini-gastric bypass (OAGB / MGB). (Table 3). The most common surgical technique for SG included calibration using a 34/36 Fr bougie for 52% of the surgeons, with systematic staple line reinforcement (87.7%), using invaginating running suture (52.3%) with absorbable material (56.9%). The most common RYGB included a short alimentary and long biliopancreatic limb (36.9%), a calibrated gastrojejunal anastomosis using a linear stapler (80.1%), and closure of both mesenteric defects (72%). The most common OAGB / MGB technique included the "anti-reflux mechanism" (58.1%), a long narrow pouch (93%), complete small bowel measurement (51.1%) and 200 cm of biliopancreatic limb (44.1%). The OAGB / MGB technique showed more heterogenicity within responders, compared with SG and RYGB.

Table 1 Demographics and characteristics of surgical practice among 114 bariatric surgeons

	N = 114
Age ≤ 50 years old, *n* (%)	83 (72.8)
Male gender, *n* (%)	102 (89.5)
Years performing bariatric surgery, *n* (%)	31(27.2)
2–5	33 (28.9)
5–10	50 (43.9)
> 10	
Percentage of bariatric surgery in their practice, *n* (%)	27 (23.7)
< 20%	24 (21)
21–40%	18 (15.8)
41–60%	22 (19.3)
61–80%	23(20.2)
81–100%	
Board Certified in Bariatric Surgery, *n* (%)	62 (54.4)
Type of training in bariatric surgery, *n* (%)	48 (42.1)
12-months fellowship	34 (29.8)
"Crash" courses	32 (28.1)
Other (observership, proctored, no specific training)	
Bariatric surgeries performed during fellowship, *n* (%)	28 (24.6)
< 10	23 (20.2)
10–20	63 (55.2)
> 20	
Surgeons performing their own endoscopies, *n* (%)	40 (35%)
Hospital Volume, *n* (%)	19 (16.7)
> 100 beds and academic centers	29 (25.4)
51–100 beds	55 (48.2)
10–50 beds	11 (9.7)
< 10 beds	
Mainly public activity, *n* (%)	23 (20.2)
Mainly private activity, *n* (%)	91 (79.8)

Table 2 Trends in surgical technique and clinical practice among 114 bariatric surgeons

	N = 114
Annual surgical cases, *n* (%)	35 (30.7)
< 50	50 (43.9)
50–150	29 (25.4)
> 150	
Most common surgical procedure, *n* (%)	52 (45.7)
RYGB	51 (44.7)
SG	11 (9.6)
OAGB	
Preoperative weight loss, *n* (%)	59 (51.8)
Always	37 (32.4)
Only in super-obesity	18 (15.8)
Never	
Drain usage, *n* (%)	83 (72.8)
Always	18 (15.8)
While on learning curve	13 (11.4)
Only in selected cases	
Leak test, *n* (%)	87 (76.3)
Always	20 (17.5)
Only in RYGB/OAGB	7 (6.2)
Never	
Average length of stay, *n* (%)	73 (64.0)
≥ 2 days	41 (36.0)
1 day	
Pharmacologic thromboprophylaxis, *n* (%)	66 (57.9)
Always	42 (36.8)
Only in high-risk patients	6 (5.3)
Never	
Preoperative endoscopy, *n* (%)	34 (29.8)
Always	50 (43.9)
Only in symptomatic patients	29 (25.4)
If I have had the resources, I would always do it	1 (0.9)
It is not necessary	

RYGB Roux-en-Y gastric bypass; *SG* Sleeve Gastrectomy; *OAGB* One-anastomosis gastric bypass

Discussion

In this survey-based study, we were able to get a good idea of the training and practice of bariatric surgery in Mexico. The first finding is that bariatric surgeons are a generation of young surgeons, predominantly male, and with < 10 years of surgical practice. Bariatric surgery is currently extremely safe with good long-term results [1, 7]. Factors related to morbi-mortality can be divided in several groups: 1) Factors related to the patient. These include age, BMI, gender and comorbid conditions, previous DVT/PE, sleep apnea, etc. [8, 9]. 2) Factors related to the procedure, such as primary or revisional surgery, open vs laparoscopic, and the specific type of operation [7–10]. 3) Factors related to the facility. These include volume, experience, a dedicated multidisciplinary team, resources, etc. [11–13] and 4) Surgeon training (learning curve, fellow/resident involvement, etc.) [14–17]. In 2008, the International Federation for the Surgery of Obesity and Metabolic Diseases (IFSO), created a series of guidelines for safety, quality, and excellence in bariatric surgery, which cover all these aspects [18].

Bariatric education and accreditation

Bariatric surgery training has evolved dramatically over time. The first years were devoted to the development of reproducible and safe techniques, initially open and subsequently laparoscopic [19]. Differences in difficulty among procedures were recognized, and the concept of minimal requirements and learning curves appeared [20, 21]. The next step was to establish educational programs, and to designate the credentials for both, surgeons and hospitals [22, 23]. Fellowship programs were developed around 2005, and the concept of Centers of Excellence was created [24–26]. Since the year 2009, a formal Bariatric Surgery Fellowship (12-months duration) was introduced in Mexico into some Academic Centers. Currently, we have 11 University programs with 35–40 graduates per year. Our survey identified that one-third of the responders graduated from those programs, half of them performed at least 20 bariatric procedures during training. The CMCOEM is a non-profit Society in Mexico that gathers Bariatric Surgeons and Integrated Health professionals since 1994. In 2013 an accreditation process was developed and eventually transferred to the Mexican Board of Surgery. Our survey showed that close to 50% of our surgeons are board-certified. Is important to emphasize that Mexico is one of the few countries with board accreditation in bariatric surgery.

