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Assessment of Mean Change in Body Weight in Patients after Exploratory Laparotomy at CMH Quetta

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Abstract

Background: *An exploratory laparotomy is a surgical intervention conducted to gather information that cannot be obtained through clinical evaluation or other diagnostic techniques. This procedure is typically indicated for patients experiencing acute or unexplained abdominal pain, as well as those suffering from abdominal trauma. The primary indications for performing an exploratory laparotomy include penetrating trauma and acute peritonitis. In cases where patients do not exhibit signs of peritonitis and are hemodynamically stable, a selective non-operative management approach may be a preferable option.*

Objective: *To assess the mean change in body weight in patients after exploratory laparotomy at CMH Quetta*

Methodology:

Study design & Setting: *This Quasi Experimental Study was conducted at Surgery department, Combine Military Hospital Quetta*

Duration & Data collection procedure: *Six months i.e. January 31, 2022 to July 31, 2022. All patients between ages 18-70 years including male and female undergoing exploratory laparotomy for acute abdomen such as Duodenal Perforation, TB and typhoid enteric perforations were included. Moreover, the patients who were kept NPO for more than 1 day after exploratory laparotomy were included. Pre-laparotomy and post-laparotomy body weight at 7th post-operative day was noted and the mean change in weight was assessed.*

Results: *The mean body weight of patients before undergoing laparotomy was 70.88 ± 9.02 kg, and this decreased to a mean of 67.97 ± 9.03 kg after the operation. The weights of patients post-laparotomy varied, with a minimum of 48kg and a maximum of 81kg. The average change in body weight after the procedure was 2.90±0.97 kg, with individual weight changes ranging from a minimum of 1.50 kg to a maximum of 7kg.*

Conclusion: *Patients who underwent exploratory laparotomy exhibited a significant change in body weight, as evidenced by the differences noted before and after the surgical intervention.*

Keywords: Body Mass Index, Obese, Exploratory, Laparotomy.

INTRODUCTION

An exploratory laparotomy is a surgical procedure designed to obtain information that is not available through clinical examination or other diagnostic approaches. In surgical

terminology, it involves the exploration of the abdominal cavity, followed by further actions based on the findings. This procedure is commonly indicated for patients suffering from acute or unexplained abdominal pain, as well as those who have undergone abdominal trauma.

In 1842, Frank Zurfley carried out the first recorded exploratory laparotomy. The patient was suspected of experiencing peritoneal hemorrhage as a result of being struck by a van.[1]

The primary indications for conducting an exploratory laparotomy include penetrating trauma and acute peritonitis. In cases where patients exhibit no signs of peritonitis and maintain stable vital signs, a selective non-operative management approach is a viable option. Conversely, patients presenting with visceral perforation or those who are hemodynamically unstable necessitate an exploratory laparotomy.[2-5]

Exploratory laparotomy serves as the definitive procedure to assess intra-abdominal injuries regarding their location and severity. In cases involving multiple traumas, identifying the primary source of hemorrhage can be challenging. In such circumstances, laparotomy presents a safer alternative. Additionally, it aids in managing hemorrhage and averting contamination from the gastrointestinal tract. Conditions such as gastric and bowel perforations, pancreatitis, diverticulitis, ruptured ectopic pregnancy, ruptured liver abscess, and peritoneal dialysis can lead to peritonitis.[7,8]

Exploratory laparotomy is primarily indicated in cases of acute peritonitis and penetrating trauma. In patients who are hemodynamically stable and exhibit no signs of acute peritonitis, non-surgical conservative management may be an appropriate approach. Conversely, patients who are hemodynamically unstable or present with visceral perforation necessitate an exploratory laparotomy. Trauma-related injuries can lead to preventable fatalities; however, only a limited number of patients maintain hemodynamic stability. It is crucial to identify the underlying cause and promptly address any hemodynamic instability. Laparotomy serves as a definitive procedure to ascertain intra-abdominal injuries and is regarded as a safe method for investigating sources of intra-abdominal hemorrhage in individuals with multiple traumas. In our tertiary care facilities, numerous patients present to surgical emergencies with acute abdominal conditions. A significant proportion of these individuals exhibit free air beneath the right hemidiaphragm, typically indicative of visceral perforation. Following thorough history-taking and subsequent surgical intervention, diagnoses such as complications from enteric fever, duodenal perforation, gastric perforation, and enteric perforation due to tuberculosis have been established. While there is no documented correlation between exploratory laparotomy and weight loss, I wish to emphasize this concern, as our surgical departments frequently observe weight reduction in patients undergoing this procedure while still hospitalized. Post-operative weight loss is often attributed to prolonged periods of being NPO (nothing by mouth) without sufficient nutritional support. My objective is to evaluate the average change in body weight among patients undergoing exploratory laparotomy and to advocate for the implementation of effective strategies, such as early and adequate nutritional interventions, to mitigate this issue. Addressing this concern is essential for enhancing patient recovery, overall health, and reducing post-operative complications.

