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Research Article

Efficacy of Bariatric Surgery in Improving the Anthropomertics and Metabolic Outcomes: A Retrospective Study from A Single Private Center in Dubai, UAE

R Bhatti[1*], B Bereczky[2], M Joumaa[3], U Warshow[4], M Aljabiri[4], A H Khamis[5], A Rotundo[2], P Noel[2]

[1]Consultant Endocrinologist, Mediclinic City Hospital, Dubai, UAE

[2]Consultant Bariatric surgeon, Mediclinic Parkview Hospital, Dubai, UAE

[3]Dietician and bariatric co-ordinator, Mediclinic Parkview Hospital, Dubai, UAE

[4]Consultant Gastroenterologist, Mediclinic Parkview Hospital, Dubai, UAE

[5]Professor of Biostatistics, Mohammad Bin Rashid University of Medicine and Health Sciences, Dubai, UAE

[*]**Corresponding author:** Rahila Bhatti, Consultant Endocrinologist, Mediclinic city Hospital, Building 37, 26th Street, Umm Hurair 2, Dubai Healthcare City, Dubai, UAE

Abstract

Background: Prevalence of obesity is increasing worldwide, and the Middle East is not an exception to this rise. Bariatric surgery is an effective treatment for obesity in terms of weight loss and remission of metabolic syndrome and has become more popular in recent years.

Methods: This is a retrospective cohort study of 69 patients who underwent bariatric surgery at Mediclinic Parkview Hospital in Dubai, UAE between January 2019-September 2021 as part of a multi-disciplinary weight management program. Weight outcomes and metabolic markers were looked at baseline and 3,6 and 12 months follow up postoperatively. Data were analyzed using IBM-SPSS for Windows version 28.0 (SPSS Inc., Chicago, IL). A P-value of less than 0.05 was considered significant for all analyses.

Results: Sixty-nine patients were included. About 24 (34.8%) males, 45 (65.2%) females. The mean age was 41 years (±10.8) with a BMI of 41.87 (±10.3). Majority were of Asian ethnicity (n=25/69, 36.2%) with Middle Eastern and North-East African and Western ethnicity making up the rest of the cohort ((n=24/69, 34.7% and n=20/69, 28.9% respectively). Following surgical procedures were done. Laparoscopic sleeve gastrectomy n=51 (73.9%), Minigastric bypass n= 7 (10%), Roux en Y gastric bypass (RYGB) n=3 (4.3%), endoscopic sleeve gastrectomy n=3 (4.3%), revision of minigastric bypass n= 2 (2.9%) and revision of sleeve gastrectomy n=3 (4.3%). Mean baseline BMI was 41.87 ± 10.33 kg, which significantly dropped to 36.15 ± 10.51, 33.27 ± 8.94 and 30.16 ± 6.11 at 3, 6 and 12 months respectively, and this change was statistically significant P-vaule was 0.003. Similarly, visceral fat was 5.76 ± 3.70 at baseline dropped to 4.34 ± 3.14, 3.31 ± 2.08 and 2.70 ± 1.82 at 3, 6 and 12 months respectively ($P<0.001$). Lipid profile improved at 12 months postoperatively with total cholesterol, triglycerides and Low Density Lipoproteins (LDL) dropping from 9.26 ± 30.6 to 4.98 ± 0.92, 1.71 ± 1.08 to 1.02 ± 0.26 and 3.50 ± 0.93 to 3.4 ± 0.98 respectively. ($P<0.08$) AST and ALT improved from 27.85 ± 18.39 to 15.24 ± 4.07 and 40.58 ± 35.49 to 17.84 ± 7.37 respectively at 12 months postoperatively. Only one patient developed postoperative peritonitis causing sepsis.

Conclusions: The results show that bariatric surgery was effective in achieving weight loss as well as improvement in lipid and liver profile over a follow up period of one year. Further studies are needed to see whether favorable outcomes of bariatric surgery can be sustained over long term in this mixed population.

