



Outcomes of One Anastomosis Gastric Bypass in the IFSO Middle East North Africa (MENA) Region

Ashraf Haddad¹  · Mathias Fobi² · Ahmad Bashir¹ · Mohamed Al Hadad³ · Mohamad Hayssam ElFawal⁴ · Basem Safadi⁵ · Osama Taha⁶ · Mohamed Abouzeid⁷ · Aayed Alqahtani⁸ · Abdelrahman Nimeri⁹

Published online: 10 April 2019

© Springer Science+Business Media, LLC, part of Springer Nature 2019

Abstract

Introduction Since it was first described in 2001, the one anastomosis gastric bypass (OAGB) has been gaining popularity in the Middle East region and worldwide. We designed a survey to evaluate the trends, techniques, and outcomes of OAGB in our region.

Methods A questionnaire to study OAGB was sent to the members of the IFSO MENA chapter.

Results One-hundred and forty-eight surgeons (74%) responded. Forty-six percent of all respondents (64 surgeons) performed OAGB routinely. The most commonly performed procedures were the laparoscopic sleeve gastrectomy (LSG), followed by OAGB, and then Roux-en-Y (RYGB). Of the surgeons who responded, 65% did not perform routine pre-operative endoscopy. Seventy-two percent believed that OAGB produces better weight loss than the LSG while 58% did not believe it produced better results to RYGB. The most common length of biliopancreatic limb utilized was 200 cm, and 72% of surgeons did not measure the total length of the small bowel. Fifty percent of the surgeons offered OAGB as a treatment for acid reflux and 33% offered it to active smokers. Early complications included leak (<1%), venous thromboembolism (<1%), and mortality (<0.5%) in most centers. Leaks were managed conservatively (23%), by conversion to RYGB (20%), reinforcing the anastomosis (19%), reversal to normal anatomy (6%), and others (32%). Of the total surgeons, 41% reported revising at least one patient for malnutrition and steatorrhea, and 32% reported revising at least one patient for severe bile reflux.

Conclusion OAGB is a commonly performed and safe procedure in the MENA region. Malnutrition and bile reflux requiring surgical intervention are serious long-term concerns.

Keywords One anastomosis gastric bypass · MENA · RYGB

✉ Ashraf Haddad
drajhaddad@gmail.com

- 1 Minimally Invasive and Bariatric Surgery, Gastrointestinal Bariatric and Metabolic Center (GBMC)-Jordan Hospital, Queen Noor Street, Amman 11152, Jordan
- 2 Mohak Bariatric and Robotics, SAIMS Campus, Indore – Ujjain State Highway, Indore, India
- 3 Bariatric Surgery, Healthpoint Hospital, Abu Dhabi, United Arab Emirates
- 4 Bariatric Surgery Clinic “BSC,” Bariatric and Metabolic Unit, Makassed General Hospital Beirut, Beirut, Lebanon
- 5 Department of Surgery, Gilbert and Rose-Marie Chagoury School of Medicine, Lebanese American University, Beirut, Lebanon
- 6 Bariatric and General Surgery, Assiut University, Assiut, Egypt
- 7 General Surgery Department, Ain Shams University, Cairo, Egypt
- 8 New You Medical Center, Riyadh, Saudi Arabia
- 9 Carolinas Bariatric/MIS Fellowship Program, Carolinas Weight Management, Carolinas Medical Center, Charlotte, NC, USA

Introduction

According to the worldwide bariatric survey the total number of bariatric/metabolic procedures performed in 2016 was 685,874. The most performed primary surgical bariatric/metabolic procedure was sleeve gastrectomy, followed by Roux-en-y gastric bypass (RYGB), and in third place one-anastomosis gastric bypass (OAGB) [1].

The OAGB has been gaining popularity worldwide and in particular in the Middle East and Asia-Pacific region [1]. Although the OAGB meets many of the criteria of a good weight loss operation [2]. Many authors have raised concerns regarding some long-term complications or the need for re-operation [3–9].

The aim of this survey is to study the trends, techniques, complications, and outcomes of the OAGB in the Middle East Chapter of IFSO, MENAC (International Federation for Surgery of Obesity/Middle East and North Africa chapter) [10].