METHODOLOGY

This quasi-experimental study was carried out in the Surgery Department of Combined Military Hospital Quetta. The study included all patients aged between 18 and 70 years, encompassing both males and females, who underwent exploratory laparotomy due to acute abdominal conditions such as duodenal perforation, tuberculosis, and typhoid enteric perforations. Additionally, patients who remained NPO (nothing per oral) for more than one day following the exploratory laparotomy were also included. Informed verbal consent was obtained from all participants. The body weight of patients was recorded both preoperatively and on the seventh postoperative day, allowing for an assessment of the mean change in weight. The results were documented, and a proforma was created for each patient.

Mean and Standard Deviation was calculated for Age and body weight of all patients. Frequency and percentage was calculated for gender. T-Test was used to compare both groups. P-value< 0.05 or 0.01 was taken as significant. Data was entered and analysed by using SPSS version 20. Data was stratified for age, gender, preoperative BMI and indication of laparotomy. Post stratification T-test was used.

RESULTS

Mean age of patients was 37.68±11.78 years. Minimum and maximum age of patients was 18 and 70 years. Table-1

Among patients 8(13.33%) were female and 52(86.67%) were female. Figure-1

Mean BMI of patients was 23.20±2.47. Minimum and maximum BMI of patients was 17.60 and 29 respectively. Table-2

The most frequent indication for laparotomy was perforation peritonitis (63.4%) followed by intestinal obstruction (15%), blunt trauma of abdomen (6.7%) and fire arm injury peritonitis (3.3%). Table-3

Mean body weight of patients before laparotomy was 70.88±9.02 and after surgery mean weight of patients was 67.97±9.03 respectively. Minimum and maximumweight after laparotomy as 48 and 81 respectively.Table-4

Mean change in body weight after laparotomy was 2.90±0.97. Minimum and maximum weight change in patients was 1.50 and 6 kg respectively.Table-5

Mean change in weight of patients after laparotomy in different age groups did not show any statistically significant difference between the age groups. i.e. 18-35 years (p-value=0.602), 36-50 years (p-value=0.297) and 51-70 years (p-value=0.552).Table-6

No significant difference was seen in mean change in body weight after laparotomyamong male and female patients. i.e. p-value=0.918.Table-7

No significant difference was seen in change in weight after laparotomy in patients with BMI 17-23.99 and 24-29respectively. i.e. p-value=0.251.Table-8

Mean change in BMI with respect to indications of laparotomy are given in table below. Table-9

