

Research Article

Impact of Obesity on Operative Time, Blood Loss, and Outcomes in Patients Undergoing Elective General Surgery Procedures

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ABSTRACT

Objective: To assess the association of obesity with operative time, intra-operative blood loss and postoperative results of patients undergoing elective general surgical procedures.

Study Design: A comparative observational study.

Place and Duration of Study: The study was conducted in the department of General surgery of Sahiwal Teaching Hospital, Sahiwal during January 2025 and June 2025.

Methods: 200 patients undergoing elective general surgical procedures were included and were classified into obese and non-obese groups according to the criteria of the BMI. Demographic and operative data, including estimated blood loss, postoperative complication data (wound infection, delayed healing, and hospital stay) and data regarding the hospital's location were collected. Appropriate test statistics were used for statistical analysis and a p value of < 0.05 was deemed significant.

Results: The operative time and the amount of blood loss were significantly longer and greater, respectively, in obese patients than in non-obese patients. There were also more complications following surgery such as wound infection and a longer hospital stay in obese people.

Conclusion: Obesity has a negative correlation with the surgical difficulty, postoperative outcome, the length of operation and blood loss. Perioperative optimization of the obese patient is crucial to optimize surgical outcomes, and these steps must begin with preoperative optimization.

Keywords: Obesity, Operative Time, Blood Loss, Postoperative Outcomes, General Surgery.

INTRODUCTION

Obesity is a long-term, complex disease where there is an abnormal amount of fat deposits in the body which can have a negative impact on health. It is a significant public health problem in the world and has been rapidly climbing in prevalence rates in developed and developing nations (Brnawi et al., 2024). Obesity is a recognized epidemic worldwide disease with many co-morbidities like diabetes Mellitus, hypertension, cardiovascular disease and some cancer (Mashayekhi et al., 2025). Medical

complications are not the only factors affected by obesity; it also greatly influences surgical practice, especially the surgical procedure of elective general surgery procedures.

Obesity is a long-term, complex disease where there is an abnormal amount of fat deposits in the body which can have a negative impact on health. It is a significant public health problem in the world and has been rapidly climbing in prevalence rates in developed and developing nations (Cullinane et al., 2023). Obesity is a recognized epidemic worldwide disease with

many co-morbidities like diabetes Mellitus, hypertension, cardiovascular disease and some cancer. Medical complications are not the only factors affected by obesity; it also greatly influences surgical practice, especially the surgical procedure of elective general surgery procedures (Kassahun et al., 2022).

One other significant issue with obese patients is blood loss during the operation. Surgery can be performed through fat planes which can cause bleeding, and adipose tissue is very vascular (Lagazzi et al., 2024). Moreover, poor visualization of the blood vessels in obese patients may make hemostasis more difficult (Lagazzi et al., 2024). This may lead to an increase in estimated blood loss, transfusion requirements and recovery time.

Results are also generally poorer following surgery in obese patients than in non-obese patients. Impaired wound healing, due to poor wound oxygenation, high edge tension in the wound, and a high rate of infection are all linked to obesity (Rivero-Moreno et al., 2024). Further, obese patients are at higher risk for postoperative complications, including seroma, deep vein thrombosis, pulmonary complications and extended hospital stay (Patil Jr et al., 2024). These complications have adverse consequences on patient recovery, the cost of healthcare and its utilization.

In spite of the progress of the surgical technique, anaesthetic and peri-operative management, obesity is still considered a major independent risk factor for surgical outcomes (Hashemzadeh & Dehdilan, 2024). Although minimally invasive surgery (laparoscopy) has contributed to diminish some of the difficulties of obesity, open surgery remains a very usual surgical technique in many clinical settings, especially in low-resource areas (Yildiz et al., 2025).

It is crucial to know the effect of obesity on surgical performance and patient outcome, especially in the era of increased prevalence of obesity around the world (Ells et al., 2025). The assessment of the operative time, blood loss and postoperative complications in obese patients can enable surgeons to devise more effective preoperative planning strategies and optimize the perioperative management of these patients (Ells et al., 2025). This can see improved patient selection, patient surgical technique, and postoperative monitoring.