Methods

The IFSO MENAC scientific committee designed a survey to examine the OAGB in our Chapter. The survey includes four main parts:

1. Questions regarding the surgeon's experience, the setup of the practice, the performance of pre- and post-up endoscopy, whether there is a multidisciplinary team, and the annual volume and types of bariatric surgeries performed.
2. Questions on how surgeons viewed the OAGB, perceptions, indications, techniques, and outcomes.
3. The incidence and management of complications including leak, bile reflux, steatorrhea, and mortality.
4. The long-term need and indications for revisional procedures.

The survey was uploaded to **Survey Monkey**; a link was sent to the IFSO MENAC social media platforms as described previously [10]. The Survey was filled anonymously and results were analyzed using **Survey Monkey** statistical software.

Results

The response rate to the survey was 74% (148 surgeons responded). The majority of the surveyed surgeons were experienced as they were more than 5 years into practice (75%) and most surgeons (59%) were high-volume bariatric surgeons (defined as > 125 cases/year).

The most commonly performed procedure in the IFSO MENA region was the laparoscopic sleeve gastrectomy (LSG), followed by the OAGB, and in third place RYGB. Majority of surgeons did not perform routine endoscopy pre-operatively (65%) nor post-operatively during routine follow-up for surveillance (82%).

Seventy-two percent (72%) of the responders thought the OAGB produced better weight loss than the LSG while 41% thought it provided better weight loss than the RYGB (46% and 23% thought it produced comparable results to the RYGB and LSG, respectively), while 13% and 5% thought weight loss after OAGB was inferior to RYGB and LSG, respectively.

Forty-six percent of surgeons (64 surgeons) offered OAGB regularly to their patients. Ninety percent (90%) of surgeons who performed OAGB regularly would offer it as either a primary or revisional procedure while only 10% offered it as only primary or revisional procedure. In addition, 53% (33 surgeons) offered OAGB as treatment for gastroesophageal reflux disease (GERD) with morbid obesity and 41% (26) of the surgeons that performed it offered it as a treatment to post-

sleeve GERD patients. One third (33.3%) reported offering OAGB to active smokers.

Bougie size used to create the OAGB pouch varied from 32 to 40 F with 36 F bougie being most commonly used 67% of the time (43 surgeons). A drain was placed 44% of the time. Fifty-two percent (52%) of surgeons used a fixed biliopancreatic limb (BPL) of 200 cm (33 surgeons). Eighteen percent of surgeons (11 surgeons) used 180 cm BPL, and 12% (8 surgeons) reported that they adjusted the BPL length based on desired weight loss, body mass index (BMI), or whether the procedure was revisional or primary. Only 10% (6 surgeons) used one third of the total length of the small bowel and 8% (5 surgeons) used a BPL of 150 cm. Only 28% of surgeons measured the entire small bowel length.

Majority of the surgeons (86%, 55 surgeons) performing OAGB reported that their most commonly performed procedure was the LSG prior to performing OAGB and 64% (41 surgeons) reported that they rarely or never performed RYGB prior to performing OAGB.

Leak rate, VTE, and 30-day mortality were low with the majority of surgeon's reporting incidences of < 1% (Figs. 1, 2, and 3).

We identified a total of 318 reported post-operative leaks in patients after OAGB. The approaches to manage leaks were assessed. Leaks were managed conservatively 23% of the time (73 patients), 20% (65 patients) required conversion to RYGB, 19% (62 patients) were treated by reinforcing the anastomosis, and 6% (20 patients) only were reversed to normal anatomy. Ninety-eight patients (32%) were treated by (other methods) including endoluminal stenting and interventions and CT-guided drainage.

We identified in our survey 35 reported mortalities within 30 days. There were 15 mortalities from leaks, 10 from post-operative bleeding, 9 pulmonary embolisms, and 1 missed enterotomy.

There was a total of 4 mortalities due to severe malnutrition (2 patients) and cirrhosis with liver failure (2 patients).

