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WEIGHT REDUCTION BEFORE BARIATRIC SURGERY, IS IT SUBSTANTIAL? COMPARATIVE STUDY AT KING HUSSEIN MEDICAL CENTER

Mohammad AL-Huniti[1]*, Ramadan Hassanat[1], Khaled Aladwan[1], Mosa Albraizat[1], Sohaib Almistarihi[1], Ban W. Sha'Ban[1] and Sara M. Nseirat[1]

[1]Department of General Surgery, Royal Medical Services, Amman, Jordan.

***Corresponding Author: Mohammad AL-Huniti**
Department of General Surgery, Royal Medical Services, Amman, Jordan.

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ABSTRACT

Background: Obesity is a global epidemic associated with increased mortality and morbidity. Bariatric surgery has emerged as a successful intervention for clinically morbid obesity, often incorporating pre-operative weight loss criteria. The relationship between preoperative weight reduction and bariatric surgery outcomes remains underexplored. This study aims to investigate the effect of pre-operative weight reduction on post-operative outcomes in a Jordanian population. **Methods:** A single-center, retrospective, comparative study was conducted at King Hussein Medical Hospital, Jordan, between March 2019 and March 2020. The study enrolled patients who underwent bariatric procedures, categorizing them into two groups: those achieving a 10% pre-operative weight reduction (Group A) and those without weight reduction (Group B). Data collection included demographic, clinical, and operative variables. **Results:** Among 280 patients, predominantly female (91%), Group B exhibited a significantly higher BMI (Mean: 53.0 vs. 39.0, p-value<0.001) and increased post-operative WBC levels (means: 11.5 vs. 10.2, p-value=0.027). Group A demonstrated better outcomes, with 13% post-operative complications in Group B, including bleeding, hernia, intestinal obstruction, and intra-abdominal abscess. **Conclusion:** Our study suggests a potential benefit of pre-operative weight reduction in enhancing post-operative outcomes in bariatric surgeries among the Jordanian population. The observed differences in BMI, WBC levels, and postoperative complications between groups emphasize the relevance of pre-operative interventions in optimizing surgical results.

KEYWORDS: Weight Reduction; Bariatric Surgery; Obesity; Comparative Study.

INTRODUCTION

Obesity is becoming an escalating epidemic both in the United States and globally. It is linked to heightened overall mortality, with over 300,000 deaths annually in the US attributed to this condition.[1] Several morbidities are associated with obesity including heart disease, strokes, type 2 diabetes, and cancer, which stand as major contributors to avoidable premature deaths.[2] In 2019, the projected annual medical expenditure linked to obesity in the United States reached almost $173 billion. Adults grappling with obesity incurred medical expenses approximately $1,861 higher than those with a healthy weight.[3]

Bariatric surgery has proven to be the most successful and enduring method for treating clinically morbid obesity, defined as a body mass index (BMI) of 35.0 or higher with comorbidities. This condition is challenging to address using conventional methods like lifestyle intervention, and bariatric surgery provides a more effective solution.[4] Metabolic bariatric procedures, including sleeve gastrectomy, Roux-en-Y gastric bypass, and duodenal switch, yield substantial and enduring weight loss, along with metabolic alterations that are not solely dependent on weight reduction.[5]

Several bariatric surgeries implement a pre-operative weight loss criterion prior to approving surgery. Certain programs may necessitate individuals to achieve approximately 5-10% excess weight loss before surgery, whereas numerous privately funded services, particularly those associated with insurance companies, mandate active participation in a supervised dietary program lasting 6-12 months.[6],[7] A key benchmark for evaluating surgical outcomes is the 30-day mortality following the procedure. Striving to minimize the mortality rate to zero is crucial for any surgical intervention, and this holds particular significance for bariatric surgery. Given that most bariatric procedures are elective, and patients are not anticipated to

experience short-term mortality if the surgery is deferred, achieving a zero-death rate is especially pertinent.[8],[9] The relationship between preoperative weight loss and bariatric surgery outcomes is still not well-studied.

In this single-center, retrospective study, we aim to investigate the effect of pre-operative weight reduction on the post-operative outcomes of bariatric surgeries in a Jordanian population.

MATERIALS AND METHODS

Study Design

We conducted a single-center, retrospective, comparative study at King Hussien Medical Hospital – Royal Medical Services in Jordan between the period of March 2019 to March 2020 for patients who underwent bariatric procedures.