Figure-1: Histogram for Age of patients

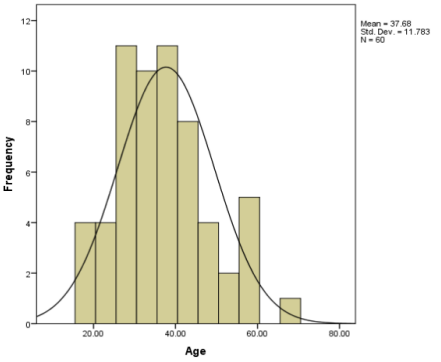

Table-1: Age of patients

S. No	Facts Value	Result
1.	Number of Patients age	60
2.	Mean	37.68
3.	SD	11.78
4.	Minimum	18
5.	Maximum	70

Figure-1: Gender of Patients

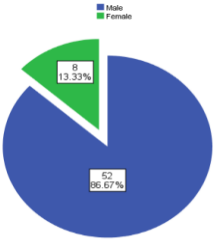

Figure-2: Histogram for BMI

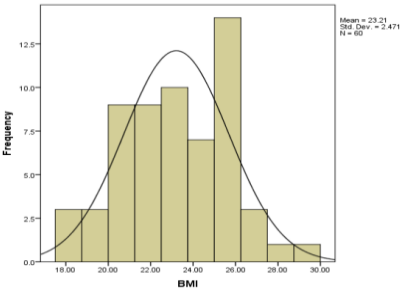

Table-2: BMI of patients

S. No	Facts Value	Result
1.	Number of Patients age	60
2.	Mean	23.20
3.	SD	2.47
4.	Minimum	17.60
5.	Maximum	29

Table-3: Indications for Laparotomy

	Frequency	Percent
Blunt trauma abdomen	4	6.7%
Blunt trauma Peritonitis	1	1.7%
Fai lead to Peritonitis	1	1.7%
Firearm injury Peritonitis	2	3.3%
Firearm injury to abdomen	1	1.7%
Gangrenous gut Peritonitis	1	1.7%
Intestinal obstruction	9	15%
Intestinal obstruction intussusception	1	1.7%
Intestinal obstruction volvulus	1	1.7%
Perforation Peritonitis 38 63.4%	38 63.4%	63.4%
Stab wound Peritonitis	1	1.7%
Total 60 100	60 100	100

Table-4: Descriptive statistics for Body Weight before and after Laparotomy

	Before Laparotomy	After Laparotomy
N	60	60
Mean	70.88	67.97
SD	9.02	9.03
Minimum	50	48
Maximum	84	81
p-value	0.000	

Figure-3: Total body weight loss after Laparotomy

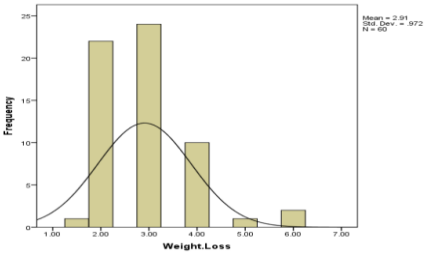

Table-5: Descriptive statistics for total loss in body weight (Kg)

S. No	Facts Value	Result
1.	Number of Patients	60
2.	Mean	2.90
3.	SD	0.97
4.	Minimum	1.50
5.	Maximum	6

Table-6: Descriptive statistics for total loss in body weight (Kg) in relation to Age

	18-35 Years	36-50 Years	51-70 Years
Mean	3.02	2.87	2.63
SD	0.97	1.06 0.74	
Minimum	1.50	2	2
Maximum	6	6	4
p-value	(18-35 vs. 36-50) 0.602		
p-value	(18-35 vs. 51-70) 0.297		
p-value	(36-50 vs. 51-70) 0.552		

Table-7: Descriptive statistics for total loss in body weight (Kg) in relation to Gender

	Male	Female
Mean	2.91	2.88
SD	1	0.83
Minimum	1.50	2
Maximum	6	4
p-value	0.918	

Table-8: Descriptive statistics for total loss in body weight (Kg) in relation to BMI

	17-23.99 (Kg/m^2)	24-29 (Kg/m^2)
Mean	2.79	3.08
SD	0.78	1.19
Minimum	1.50	2
Maximum	4	6
p-value	0.251	

Table-9: Descriptive statistics for total loss in body weight (Kg) in relation to Indications

	Mean ± SD	
Blunt trauma abdomen	2.00	-
Blunt trauma Peritonitis	3.00	-
Fai lead to Peritonitis	4.00	-
Firearm injury Peritonitis	2.50	0.70
Firearm injury to abdomen	2.00	-
Gangrenous gut Peritonitis	3.00	-
Intestinal obstruction	2.61	1.05
Intestinal obstruction intussusception	2.00	-
Intestinal obstruction volvolus	2.00	-
Perforation Peritonitis	3.13	0.99
Stab wound Peritonitis	3.00	-

DISCUSSION

An exploratory laparotomy is a surgical intervention conducted to gather information that cannot be obtained through clinical evaluation or other diagnostic techniques. In surgical terminology, exploratory laparotomy refers to the examination of the abdominal cavity, with subsequent actions taken based on the identified underlying issue. This procedure is typically indicated for patients experiencing acute or unexplained abdominal pain, as well as those who have sustained abdominal trauma.[9] Afridi et al. reported that the average age of the patients was 40.5 years, with a predominance of males at 68.3% and females at 31.7%. In contrast, our study revealed a mean age of 37.68±11.78 years, which is slightly higher than the previously mentioned study, with a male representation of 86.67% and female representation of 13.33%. These results align closely with those of Afridi et al. Conversely, Santo et al. presented different results, noting 12 females and 8 males in their study, with an average age of 45.6 years. The youngest participant was 21 years old, while the oldest was 59 years old.[10]

According to the research conducted by Santo et al., the average initial body weight was recorded at 180 kg, and the average BMI at the beginning of hospitalization was 67 kg/m^2, with a range spanning from 51 to 98 kg/m^2. In our investigation, however, the average body weight before surgery was determined to be 70.88±9.02 kg, and the mean BMI was 23.20±2.47, which is markedly less than the data presented in the earlier study.[11]