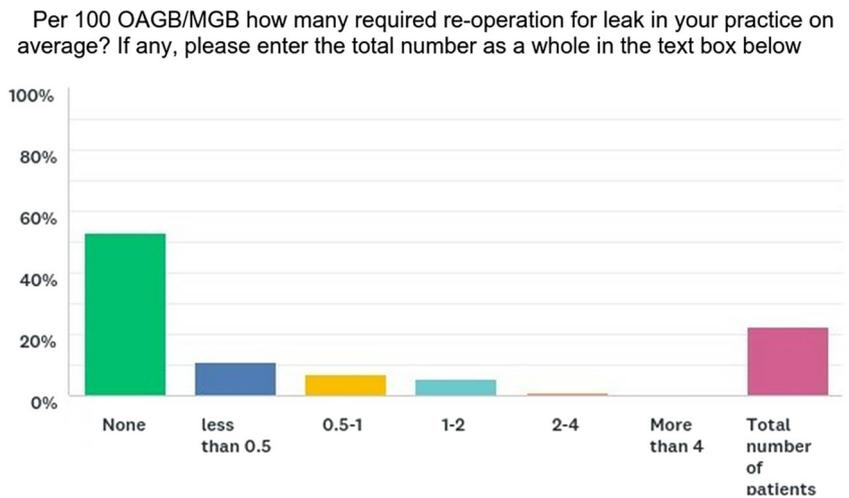
Forty-nine percent of surgeons (56 surgeons) reported that they encountered at least one patient with marginal ulceration after OAGB.

Malnutrition and Steatorrhea

Forty-one percent of surgeons (50 surgeons of 125) had revised at least one patient with malnutrition/steatorrhea after OAGB as a primary procedure. The mean age of the patients was 36 years, the revisional surgery was done at another institution 58% of the time, and 26% had concomitant bile reflux.

Data on 45 OAGB revisions showed that 29 patients (64%) were reversed to normal anatomy, 7 patients (16%) to a RYGB, 5 patients (11%) to LSG, and 4 (9%) were treated

Fig. 1 The figure demonstrates the number of patients requiring reoperation after OAGB per 100 cases per surgeon



by shortening their BPL. Most patients who had a revision of OAGB had a BPL of 200 cm (Fig. 4).

Bile Reflux

Thirty-two percent of surgeons (37 surgeons of 117 responders) said that they had to revise at least one patient for bile reflux. The mean age of the patients was 41 years; the revisional surgery was done at another institution 51% of the time.

Surgeons reported intraoperative data on 45 patients. The pouch was reported to be short (48%) of the time, 38 patients (84%) were converted to RYGB, 6 patients (14%) had a Braun entero-enterostomy, and 1 patient (2%) was converted to LSG.

Discussion

Our survey of practicing surgeons in the IFSO MENA region showed that OAGB is the second most common procedure after the LSG. Similarly, the fourth IFSO Global Registry

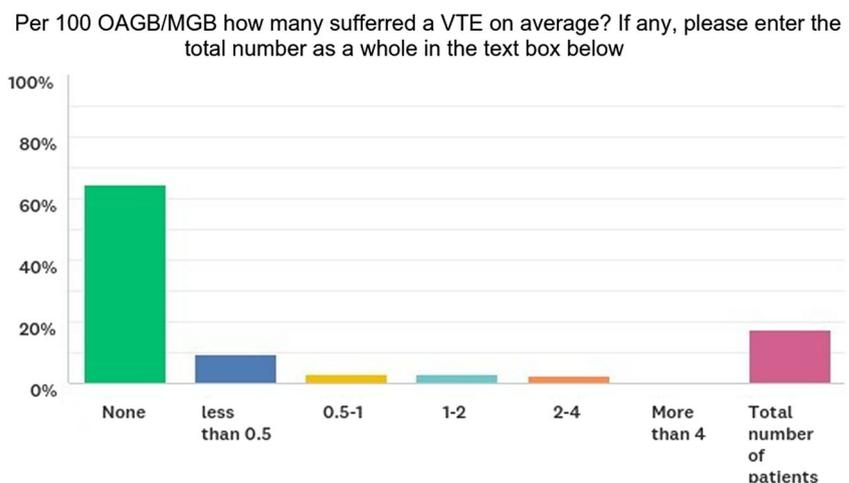
Report in 2018 revealed that OAGB is the second most commonly performed procedure (10%) in the Middle East region.