Study Participants

The study aimed to enroll individuals who had undergone bariatric procedures to explore the clinical, demographic, and prognostic factors related to the effect of weight reduction prior to bariatric surgery. Inclusion criteria encompassed all patients who underwent bariatric surgery and reduced 10% of their weight prior to surgery and were assigned to group A, and group B included patients who did not reduce their weights and served as controls. Exclusion criteria involved individuals with a history of deep vein thrombosis (DVT) or pulmonary embolism, as well as those with a family history of coagulopathies or bleeding disorders. Follow-up assessments occurred at 2 weeks, 4 weeks, and 12 weeks postoperatively during clinic visits.

Ethical Approval

The Institutional Review Board (IRB) approved the study. The study was performed in accordance with the principles of the Declaration of Helsinki, 1975. Informed consent was waived by the IRB committee due to the retrospective nature of the study, as the research could not be carried out practically without the waiver. In addition, the research involves no more than minimal risk to the patients, and it will not adversely affect the rights or privacy of the participants given the importance of the knowledge to be gained. Patient data was anonymized, and confidentiality was maintained.

Data collection

Retrospective data collection involved a thorough review of patients' hospital records. The study gathered information on various demographic and clinical variables, including age at the time of the operation, gender, body mass index (BMI), height (measured in centimeters), weight (measured in kilograms), post-operative packed cell volume levels (PCV) at 6 hours and 24 hours following surgery, post-operative white blood cell (WBC) levels at 6 hours and 24 hours post-surgery, the utilization of drains, the type of surgery performed (Roux-en-Y gastric bypass, or sleeve gastrectomy), and post-operative bleeding as the primary study outcomes.

Statistical analysis

Continuous variables were expressed as means accompanied by their corresponding standard deviations (SD), while categorical variables were summarized using frequencies and percentages. To investigate the association between demographic, clinical, and operative variables and the risk of mortality, the Wilcoxon (Mann-Whitney U) test was employed for continuous variables. For categorical variables with a category count of fewer than 5, either the chi-squared (X2) test or Fisher's exact test was utilized. Statistical significance was determined at a p-value less than 0.05. All statistical analyses were conducted using R software (version 4.2.3, Vienna, Austria).

RESULTS

A total of 280 patients who underwent bariatric surgery were included in our study, the mean age was 36.0 (8.0) years, the majority of patients were females (91%), the mean BMI was 44.0 (7.0) Kg/m^2, the mean height was 165.0 (8.0) cm, and mean weight was 115.0 (18.0) Kg. The mean PCV value 6-hours post-operatively was 39.4 (4.4), and 24-hours post-operative PCV was 38.1 (5.4), mean 6-hours post-operative WBC was 10.5 (3.2), and mean 24-hours post-operative WBC was 12.07 (3.54). Laparoscopic SG was performed in 191 (68%) of patients, while 89 (32%) underwent LRYGB, and 211 (75%) had drains. Post-operative complications were seen in 17 (6.1%) of patients.

A total of 180 patients reduced 10% of their weight pre-operatively (Group A), and 100 patients did not reduce their weights and were served as controls (Group B). There was a significant difference in BMI between the two groups with higher BMI levels in Group B (Mean: 53.0 vs. 39.0, p-value<0.001) as shown in **Table 1**. Post-operative WBC levels were significantly higher in group B (means: 11.5 vs. 10.2, p-value=0.027). Surgery option was significantly different between the groups in which 78% of group A underwent LSG (p-value<0.001). Post-operative complications showed significantly better outcomes in Group A with 13% of patients in Group B having postoperative complications including bleeding, hernia, intestinal obstruction, and intra-abdominal abscess.

Table 1: Baseline clinical and demographic characteristics of included patients.

Characteristic	N = 280	Group A, N = 180	Group B, N = 100	p-value
Age	36 (8)	37 (8)	34 (8)	0.077
Sex				0.4
Female	255 (91%)	162 (90%)	93 (93%)	