In their research, Pache et al. found that 10% of consecutive unselected patients undergoing laparoscopic surgery experienced significant preoperative weight loss of more than 5%. This weight loss was shown to adversely impact ERAS compliance and increase the length of hospital stay, leading to negative consequences for the postoperative course. The multivariable analysis highlighted a 2.5-fold increase in the risk of adverse events, accounting for various measures of surgical complexity as confounding variables.[12]

Additional research indicated that eighteen patients had a prior diagnosis of arterial hypertension and were receiving treatment for it. Furthermore, eight patients were being monitored for type 2 diabetes mellitus, five patients had dyslipidemia, and nine patients were diagnosed with obstructive sleep apnea. One patient was identified with congestive heart failure, exhibiting grade III diastolic dysfunction, while another patient had chronic atrial fibrillation. Notably, only two out of the twenty patients were free from any associated diseases.[13]

There is a relative scarcity of research focused on postoperative morbidity and mortality among patients with SO, along with limited exploration of predictors for morbidity and protocols aimed at preventing complications in this specific patient population.[14]

There is no unified opinion among advocates of preoperative weight loss regarding the ideal percentage of weight loss for patients prior to bariatric surgery. It is crucial to explore these important concerns. The specific juncture at which prolonged hospitalization and treatment, along with the resulting delay in surgical care, becomes unfavorable for the patient in terms of cost-effectiveness has yet to be determined.[15]

Factors such as male gender, hypertension, and known risk factors for pulmonary embolism—including previous episodes of pulmonary embolism, the existence of a vena cava filter, hypoventilation, and pulmonary hypertension—have been identified as significant risks. Moreover, individuals aged over 40 years, those with a history of morbid obesity, coronary disease, lung disease, dyslipidemia, and a body mass index of 50 kg/m² or greater are also at heightened risk when undergoing bariatric surgery. Additionally, sleep apnea is recognized as an independent risk factor for complications that may arise both intraoperatively and postoperatively.[16]

Body Mass Index (BMI) is the sole risk factor that can be altered through preoperative weight reduction. In this study, participants experienced a weight loss of 10% over a period of 7.7 weeks, 15.2% over 15 weeks, and 19.7% over 21.3 weeks of hospitalization. By the end of week 14, which accounts for 63% of the average duration of stay, 78.3% of the patients reached the desired weight loss goal.[17]

At this stage, the weight loss achieved became statistically negligible. The majority of surgical complications and mortality associated with severe obesity (SO) can be attributed to the increased technical challenges of the procedure, as well as the presence and severity of co-morbidities that are directly linked to the level of obesity, the duration of the disease, restricted mobility, and a diminished capacity to respond to and recover from postoperative complications. From a technical perspective, surgeries involving SO are more complex, primarily due to factors such as steatohepatitis, hepatomegaly, the size and weight of the greater omentum, the thickness and shortening of the mesentery, the thickness of the lesser omentum, and elevated intra-abdominal pressure.[18]

The incidence of wound infections, dehiscence, and incisional hernias is notably high in open bariatric surgery, yet these complications are significantly less

frequent with the use of laparoscopic surgery. On the other hand, the thicker abdominal wall in laparoscopic techniques requires greater torque to maneuver the instruments, which may lead to decreased sensitivity and precision in surgical actions. Additionally, the advantages of weight loss prior to surgery are clearly demonstrated by a reduction in the duration of the operative process.[19]

In a retrospective study, Alvarado et al. evaluated 90 patients with an average BMI of 48 kg/m² and a mean preoperative weight loss of 7.25% of their initial body weight. The researchers observed a significant reduction in surgical time, specifically a 36-minute decrease for patients who had lost at least 5% of their initial weight. Additionally, a relationship was established between the initial weight loss and the surgical outcomes after one year; notably, each 1% decrease in initial weight corresponded to an excess weight loss exceeding 1.8% one year following the procedure. Nevertheless, the study highlighted a 10% occurrence of substantial weight loss, indicating the urgent need for the identification and management of malnourished patients prior to their admission to the hospital. Despite enhancements in perioperative care, these findings reinforce the importance of systematic nutritional screening and tailored nutritional interventions for at-risk patients.[20]

CONCLUSION

Patients who underwent exploratory laparotomy exhibited a significant change in body weight, as evidenced by the differences noted before and after the surgical intervention.

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