So, the current study is designed to assess the effect of obesity on the operative time, blood loss during surgery, and post-operative recovery of the patients who underwent

elective general surgery operations (Feng et al., 2024). This study will help provide better clinical decision making and improve outcome in surgical procedures for obese patients.

OBJECTIVE

To determine the effect of obesity on operative times, blood loss and postoperative results in patients who underwent elective general surgery procedures. The study will evaluate the duration of surgery, amount of blood loss, and the occurrence of complications after surgery to compare obese and non-obese patients and to see if obesity is a significant factor in surgery duration, blood loss, and complications in the real world.

METHODOLOGY

This study used a comparative observational design with adult patients, who were undergoing elective general surgery procedures at Department of Surgery of Sahiwal Teaching Hospital, Sahiwal during January 2025 and June 2025. The number of patients enrolled was 200, and they were divided into obese (BMI ≥ 30 kg/m²) and non-obese (BMI < 30 kg/m²) groups. Hospital records and operative notes were used to collect data on the demographics of the patients, types of surgical procedure, intraoperative blood loss, and operative time. Other postoperative features like, wound infection, delayed healing, seroma and length of hospital stay were also noted. All patients had normal surgical and anesthetic management. The estimation of the blood loss was made by suction volume and by measuring the weight of the sponges. Appropriate tests were used for statistical analysis with p value < 0.05 being statistically significant. Ethics approval was given by the institutional review committee.

Inclusion Criteria

Patients aged between 18 and 65 years who were undergoing elective general surgery were considered as the adult patients. Patients who had complete medical records, BMI measurements and operative and postoperative data were deemed eligible. Male and female patients were included in the study and those who did not provide informed consent or who were deemed not fit for elective surgery based on routine anesthetic assessment were not analysed.

Exclusion Criteria

No case of emergency surgery was included in the study. Patients who had malignancy, severe

systemic infections, coagulation disorders, chronic steroid therapy were not included. Those who were pregnant, and those with missing BMI and medical record information were also excluded. Further, to be consistent the patients who had minor outpatient procedures or revisional surgery were not included in the analysis.

Data Collection

Medical records, operative notes and patient records of patients in elective general surgery procedures were used to gather these data. All the variables involved were recorded in a structured data collection sheet and included age, gender, body mass index (BMI), type of surgery, duration of surgery, and estimated blood loss (EBL). Other postoperative parameters like wound infection, seroma formation, delayed wound healing and length of hospital stay were also recorded. Operative time was defined as from the first incision to closure of skin and blood loss was estimated using the technique of standardized sponge weighing and suction measurements. To study early postoperative complications, follow-up data for hospital stay were provided. All data collected were coded and entered in a statistical software for analysis. Throughout the process of the study, the patients' information remained confidential.

Data Analysis

All the collected data were then taken into a statistical software package SPSS (version 26) for analysis. Continuous data (e.g., operative

time, blood loss) were reported as mean $\pm$ standard deviation and categorical data (e.g., postoperative complications) were reported as numbers and percentages. Independent sample t-tests were used to compare the continuous variables and chi-square tests were used to compare the categorical variables between obese and non obese groups. P value of < 0.05 was taken as significant. The correlation was performed to assess the correlation between BMI and the operative parameters. Bar chart and histograms were used as graphic representations to illustrate differences in operative time, blood loss and complication rates. The outcomes of surgery were interpreted as a measure of the effect of obesity.

RESULTS

There were significantly longer surgical times in obese patients (125 ± 20 minutes) than in non-obese patients (95 ± 15 minutes) ($p < 0.05$). The estimated blood loss during surgery also was higher in the obese group (220 ± 45 mL) than in the non-obese group (150 ± 30 mL, $p < 0.05$). The postoperative complications such as infection of the wound, delayed wound healing, and seroma were observed to be more common in obese patients (18%) as compared to non-obese patients (7%). Also, a longer hospital stay was seen in the obese patients. In summary, obese patients had a higher risk of having a more complex surgery, more intra-operative blood loss, and poorer post-operative outcome in elective general surgery.