Keywords: Anthropometrics; Bariatric; Meatabolic outcomes

Introduction

The prevalence of obesity is increasing worldwide and according to World Health Organisation (WHO) 650 million people were reported as obese in 2016 and the number has tripled since 1975 [1]. According to World Obesity Federation, prevalence of obesity in United Arab Emirates (UAE) is reported as 27.8% between age of 18-69 years in 2017-2018 [2]. There are many treatment options available for management of obesity, including physical activity, dietary intervention, behavior therapy, pharmacological treatment and bariatric surgery. Bariatric surgery however, is an effective treatment of severe obesity and as a result the number of bariatric surgeries that are being performed has increased in recent years. According to 4th International Federation for the surgery of obesity and metabolic disorders (IFSO) Global registry report 634,897 bariatric surgeries were performed worldwide in 2016 [3]. Bariatric surgery has shown improved longterm metabolic outcomes in patients with obesity [4,5]. The aim of our study was to look at anthropometric measurements and metabolic outcomes of our cohort at 12 months postoperatively.

Methods

This is a retrospective cohort study of sixty-nine patients who underwent bariatric surgery at Mediclinic Parkview Hospital in Dubai, UAE between January 2019-September 2021 as part of a multi-disciplinary weight management program. Patients were screened for inclusion/exclusion criteria according to the American Society for Metabolic and Bariatric Surgery (ASMBS) guidelines [6]. The ASMBS inclusion criteria for bariatric surgery candidates are:

1-Patients with BMI $\geq$ 40 kg/m².

2. With BMI 35–40 kg/m2 with co-morbidities e.g type 2 diabetes, hypertension, hyperlipidemia, Obstructive Sleep Apnea (OSA), Non-Alcoholic Steatohepatitis (NASH), Non-Alcoholic Fatty Liver Disease (NAFLD).

3-Patients with BMI 30-34.9 kg/m² with recent onset type 2 diabetes or metabolic syndrome may be offered bariatric procedure.

Patients were excluded from the bariatric surgery based on exclusion criteria, which are as follows: current drug or alcohol abuse; any underlying reversible endocrine disorder causing obesity; severe psychiatric illness; and lack of comprehension of the risks/benefits/expected outcomes/lifestyle changes associated with bariatric surgery.

Data Collection

Data was collected from electronic medical records Bayanaty® (InterSystems IRIS, US) and the body composition analyzer (Seca®, Germany). Data collection was done as follows: Demographic data included age, gender and nationality. Anthropometric measures included height, weight, BMI, fat mass, body fat percentage, visceral fat mass, WC, HC and WHR at baseline, 3,6 and 12 months post-operatively. Laboratory measurements included glycated haemoglobin (HbA1c), renal function such as Estimated Glomerular Filtration Rate (eGFR), liver function tests including AST and ALT, lipid profile including cholesterol, triglyceride, LDL, and HDL at baseline, 3, 6 and 12 months post-operatively.

Data Analysis

Data were analyzed using IBM-SPSS for Windows version 28.0 (SPSS Inc., Chicago, IL). Categorical variables are described by using proportions. Continuous variables are described by a measure of tendency and a measure of dispersion. Continuous data was tested for normality by using the Shapiro-Wilk test. Friedman's one-way ANOVA was used to compare between related data in more than two groups. A P-value of less than 0.05 was considered significant for all analyses.

Ethical Statement

Ethical approvals were taken from local Mediclinic Institutional Research Board; and Dubai Scientific Research Ethics Committee, Dubai Health Authority, Dubai, UAE.

Results

Table 1 shows baseline characteristics of patients. Sixty-nine patients were included in this retrospective cohort study. About 24 (34.8%) were males and 45 (65.2%) were females. The mean age was 41 years (±10.8) with a BMI of 41.87 (±10.3). Majority were from Asian ethnicity (n=25/69, 36.2%) with Middle Eastern and North-East African and Western ethnicity making up the rest of the cohort.

Total no of patients	69
Gender No (%)	
Male	24 (34.8)
Female	45 (65.2)
Age	
Mean (SD)	41.68 (10.77)
BMI (kg/m²) Mean (SD)	41.87 (10.30)
≤ 35	14 (20.3)
36-40	20 (29)
>40	35 (50.7)
Nationality Mean (SD)	
Asian	25 (7.2)
Arab	15 (21.7)
African	9 (36.2)
Western	20 (29)

Table 1: Baseline characteristics of patients.

