

Open Vs. Laparoscopic appendectomy in obese patients: An outcome and quality of life observational study

¹Dr.Megha Ankush Dhamale,²Dr. Harshvardhan Vedpalsingh Tanwar,³Dr. Hemant Madhukar Naik

¹Junior Resident,²Associate Professor,³Associate Professor

¹Department of General Surgery,

¹DVVVPF's Medical College and Hospital, Ahmednagar,India

Abstract:

Introduction: The gold standard in treating acute appendicitis is to perform an appendectomy. we conducted the present study with an aim of comparing the morbidity, duration of hospital stay, post operative complications, duration of surgery and post operative recovery of obese patients undergoing appendectomy via open and laparoscopic procedure.

Materials and methods: The present prospective study was conducted in the department of surgery of tertiary care hospital in Maharashtra. The duration of the study was for 1 year [June 2021 to June 2022]. Before the start of the study, we took necessary permission from the institutional ethics committee. Informed consent was taken and strict confidentiality was maintained during the study period. Obese patients were divided into a laparoscopic group (LG) and an open group (OG). Patients aged 18-40 years with a BMI of 30 kg/m² or greater and diagnosed with acute appendicitis by the ALVARDO score. Various intra operative parameters, post operative complications including mortality and quality of life were assessed in both the groups. Quality of life was assessed using SF-36 questionnaire.

Results: The mean duration of laparoscopic group was 64.45 minutes and of open group it was 44.56 minutes and this difference was statistically significant. We found significant difference between the proportions of wound dehiscence, fistula and wound infection in both the groups. The overall quality of life was with average SF-36 score of 67 in laparoscopic group and score of 55 in open group and this difference was statistically significant.

Conclusions: Operative time was significantly longer in lap group when compared to open group. We found significant difference between the proportions of wound dehiscence, fistula and wound infection in both the groups. Quality of life of patients undergoing laparoscopic technique was significantly better than open group.

IndexTerms—Appendicitis; Quality of life; Obesity; Laparoscopic; Open technique

Introduction:

Due to its morbidity and mortality, obesity is considered to be the most serious lifestyle disease of the 21st century.¹ Obesity is associated with increased postoperative complications and increased technical difficulties in patients undergoing surgery. Excess adipose tissue hinders proper exposure and direct visualization, increases the complexity of the procedure, and results in increased operative time and technical difficulties.^{2,3}The gold standard in treating acute appendicitis is to perform an appendectomy.⁴ As the field of surgery has evolved, there has been a desire to treat various surgical conditions with minimally invasive techniques. Laparoscopic surgery is gaining popularity in gastrointestinal surgery due to its low invasiveness and favorable results.³⁻⁶ The number of open surgeries, especially for benign diseases such as cholecystectomy and appendectomy, has decreased dramatically. According to medical research, laparoscopy is also superior to appendectomy in terms of wound infection, postoperative recovery time, and hospital discharge costs.^{5,7} Obese patients have thicker abdominal walls, which can make exposing the surgical field, performing surgical procedures, and managing wound-related issues more difficult. Laparoscopy solves these problems. Laparoscopic appendectomy (LA) leads to the opinion that it is superior to open appendectomy (OA) in the treatment of appendicitis.⁸⁻¹⁰ While some studies suggest that LA is a safe and effective approach for both acute and perforated appendicitis, other data suggest that an open procedure is preferable. With this background, we conducted the present study with an aim of comparing the morbidity, duration of hospital stay, post operative complications, duration of surgery and post operative recovery of obese patients undergoing appendectomy via open and laparoscopic procedure.