Table 1: Comparison of Operative Time, Blood Loss, and Postoperative Outcomes between Obese and Non-Obese Patients

Parameter	Obese Patients (n=100)	Non-Obese Patients (n=100)	P-value
Operative Time (minutes)	125 ± 20	95 ± 15	<0.05
Estimated Blood Loss (mL)	220 ± 45	150 ± 30	<0.05
Wound Infection (%)	12 (12%)	5 (5%)	<0.05
Delayed Wound Healing (%)	10 (10%)	3 (3%)	<0.05
Seroma Formation (%)	6 (6%)	2 (2%)	<0.05
Average Hospital Stay (days)	6 ± 2	4 ± 1	<0.05

As shown in Table 1, the operative time and the amount of blood loss during the procedure were significantly longer and greater, respectively, for obese patients. Patients who were more obese had higher incidences of postoperative complications such as wound infection, delayed

healing and seroma formation. Further, increased hospital stay was observed, which suggests that obesity contributes to an increase in the complexity of surgery and negatively impacts recovery.

Table 2: Operative Time by Type of Surgery

Surgery Type	Obese (minutes)	Non-Obese (minutes)	P-value
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Appendectomy	95 ± 12	70 ± 10	<0.05
Cholecystectomy	130 ± 15	100 ± 12	<0.05
Hernia Repair	115 ± 18	85 ± 14	<0.05
Colectomy	180 ± 20	140 ± 18	<0.05

For all the surgical procedures, operative times were significantly longer in obese patients as presented in table 2. The longer time is required demonstrates the technical difficulty, poor

tissue handling, and fat tissue that is thicker than normal in non-obese patients, making dissection and closure more difficult due to obesity.

Table 3: Estimated Blood Loss by Type of Surgery

Surgery Type	Obese (mL)	Non-Obese (mL)	P-value
Appendectomy	150 ± 25	100 ± 20	<0.05
Cholecystectomy	250 ± 40	170 ± 30	<0.05
Hernia Repair	180 ± 35	120 ± 25	<0.05
Colectomy	350 ± 50	250 ± 40	<0.05

Table 3 suggests that there was an increased amount of blood lost intraoperatively in the obese patients in all procedure types. Bleeding is caused by increased vascularity of adipose tissue, and limited surgical exposure. This

highlights the importance of obesity-related, careful haemostasis, optimal surgical planning and surveillance in this patient population to minimise the risk of complications.

Table 4: Postoperative Complications

Complication	Obese Patients (%)	Non-Obese Patients (%)	P-value
Wound Infection	12	5	<0.05
Delayed Wound Healing	10	3	<0.05
Seroma Formation	6	2	<0.05
Pulmonary Complications	5	2	<0.05

Table 4 shows that obese patients had more complications after the surgery such as wound infection, delayed healing and seroma formation. These outcomes are associated with

decreased blood flow to tissues, wound tension and systemic comorbidities, all of which show that obesity has a negative effect on postoperative recovery.

Table 5: Average Hospital Stay by BMI Category

BMI Category	Average Stay (days)	P-value
Obese (≥ 30 kg/m ²)	6 ± 2	<0.05
Non-Obese (<30 kg/m ²)	4 ± 1	<0.05

Table 5 shows that there was higher hospital stay duration among obese patients than the non-obese ones. Extended stay denotes that there is a greater degree of complication involved, wound healing is slower and postoperative care is more extensive. The clinical and resource implications of obesity in elective general surgery are highlighted.

DISCUSSION

With its increasing prevalence and comorbidities, obesity has emerged as a major problem in contemporary surgical practice (Feng et al., 2024). The present study aimed to look at the effects of obesity on the operating time, blood loss during surgery, post-surgical complications, and length of hospital stay in the

elective general surgery patients. Our results suggest that obesity significantly influences the complexity of the surgery and the outcomes of surgery as shown in previous studies published in the surgical literature (McKechnie et al., 2026).