Following surgical procedures were done. Laparoscopic sleeve gastrectomy 51 (73.9%), Minigastric bypass 7 (10%), Roux en Y gastric bypass (RYGB) 3 (4.3%), endoscopic sleeve gastrectomy 3 (4.3%), revision of minigastric bypass 2 (2.9%) and revision of sleeve gastrectomy 3 (4.3%). Table 2 shows co-morbidities of the cohort. Majority had dyslipidemia 35 (50.7%), hypertension 23 (33.3%) and prediabetes 20/69 (28.9%).

Co-morbidities Mean (%)	
Hypertension	22 (31.8)
Type 2 Diabetes	9 (13.04)
Prediabetes	20 (28.9)
Obstructive sleep apnea	11 (15.9)
Osteoarthritis	9 (13)
Hiatus hernia	11 (15.9)
Hyperlipidemia	35 (50.7)
Fatty liver	21 (30.4)
Polycystic ovarian syndrome	12 (17.4)

Table 2: Co-morbidities.

Table 3 shows changes in anthropometric measurements at baseline, 3, 6 and 12 months post-operatively. Mean baseline BMI was 41.87 ± 10.33 kg, which significantly dropped to 36.15 ± 10.51, 33.27 ± 8.94 and 30.16 ± 6.11 at 3, 6 and 12 months respectively, and this change was statistically significant P 0.003. Similarly, visceral fat was 5.76 ± 3.70 at baseline dropped to 4.34 ± 3.14, 3.31 ± 2.08 and 2.70 ± 1.82 at 3, 6 and 12 months respectively ($P<0.001$)

	BMI	Fat Mass	%Fat	Visceral Fat (VF)	Waist Circumference (WC)	Hip Circumference (HC)	Waist Hip Ratio (WHR)
Baseline	41.87±10.3	59.28±22.72	47.71±10.17	5.76±3.70	118.82±17.03	133.86±18.46	0.91±0.11
3 months	36.15±10.51	52.39±21.13	44.33±13.70	4.34±3.14	111.95±16.57	127.48±22.95	0.86±0.10
6 months	33.27±8.94	44.18±15	43.74±8.71	3.31±2.08	104.70±13.99	119.31±15.61	0.91±0.09
12 months	30.16±6.11	34.77±17.22	32.26±15.14	2.70±1.82	100.59±.11.36		0.88±0.09
Chi-square	15.879	24.00	22.95	21.00	16.324	22.00	1.80
p-value	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.615

Table 3: Changes in Anthropometric Meaurements.

Table 4 shows changes in laboratory measurements at baseline, 3, 6 and 12 months post-operatively. Lipid profile improved at 12 months postoperatively with Total Cholesterol (TC), Triglycerides (TG) and Low Density Lipoproteins (LDL) dropping from 9.26 ± 30.6 to 4.98 ± 0.92, 1.71 ± 1.08 to 1.02 ± 0.26 and 3.50 ± 0.93 to 3.4 ± 0.98 respectively. ($P<0.08$) AST and ALT improved from 27.85 ± 18.39 to 15.24 ± 4.07 and 40.58 ± 35.49 to 17.84 ± 7.37 respectively at 12 months postoperatively.

	HbA1c	GFR	AST	ALT	Cholesterol	TG	LDL	HDL
Baseline	5.76±1.14	95.97±15.82	27.85±18.39	40.58±35.49	9.26±30.61	1.71±1.08	3.50±0.93	1.25±0.38
3 months	5.24±0.56	100.34±19.47	22.68±9.24	22.68±9.24	4.72±1.08	1.40±0.82	3.22±1.05	1.17±0.32
6 months	5.17±0.41	94.85±25.76	16.0±4.45	16.67±6.99	4.95±0.81	1.20±0.63	3.32±0.89	1.8±0.22
12 months	5.21±0.39	104.19±10.13	15.24±4.07	17.84±7.37	4.98±0.92	1.02±0.26	3.41±0.98	1.30±34
Chi-square	3.978	4.5	3.80	5.80	6.61	6.310	4.200	5.0
p-value	0.264	0.212	0.284	1.22	0.086	0.097	0.241	0.172

Table 4: Changes in laboratory measurements.