The response rate of the survey was excellent at 74%. Posting our survey on our IFSO MENAC social media platforms (Telegram, Facebook, Twitter) as well as sending reminders during our monthly online activities helped us in getting such an excellent response rate from our surgeons.

The majority of surgeons in the IFSO MENA region thought that OAGB produced superior weight loss than LSG. This is consistent with findings in other publications. Kular et al. comparing the OAGB to LSG showed % excess body weight loss (EBWL) of 68% vs 51.2%, respectively, at 5 years [11]. A meta-analysis comparing the outcomes of the two procedures also concluded that the OAGB/MGB provided better weight loss than the LSG [12].

In our study, 46% of surgeons thought the results of weight loss outcomes of OAGB to RYGB were comparable while 41% thought OAGB provided better weight loss results than after the RYGB. Rutledge reported 77% excess body weight loss (EBWL) at 2 years after the OAGB. Noun reported % EBWL midterm at 3–5 years between 71 and 80% [3, 6, 13]

Fig. 2 The figure demonstrates the number of patients that suffered a VTE after OAGB per 100 cases per surgeon



or not these surgeons performed OAGB as a primary procedure. Pre-existing gastroesophageal reflux all were associated with higher percentage of post-operative bile reflux requiring surgical intervention [4–7, 9, 10, 21].

Most patients with bile reflux gastritis were managed surgically contrary to what is published in the literature. In 45 patients who underwent revisions 84% of the time the patient was converted to RYGB (38 patients), 14% had a Braun entero-enterostomy (6 patients), and 2% were converted to LSG (1 patient).

Our study has several limitations, first is the bias introduced with studies based on surveys. In addition, recall bias or bias introduced by a survey rather than a prospective or registry study can play a factor. We tried to account for sampling bias by including all the surgeons in our chapter whether or not they performed OAGB; this however this will not eliminate other types of bias associated with surveys such as recall and response bias. Nevertheless, the strength of this study is the number of responders and that it is the first study evaluating the technique and complications of OAGB in the IFSO MENA chapter. There is need for more studies like this in other chapters or societies if not of IFSO.

Conclusion

OAGB is a commonly performed and safe procedure. Most surgeons in MENA region use a 200-cm biliopancreatic limb. Malnutrition and bile reflux requiring surgical intervention are serious long-term concerns; thus, studies with long-term follow-up are needed to better delineate these risks.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interests.

Consent For this type of study formal consent is not required.

References

1. Anglican L, Santonicola A, Iovino P, et al. IFSO worldwide survey 2016: primary, endoluminal, and revisional procedures. *Obes Surg*. 2018 Dec;28(12):3783–94. <https://doi.org/10.1007/s11695-018-3450-2>.
2. Rutledge R. The mini-gastric bypass: experience with the first 1, 274 cases. *Obes Surg*. 2001 Jun;11(3):276–80.
3. Musella M, Susa A, Greco F, et al. The laparoscopic mini-gastric bypass: the Italian experience: outcomes from 974 consecutive cases in a multicenter review. *Surg Endosc*. 2014;28(1):156–63. <https://doi.org/10.1007/s00464-013-3141-y>.
4. Musella M, Susa A, Manno E, et al. Complications following the mini/one anastomosis gastric bypass (MGB/OAGB): a multi-