Male	25 (8.9%)	18 (10%)	7 (7.0%)	
BMI	44 (7)	39 (2)	53 (4)	**<0.001**
Height (cm)	165 (8)	166 (7)	164 (9)	0.14
Weight (Kg)	115 (18)	106 (10)	139 (16)	**<0.001**
6-hours post-PCV	39.4 (4.4)	39.5 (4.2)	39.0 (5.1)	0.6
24-hours post-PCV	38.1 (5.4)	38.0 (5.5)	38.2 (5.3)	>0.9
6-hours post-WBC	10.5 (3.2)	10.2 (3.2)	11.5 (2.9)	**0.027**
24-hours post-WBC	12.07 (3.54)	12.01 (3.62)	12.25 (3.34)	0.8
Drains	211 (75%)	132 (73%)	79 (79%)	0.3
Surgery				**<0.001**
LRYGB	89 (32%)	40 (22%)	49 (49%)	
LSG	191 (68%)	140 (78%)	51 (51%)	
Type of Complication				**0.002**
Bleeding	4 (1.4%)	0 (0%)	4 (4.0%)	
Hiatal Hernia	4 (1.4%)	1 (0.6%)	3 (3.0%)	
Intestinal Obstruction	5 (1.8%)	2 (1.1%)	3 (3.0%)	
Intra-abdominal Abscess	4 (1.4%)	1 (0.6%)	3 (3.0%)	
No	263 (94%)	176 (98%)	87 (87%)	

Abbreviations: PCV; packed cell volume, WBC; white blood cells, LSG; laparoscopic sleeve gastrectomy, LRYGB; laparoscopic Roux-en-Y gastric bypass.

DISCUSSION

Bariatric surgery has demonstrated itself as the most effective and enduring approach for addressing clinically morbid obesity. Before approving surgery, many bariatric procedures incorporate a pre-operative weight loss criterion.[10],[11] Therefore, we aimed to analyze the post-operative outcomes of bariatric surgeries between patients who reduced their weight before surgery and those who did not in the Jordanian population.

Our study involved a total of 280 patients who underwent bariatric surgeries in Jordan, showing a female predominance of 91% of the total sample. It has been shown that bariatric surgeries enhance factors associated with anovulation in women of reproductive age, promoting spontaneous fertility.[12] The increased levels of sex hormone binding globulin and follicular stimulating hormone, along with a decrease in androgen levels, contribute to the possibility of achieving spontaneous pregnancy within a year after undergoing bariatric surgery.[13],[14] Furthermore, a substantial gender imbalance is evident, as 80% of individuals undergoing bariatric surgery are women, despite comparable obesity rates between genders.[15]

Furthermore, our findings showed a significant difference in WBC levels between the weight reduction group with lower levels in patients who reduce their weights prior to surgery. A study by Dallal et al. also showed that a decrease in WBC count was independently associated with more significant weight loss, an extended duration post-surgery, lower hematocrit levels, and a diminished platelet count.[16] In contrast, the findings by Shinder et al. study did not indicate a correlation between participation in a medically supervised weight loss program before bariatric surgery and subsequent weight loss, whether in the short or long term.[17]

Post-operative complications were significantly lower in patients who reduced their weight prior to surgery, showing significantly better surgical outcomes. In contrast to our findings, Samaan et al. study showed that weight loss before the surgery did not serve as a predictor for the success of weight loss after undergoing bariatric surgery. Although a higher preoperative weight loss was linked to a modest reduction in the length of hospital stay, it did not correlate with a decrease in operative time, overall complication rates, ICU admissions, or intraoperative complications.[18] A review by Gerber et al. concluded that, given the inconsistency in the available data on the effect of pre-operative weight loss and post-operative outcomes of bariatric surgery, the findings cannot be utilized as a rationale for imposing mandatory weight loss programs before undergoing bariatric surgery.[19]

CONCLUSION

Our study provides several strong points. First, our study includes a substantial sample size of 280 patients, providing a robust representation of individuals undergoing bariatric surgery in the Jordanian population. This enhances the generalizability of the findings to a broader patient demographic. Second, our study's focus on the clinically relevant outcome of postoperative complications, including bleeding, hernia, and intra-abdominal abscess, adds practical significance to the findings, as these complications directly impact patient well-being. However, our findings should be interpreted carefully in the context of several limitations. First, the retrospective nature of the study introduces inherent limitations, such as potential recall bias and the inability to control variables that were not consistently recorded in medical records. Prospective studies would provide more control over data collection processes. Second, our study lacks information on the specific methods and duration of pre-operative weight reduction, limiting the ability to

conclude the most effective weight loss strategies. Standardizing these protocols in future studies could provide more actionable insights. Extended follow-up periods beyond 12 weeks could provide insights into the sustainability of the observed outcomes. Long-term assessments would contribute to understanding the durability of the benefits associated with pre-operative weight reduction.

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CONFLICT OF INTEREST
The authors declare no conflict of interest.

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