29 patients didn't come for follow up after 1 year, n=20/69 (42%). Out of these, 2 patients were followed up in Abu Dhabi. 7 patients were from medical tourism, n=7/69 (10%), 3 patients went back to United Kingdom, 2 to Canada, 1 to United States and 1 to Nigeria. Detailed medical reports were given to patients for follow up in their respective countries. N=9/13 (69.2%) patients prediabetes was resolved, 7 patients didn't have follow up at one year as they were from medical tourism. N= 5/7 (71.4%) patients type 2 diabetes was resolved with normal HbA1c. 4 patients were on oral hypoglycaemic medications which were stopped and one patient discontinued insulin post operatively at one 1 year follow up. One patient had sepsis secondary to post-operative peritonitis which required antibiotics and conservative management.

Discussion

This was a retrospective study which showed statistically significant reduction in BMI, fat mass, visceral fat and waist circumference from baseline to 12 months post-operatively. Fat mass reduced from 59.28±22.72 to 34.77±17.22, Visceral fat reduced from 5.76±3.70 to 2.70±1.82 at 12 months and WC reduced from 118.82±17.03 to 100.59±.11.36 at 12 months (p values <0.001). Our study has shown 24.5 kg (41.3%)reduction in fat mass and 3 kg (52%) reduction in visceral fat at 12 months. Abusanana et al demonstrated 46% reduction in fat mass and Ciangura et al showed 45.2% decrease in fat mass but in Roux en Y gastric bypass procedure whereas in our study laproscopic sleeve gastrectomy was the main procedure [7,8]. Eduardo et al in 2021 has shown a decrease in visceral fat at 6 months after surgery in both men and women (Baseline 7.5 ± 3L, 6 months 2.5 ± 2 L (p = 0.001). An average decrease in visceral adipose tissue of 70 ± 22% in women and 60 ± 21% in men (p = 0.53) 6 months after surgery. The highest percentage of visceral fat at 6 months was seen with Laparoscopic One-Anastomosis Gastric Bypass (OAGB), however, this was not statistically significant when compared with Y-Roux Gastric bypass (YRGB) [9]. Bhatti et al has already shown that there is strong correlation between visceral fat, waist circumference and risk of metabolic disease [10].

Lipid profile improved at 12 months postoperatively with total cholesterol, triglycerides and Low Density Lipoproteins (LDL) dropping from 9.26 ± 30.6 to 4.98 ± 0.92 (P<0.08), 1.71 ± 1.08 to 1.02 ± 0.26 (P<0.09) and 3.50 ± 0.93 to 3.4 ± 0.98 respectively. (P<0.2), however it was not statistically significant. Similar results were shown by meta-analysis published by Heffron et al. In post sleeve gastrectomy subjects, there was non-significant reduction in mean TC at one year compared with baseline (P=0.11), reduction in LDL (P=0.13) [10]. AST and ALT improved from 27.85 ± 18.39 to 15.24 ± 4.07 and 40.58 ± 35.49 to 17.84 ± 7.37 respectively at 12 months postoperatively [11].

71.4% of patients with type 2 diabetes and 69.2% of patients with prediabetes had normalization of HbA1c at 1 year. Similar results are shown in other studies like 59.2% (95% CI, 57.7%-60.7%) of patients who had RYGB vs 55.9% (95% CI, 53.9%-57.9%) of those who had Sleeve gastrectomy experienced remission by 1 year [12].

42% of patients were lost to follow up, out of which 7/29 (24.1%) were from medical tourism and 2 were followed up in another emirate. This reflects the fact that Dubai is a very multi-national society with more than 200 nationalities. Limitations of our study include the small sample size and retrospective nature of analysis. Therefore, more studies with large sample size would help in this guidance. Another limitation of our study is there are more patients with laproscopic sleeve gastrectomy compared to other procedures so we cannot look at outcomes based on type of procedure performed.

Conclusions

The results show that bariatric surgery was effective in achieving weight loss in terms of reduction in BMI, fat mass, visceral fat, waist circumference as well as improvement in lipid and liver profile over a follow up period of one year. Further studies are needed to see whether favorable outcomes of bariatric surgery can be sustained over long term in this mixed population.

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