Surgical trends and technique

Currently, there is not a unique bariatric surgery suitable for all patients. There are several procedures, with multiple variants, and even different anatomical conformations. The main technical differences among surgeries relate on their final configuration. In our study, we assessed the three most common surgeries performed worldwide (SG, RYGB and OAGB/MGB) [27–29]. Since 2013 SG is the most commonly performed bariatric operation [28]. However, the 2016 IFSO Worldwide Survey showed that in Latin America the RYGB was still more common. Our survey showed that SG was performed almost with the same frequency than RYGB (45.7% vs 44.7% respectively) and OAGB/MGB in 9.6% of the patients [28].

The surgical technique of SG has changed in the last 10 years [30]. Nevertheless, the variability of some aspects such as width, staple line reinforcement and leak tests, is still high [31, 32]. We found in our study that 52% of participants use calibration tubes between 34 and 36 Fr, which is similar to the recent Sleeve Global Report (53.5% of preference) [32], and the 5th International Sleeve Consensus

Table 3 Technique analysis of the three most common performed surgeries

Sleeve Gastrectomy	$n=98$
Calibration bougie	
≤32 Fr	11 (11.2%)
34–36 Fr	51 (52%)
38 Fr	26 (26.5%)
≥40 Fr	10 (8.7%)
Staple line reinforcement	86 (87.7%)
Absorbable suture	49 (56.9%)
Non-absorbable suture	37 (43%)
Continuous vs invaginating suture	41/45 (47.6%/52.3%)
Roux-en-Y Gastric Bypass	$n=111$
Limbs length	
150—200 cm BPL with 50–70 cm alimentary limb	41 (36.9%)
100 cm BPL and 100 cm alimentary limb	29 (26.1%)
Length of limbs according initial BMI	23 (20.7%)
150 cm alimentary limb with 50–70 BPL	18 (16.2%)
Gastrojejunal Anastomosis	
Linear anastomosis	89 (80.1%)
Hand-sewn anastomosis	21 (18.9%)
Systematic bougie calibration	97 (87.3%)
Mesenteric defects closure	
Closure of both mesenteric defects	80 (72%)
Only closure of Jejunal mesenteric defect	14 (12.6%)
One-Anastomosis Gastric Bypass	$n=43$
"Antireflux " technique	25 (58.1%)
Long gastric pouch	40 (93%)
Complete small bowel measurement	22 (51.1%)
GY anastomosis at 150 cm/180 cm/200 cm from Treitz	4/2/19 (9.3%/4.6%/44.1%)
Length of the BPL according to BMI	13 (30.2%)
GY anastomosis at half (or more) of total small bowel	5 (4.5%)

Only surgeons performing each technique were included

BPL bilio-pancreatic limb; *BMI* body mass index; *GJ* gastrojejunal

(60.9% agree sizes between 34 and 37 Fr.) [30]. Systematic staple line reinforcement was routinely used by 87.7% of the responders, 52.3% preferred invaginating running sutures. In the same Sleeve Global Survey, the percentage of surgeons using any type of reinforcement (mainly running sutures) was 61.3% [32]. Our observations are more in concordance with the Sleeve Consensus, where 80% agreed with the use of buttress material and 68.3% with overswing [30]. The main reason for reinforcement is the prevention of bleeding, which has been reported in some series [33, 34]. In the technique of the RYGB, a linear mechanical gastrojejunal anastomosis was preferred by most surgeons. One-third preferred a short alimentary limb (50–70 cm) and a long biliopancreatic limb (150–200 cm), and 72% closed all defects. This is still a controversial aspect. Despite the existence of data supporting the advantages of closing all defects [35, 36], the technique has not been universally adopted and for instance a recent consensus on technique among Dutch surgeons, showed that closing both mesenteric defects was not accepted as a standard step [37].

The OAGB/MGB has gained acceptance over the last years based on promising short-term results, but standardization issues are present. [38–40]. It is important to highlight the small sample size in our study (only 9.6% of responders perform OAGB/MGB), where heterogenic techniques were observed. Most surgeons performed the "anti-reflux technique" and constructed a long and narrow pouch. Major discrepancies were observed in the small bowel component. Half of surgeons made a complete bowel measurement and less than one half performed a systematic anastomosis at

200 cm from the Treitz ligament. A tailored limb length based on patient´s BMI was also a popular approach. Future studies and consensus, with longer follow-up, are required to establish the safest limb length; one of the most controversial steps in OAGB/MGB. Some other crucial aspects (like pouch size, bile reflux and risk for malignancies) have been positively addressed lately, giving a clearer and safer basis to continue improving such technique [41, 42].

Despite some limitations of our study such as the relatively low number of respondents, and the fact that only people with access to digital platforms were included, it gives for the first time a good insight about how bariatric surgery is performed in Mexico.

Conclusions

An important number of bariatric surgeons in Mexico that responded to the survey were young, male, and with < 10 years of practice. The most common techniques performed are Roux-en-Y gastric bypass and sleeve gastrectomy. Several clinical and practice trends are similar to global consensus. Fellowship programs and Board Certification in bariatric surgery are major advances in our country, aiming for practice standardization in the near future and improve care delivery.

Annex 1

Online Survey.

Funding No funds, grants, or other support was received. This paper did not receive external financing.

Declarations

Conflict of interest The author and co-authors declare not having any conflict of interest.

Research involving human participants and/or animals Not applicable.

Informed consent Not applicable.

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