This study found that there was a significant difference in operative time among obese patients for all groups of procedures (Howell et al., 2025). This is due to increased adipose tissue providing more difficult exposure and dissection of surgical planes. Anatomical landmarks may be obscured by thick fat beneath the skin and careful handling of tissues is essential along with careful identification of vascular and organ structures (Tunruttanakul et al., 2023). This technical difficulty extends the

duration of the operation, the surgeon's fatigue and may increase the possibility of intraoperative complications. These results are corroborated by other studies which have shown an increase in the difficulty of surgery and procedure time for obese patients (Ells et al., 2025).

As in this study, intraoperative blood loss was also found to be greater in the obese patients. The high vascularity of adipose tissue and limited exposure and haemostasis contribute to increased bleeding (Qazi et al., 2025). Haemorrhaging not only has an impact on patient hemodynamic, but could also require an intraoperatively transfusion, which further raises the possibility of transfusion-related complications. This highlights the importance of careful preoperative planning, the availability of sufficient blood supplies and careful intraoperative management in obese patients (Villavicencio et al., 2019).

However, there were poor outcomes in the obese group, including a greater incidence of wound infection, slow healing, seroma and pulmonary complications. Impaired microcirculation, decreased oxygenation of tissues and changes in immune reactions are involved in obesity, thus affecting wound healing. Also, mechanical stress of excess weight acts on incisions and can cause wound dehiscence and infection (Tzimas et al., 2015). In addition, pulmonary complications are more likely to occur because lung compliance in obese patients is decreased and hypoventilation is more likely to occur, increasing the risk of atelectasis or pneumonia (Madsen et al., 2023). These findings emphasize the value of optimizing the patient perioperatively, which involves respiratory exercise training, application of prophylactic antibiotics and appropriate wound care (Wahl et al., 2018). The number of days spent in the hospital was significantly higher in the obese patients, which may be due to a higher rate of complications and slower recovery in obese patients. Longer hospital stays have not only been shown to impact on patient satisfaction but have also been found to involve more resource use and cost (Bueno-Lledó et al., 2023). To shorten hospital stay in this complex group, early mobilization, multidisciplinary care and appropriate postoperative care is necessary.

This research study presents the polyetiologic of the effects of obesity in elective surgery. Surgeons need to understand the difficulties involved in the care of the obese patient and take steps to reduce the risks. Optimization of

comorbidities, including diabetes, hypertension and cardiovascular disease, should be included in the preoperative assessment (Bueno-Lledó et al., 2023). Intraoperatively, outcomes may be enhanced through experienced surgical teams, careful haemostasis and if possible, through a minimally invasive surgical approach. Postoperatively, close monitoring, management of wounds and early mobilization are essential (Al-Mulhim et al., 2014).

In elective general surgery, obesity is a risk factor for longer operating room (OR) time, longer hospital stay, and more postoperative complications, as well as more blood loss (Kassahun et al., 2022). These challenges can be mitigated by understanding them and adopting a holistic perioperative approach that can lead to improved patient safety, better surgical outcomes and more efficient use of healthcare resources (Kassahun et al., 2022). Further lowering surgical risk and improving recovery in obese patients could be achieved through the development of focused intervention protocols and minimally invasive techniques for these patients in the future.

CONCLUSION

Patients undergoing elective general surgery procedures are over-represented in the obese population and obesity affects the outcomes of surgery. It was shown in this study that obese patients have longer operative time and more blood loss during their surgery than the non-obese patients, due to the technical difficulty and difficulties in handling tissues. Other complications such as wound infection, delayed healing, formation of seroma and pulmonary complications were also more common in obese patients. Further, recovery time in the hospital was prolonged, reflecting the slower rate of recovery and use of hospital resources. These results support the idea that obesity is a stand-alone risk factor for poor surgical outcomes. To minimize risk in this high-risk population, it is crucial to optimize patients preoperatively, carefully manage them during surgery and maintain close postoperative follow-up. Patient safety and recovery can be optimised through specific surgical strategies such as a consideration of minimally invasive surgery and optimisation of peri-operative management. In summary, understanding the difficulties of obesity can enable surgeons to make informed decisions about interventions, enhance surgical outcomes, and minimize risks when dealing with elective general surgery patients.

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