

**ORIGINAL RESEARCH****Analysis of Safety and Efficacy of a Laparoscopic Cholecystectomy in the Morbid and Super Obese Patients at a Tertiary Care Centre****<sup>1</sup>Gopal, <sup>2</sup>Sharad Kumar**<sup>1</sup>Associate Professor, <sup>2</sup>Assistant Professor, Department of General Surgery, NCR Institute of Medical Sciences, Meerut, Uttar Pradesh, India**Correspondence:**

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**Email:** [drsharad\\_anikagupta@yahoo.com](mailto:drsharad_anikagupta@yahoo.com)**ABSTRACT**

**Introduction:** Laparoscopic cholecystectomy (LC) has been proved to be the benchmark treatment for symptomatic cholelithiasis. The overall morbidity and mortality rate is 5–10% and 0.1% respectively, and an open conversion rate of 5–10% is commonly reported in the literature. Over a century, classical cholecystectomy (Open method) has been the method of choice in the surgical management of gall bladder diseases. One of the risk factors for cholelithiasis is obesity, the incidence of which is increasing worldwide due to the change in lifestyle habitat. Therefore, surgeons are likely to encounter increasing number of obese patients who require a cholecystectomy for symptomatic cholelithiasis. Conventionally obesity has been considered as a relative contraindication to LC, as the technical difficulties associated with this procedure in these patients were thought to be associated with higher morbidity and mortality as well as increased open conversion rates. The aim of this study was to investigate the safety [peri-operative morbidity and mortality and the incidence of bile duct injuries (BDI)] and efficacy (duration of surgery, LOS and open conversion rates) of an elective LC in the morbid/ super obese patients (BMI > 40) compared to patients with a BMI < 26 and a BMI 26–40.

**Methods:** A review of a prospectively maintained electronic database and the medical records in the hospitals for all elective LC performed. The data collected include patient demographics and BMI, LOS, duration of surgery (DOS), intra- and post-operative complications, bile duct injuries. The patients were majorly divided into three groups: BMI < 26, BMI 26–40 and BMI > 40. The LOS was calculated from the day of admission till the discharge while duration of surgery was from the initiation of skin incision to the end of skin closure. After their discharge from the hospital, the patients were regularly followed-up in the outpatient clinic between 4 and 8 weeks, for assessing the morbidity and mortality up to 30-days.

**Results:** A total of 805 consecutive patients who underwent elective LC were included for the study. An intra-operative cholangiogram was helpful in 661 patients (83%) with no significant differences between the various BMI groups. There were 18 (2.3%) patients who had intra-operative complications; however, there were no statistically significant differences between the three groups. 12 of 18 intra-operative complications that arose were as a result of bleeding from a minor hepatic laceration and capsular tears. This bleeding in eight patients was controlled successfully with just using diathermy, whereas additional interventions were required in four patients [Surgical

(Ethicon) and/or Floseal (Baxter)]. There were 4 (0.5%) patients who suffered biliary injuries with no statistically significant differences between each of the BMI groups.

**Conclusion:** This study has concluded that LC can be performed safely and efficiently in morbid and super obese patients and with the same favourable outcomes as seen in those patients with a normal BMI. Therefore, LC should be considered as the gold standard treatment for the morbid and super obese patients with symptomatic cholelithiasis in the near future.

**Keywords:** Cholecystectomy, Morbid, Obesity, Laparoscopy.

## INTRODUCTION

Laparoscopic cholecystectomy (LC) has been proved to be the benchmark treatment for symptomatic cholelithiasis. Enormous large series of studies has already proven the safety and efficacy of this procedure. The overall morbidity and mortality rate is 5–10% and 0.1% respectively, and an open conversion rate of 5–10% is commonly reported in the literature.<sup>1-3</sup>

<sup>3</sup>Over a century, classical cholecystectomy (Open method) has been the method of choice in the surgical management of gall bladder diseases. At the beginning of the 20th Century, laparoscopic cholecystectomy (LC) was introduced as an alternative to classical cholecystectomy, has gained greater acceptance by the surgeons, and now appears to have taken over the position of open cholecystectomy for both chronic and acute cholecystitis.<sup>4-6</sup>