- institutional survey on 2678 patients with a mid-term (5 years) follow-up. *Obes Surg*. 2017;27(11):2956–67. <https://doi.org/10.1007/s11695-017-2726-2>.
5. Bruzzi M, Rau C, Voron T, et al. Single anastomosis or mini-gastric bypass: long-term results and quality of life after a 5-year follow-up. *Surg Obes Relat Dis*. 2015;11(2):321–6. <https://doi.org/10.1016/j.soard.2014.09.004>.
6. Bruzzi M, Voron T, Zinzindohoue F, et al. Revisional single-anastomosis gastric bypass for a failed restrictive procedure: 5-year results. *Surg Obes Relat Dis*. 2016 Feb;12(2):240–5. <https://doi.org/10.1016/j.soard.2015.08.521>.
7. Facchiano E, Leuratti L, Veltri M, et al. Laparoscopic conversion of one anastomosis gastric bypass to roux-en-Y gastric bypass for chronic bile reflux. *Obes Surg*. 2016 Mar;26(3):701–3. <https://doi.org/10.1007/s11695-015-2017-8>.
8. Nimeri A, Al Shaban T, Maasher A. Laparoscopic conversion of one anastomosis gastric bypass/mini gastric bypass to roux-en-Y gastric bypass for bile reflux gastritis. *Surg Obes Relat Dis*. 2017 Jan;13(1):119–21. <https://doi.org/10.1016/j.soard.2016.09.033>.
9. Nimeri A, Al Shaban T, Maasher A. Conversion of one anastomosis gastric bypass/mini gastric bypass to roux-en-Y gastric bypass for bile reflux gastritis after failed Braun jejunojejunostomy. *Surg Obes Relat Dis*. 2017;13(2):361–3. <https://doi.org/10.1016/j.soard.2016.10.022>.
10. Nimeri A, Al Hadad M, Khoursheed M, et al. The peri-operative bariatric surgery care in the Middle East region. *Obes Surg*. 2017;27(6):1543–7.
11. Kular K, Manchanda N, Rutledge R. Analysis of the five-year outcomes of sleeve gastrectomy and mini gastric bypass: a report from the Indian sub-continent. *Obes Surg*. 2014;24:1724–8. <https://doi.org/10.1007/s11695-014-1264-4>.
12. Magouliotis D, Tasiopoulou V, Svokos AA, et al. One-anastomosis gastric bypass versus sleeve gastrectomy for morbid obesity: a systematic review and meta-analysis. *Obes Surg*. 2017;27:2479–87. <https://doi.org/10.1007/s11695-017-2807-2>.
13. Taha O, Abdelaal M, Abozeid M, et al. Outcomes of omega loop gastric bypass, 6-years experience of 1520 cases. *Obes Surg*. 2017;27(8):1952–60. <https://doi.org/10.1007/s11695-017-2623-8>.
14. Carbajo MA, Luque-de-León E, Jiménez JM, et al. Laparoscopic one-anastomosis gastric bypass: technique, results, and long-term follow-up in 1200 patients. *Obes Surg*. 2017;27(5):1153–67. <https://doi.org/10.1007/s11695-016-2428-1>.
15. Higa K, Ho T, Tercero F, et al. Laparoscopic roux-en-Y gastric bypass: 10-year follow-up. *Surg Obes Relat Dis*. 2011;7(4):516–25. <https://doi.org/10.1016/j.soard.2010.10.019>.
16. Adams T, Davidson LE, Litwin SE, et al. Weight and metabolic outcomes 12 years after gastric bypass. *N Engl J Med*. 2017;377:12 [nejm.org](https://doi.org/10.1056/NEJMoa1701211) September 21, 2017.
17. Mahawar K, Parmar C, Carr C, et al. Impact of biliopancreatic limb length on severe protein-calorie malnutrition requiring revisional surgery after one anastomosis (mini) gastric bypass. *J Minim Access Surg*. 2018;14(1):37–43.
18. Eilenberg M, Langer F, Beer A, et al. Significant liver-related morbidity after bariatric surgery and its reversal—a case series. *Obes Surg*. 2018;28:812–9. <https://doi.org/10.1007/s11695-017-2925>.
19. Motamedi MAK, Barzin M, Ebrahimi M, et al. Severe fatal protein malnutrition and liver failure in a morbidly obese patient after mini-gastric bypass surgery: case report. *Int J Surg Case Rep*. 2017;33:71–4. <https://doi.org/10.1016/j.ijscr.2017.02.033>.
20. Tacchino RM. Bowel length: measurement, predictors, and impact on bariatric and metabolic surgery. *Surg Obes Relat Dis*. 2015;11(2):328–34. <https://doi.org/10.1016/j.soard.2014.09.016>.

21. Noun R, Skaff J, Riachi E, et al. One thousand consecutive mini-gastric bypass: short- and long-term outcome. *Obes Surg.* 2012 May;22(5):697–703. <https://doi.org/10.1007/s11695-012-0618-z>.
22. Welbourn R, Hollyman M, Kinsman R, et al. Bariatric surgery worldwide: baseline demographic description and one-year outcomes from the fourth IFSO global registry report 2018. *Obes Surg.* 2018;29:782–95. <https://doi.org/10.1007/s11695-018-3593-1>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.