Also, laparoscopic surgery has proved to be a safe and effective procedure in the obese population. In fact, some procedures are easier than their open counterpart for morbidly obese patients. Technical difficulties may arise in obese patients, in obtaining pneumoperitoneum or in reaching the operative region adequately and in achieving adequate exposure in the presence of an obese colon.<sup>7</sup> One of the risk factors for cholelithiasis is obesity, the incidence of which is increasing worldwide due to the change in lifestyle habitat.<sup>8</sup> Therefore, surgeons are likely to encounter increasing number of obese patients who require a cholecystectomy for symptomatic cholelithiasis. Conventionally obesity has been considered as a relative contraindication to LC, as the technical difficulties associated with this procedure in these patients were thought to be associated with higher morbidity and mortality as well as increased open conversion rates.<sup>9</sup> Although there is greater evidence on the safety and efficacy of LC in the obese patients where there is a lack of suitable data on its use in the morbid/super obese [body mass index (BMI) > 40] patients. Laparoscopic surgery was found to be associated with a shorter operating time and LOS, as well as reduced peri-operative complication rates when compared to open surgeries.

The aim of this study was to investigate the safety [peri-operative morbidity and mortality and the incidence of bile duct injuries (BDI)] and efficacy (duration of surgery, LOS and open conversion rates) of an elective LC in the morbid/ super obese patients (BMI > 40) compared to patients with a BMI < 26 and a BMI 26–40.

## MATERIALS AND METHODS

A review of a prospectively maintained electronic database and the medical records in the hospitals for all elective LC performed. The data collected include patient demographics and BMI, LOS, duration of surgery (DOS), intra- and post-operative complications, bile duct injuries.

The patients were majorly divided into three groups: BMI < 26, BMI 26–40 and BMI > 40. The LOS was calculated from the day of admission till the discharge while duration of surgery was from the initiation of skin incision to the end of skin closure. After their discharge from the hospital, the patients were regularly followed-up in the outpatient clinic between 4 and 8 weeks, for assessing the morbidity and mortality up to 30-days. The exclusion criteria for this study include acute cholecystitis, gallbladder neoplasm, open

cholecystectomy and a combined procedure, e.g., repair of an inguinal hernia in conjunction with a Laparoscopic cholecystectomy.

Data were collected and the results were tested using ANOVA and the categorical outcomes (open conversion, intra and post operative complications) were tested with the use of Fisher's exact test. A  $P < 0.05$  was considered a statistically significant result.

## RESULTS

A total of 805 consecutive patients who underwent elective LC were included for the study. The patient demographics and BMI data are shown in Table 1. An intra-operative cholangiogram was helpful in 661 patients (83%) with no significant differences between the various BMI groups.

The overall duration of surgery was 70 min [interquartile range (IQR) 56–91], with the procedure taking progressively longer to perform as the BMI increases sharply (Table 2). Peri-operative outcomes by BMI group are tabulated here in Table 2.

There were 18 (2.3%) patients who had intra-operative complications; however, there were no statistically significant differences between the three groups. 12 of 18 intra-operative complications that arose were as a result of bleeding from a minor hepatic laceration and capsular tears. This bleeding in eight patients was controlled successfully with just using diathermy, whereas additional interventions were required in four patients [Surgicel (Ethicon) and/or Floseal (Baxter)]. There were 4 (0.5%) patients who suffered biliary injuries with no statistically significant differences between each of the BMI groups.

**Table 1: Patient demographics**

	<b>BMI&lt;26, N=172</b>	<b>BMI 26-40 N=556</b>	<b>BMI &gt;40 N=77</b>	<b>Total N=805</b>
<b>Female, n(%)</b>	131(77)	412(74.2)	65(85.3)	606(76.1)
<b>Mean age, year (SD)</b>	46.8(19.7)	46.6(14.7)	39.8(12.2)	46(16.4)
<b>Mean BMI (SD)</b>	22(2.2)	32(4)	46(4.6)	31(7.3)

DOS, duration of surgery; LOS, length of hospital stay.

**Table 2: Peri-operative outcomes according to different body mass index (BMI) groups**

	<b>BMI &lt;26, n=172</b>	<b>BMI 26-40, n=556</b>	<b>BMI &gt;40, n=77</b>	<b>Total N=805</b>	<b>P - value</b>
Median DOS, min (IQR)	64(55-84)	73(59-93)	82(63-105)	70(55-92)	<0.001
Median LOS, days (IQR)	1.1(1.1-1.3)	1.1(1.1-1.3)	1.1(1.1-1.3)	1.1(1.1-1.3)	0.267
Conversion, n (%)	1(0.7)	2(0.4)	1(1.3)	4(0.5)	0.243
Post-op complications, n (%)	8(4.8)	25(4.5)	6(7.7)	39(4.7)	0.412
Biliary complications, n (%)	0(0)	4(0.7)	0(0)	4(0.5)	0.718
Cholangiogram, n(%)	143(83)	456(81)	60(80)	662(82)	-

DOS, duration of surgery; LOS, length of hospital stay.

## DISCUSSION

This study shows that a LC can be performed in the morbid/ super obese patients safely and efficiently with equally positive outcomes when compared to patients with a normal BMI. The incidence of intra-operative complications was low, ranging from 1% to 2% across the different BMI groups. The overall post-operative complication ( $n = 6/76$ ; 7.9%) rates in the BMI > 40 groups were higher than the other two BMI groups but the differences were not statistically significant. There was no reported biliary injury or death in the BMI > 40 group. LC in this group BMI > 40 group took on a median of 18 and 10 min longer to perform the surgery when compared to the BMI < 26 and BMI 26–40 groups, respectively. This defines the more challenging and difficult surgery associated with LC in these groups of patients.

However, despite this, there were no significant differences in the open conversion rates or the median duration of hospital stay which was essentially identical (1.1 days) among the different groups.

The results of this study are more favourable with the figures published in the literatures. The mean LOS in this study was estimated to be 1.5 (SD 2.6) days, compared to 2–4 days published in similar studies.<sup>10-12</sup> The mean operating time was 75 (SD 28) mins, compared to 46–98 mins calculate by the other authors.<sup>10-13</sup> The overall conversion rate in this study was found to be 0.5%, as compared to 7.7%,<sup>11</sup> 4.2%,<sup>10</sup> and 4.1%<sup>12</sup> in some identical studies. The often-quoted conversion rate in the recent literature is approximately 5–8%.<sup>1,2</sup> The intra- and post-operative complication rates reported in this study were lower than other published literatures. Ammori et al<sup>13</sup> reported their intra- and post-operative complication rates of 17.6% and 11.8%, respectively, in the morbidly super obese patients, compared to 2.3% and 4.9% in this study.

There are no studies without any limitations and this study is also no exception. Firstly, this prospective study could have allowed a more systematic collection of data like the ASA grade and patients co-morbidities which would have provided many useful information for clinical practice and the clinicians. Although this study has established the safety and efficacy of LC in the morbid/super obese patients, it is still a mystery if the same results could have been achieved in patients who are morbid/super obese with high ASA and multiple co-morbidities. Secondly, the follow-up duration was limited only up to 8 weeks post-operatively; therefore, long-term (e.g., 6- or 12-months) data such as the incidence of incisional hernia or resolution of symptoms remains mystery. A longer follow-up is needed which could also reveal how well and how soon the patient could return to their regular daily routine or activities. Finally, the authors acknowledge the smaller number of patients in the morbid and super obese groups. However, to the authors' knowledge, this study reported quite a large number of morbid/super obese (BMI > 40) patients in the literature after Khan et al<sup>15</sup> Therefore, the authors believe that this study provides important data on the safety and efficacy of LC in the morbid/super obese patients.

## CONCLUSION

This study has concluded that LC can be performed safely and efficiently in morbid and super obese patients and with the same favourable outcomes as seen in those patients with a normal BMI. Therefore, LC should be considered as the gold standard treatment for the morbid and super obese patients with symptomatic cholelithiasis in the near future.

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