Materials and methods:

The present prospective study was conducted in the department of surgery of tertiary care hospital in Maharashtra. The duration of the study was for 1 year [June 2021 to June 2022]. Before the start of the study, we took necessary permission from the institutional ethics committee. Informed consent was taken and strict confidentiality was maintained during the study period. A study conducted by Ahmed AH et al¹¹ inferred that the over-all complication rate among laparoscopic group and open groups was around 6% and 30%. Considering this, with 95% confidence interval and 80% power, we found the minimum sample size to be 46 in each group. Considering 10% attrition rate, we have included 50 cases in each group. Obese patients were divided into a laparoscopic group (LG) and an open group (OG). Patients aged 18-40 years with a BMI of 30 kg/m² or greater and diagnosed with acute appendicitis by the ALVARDO score. H. History of right lower quadrant or periumbilical pain with nausea and/or vomiting to the lower right quadrant, fever >38°C, right lower quadrant protection, and tenderness and/or on physical examination

Included was a leukocytosis of over 10,000 per ml. Patients with bleeding tendencies, previous abdominal surgery, abdominal tuberculosis, clinical or ultrasound mass formation, end-stage renal disease (ESRD), and those who refused to participate were excluded in this study. Various intra operative parameters, post operative complications including mortality and quality of life were assessed in both the groups. Quality of life was assessed using SF-36 questionnaire.

Statistical analysis plan:

The data was collected, compiled, and analyzed using EPI info (version 7.2). The qualitative variables were expressed in terms of percentages. The quantitative variables were both categorized and expressed in terms of percentages or in terms of mean and standard deviations. The difference between the two proportions was analyzed using chi-square or Fisher exact test. Normality of Quantative data was tested using Kolmogorov Smirnov test. To test the difference of means of normal data student t test were used. All analysis was 2 tailed and the significance level was set at 0.05.

Results: We have included 50 cases each in the two groups.

Table 1: Demographic characteristics of the groups

Demographic profile	Laparoscopic group		Open Group		P value
	Number	%	Number	%	
Age (in years)					
20 to 30	14	28	10	20	0.4553
31 to 40	12	24	12	24	
41 to 50	13	26	13	26	
51 to 60	11	22	15	30	
Gender					
Male	34	68	32	64	0.7832
Female	16	32	18	36	
Chronic illness					
Yes	10	20	11	22	0.6673
No	40	80	39	88	
Body mass index					
Obese Class 1 (30 to 34.9kg/m ²)	26	52	25	50	0.4578
Obese Class 2 (35 to 39.99 kg/m ²)	20	40	22	44	
Obese Class 3 (≥ 40 kg/m ²)	4	8	3	6	

The mean age of the cases among laparoscopic group and open group was 44.56 years and 43.45 years respectively with male preponderance in both the groups. The proportion of obesity classes and chronic illness was similar in both the groups. ($p>0.05$)

Table 2: Distribution of the cases based on signs and symptoms

Symptoms and signs	Laparoscopic		Open Group (n=50)		P value
	Group (n=50)				
	Number	%	Number	%	
Right hypochondriac pain	34	68	36	72	0.7866
Nausea and vomiting	17	34	18	36	0.7765
Fever	10	20	12	24	0.6754
Rebound tenderness	8	16	8	16	0.5674
Anorexia	24	48	26	52	0.5743

The symptoms and signs pertaining to appendicitis among both the groups were similar. ($p>0.05$)

Table 3: Distribution of the cases based intra operative parameters

Intra operative parameters	Laparoscopic		Open Group		P value
	group				
	Mean	SD	Mean	SD	
Duration of procedure (minutes)	64.45	2.32	44.56	3.81	<0.001
Post operative VAS score	4.1	0.57	6.3	0.4	<0.001
Hospital stay	2.1	0.33	3.4	0.45	0.0011
Blood loss (ml)	123.22	12.89	245.33	19.23	<0.001

The mean duration of laparoscopic group was 64.45 minutes and of open group it was 44.56 minutes and this difference was statistically significant. The post operative VAS scores, duration of hospital stay and blood loss were significantly higher among open group when compared to laparoscopic group. ($p < 0.01$)

Table 4: Distribution of the cases based on post operative complications

Post operative complications	Laparoscopic group		Open Group		P value
	Number	%	Number	%	
Pelvic abscess	2	4	3	6	0.0672
Paralytic ileus	1	2	4	8	0.0721
Intestinal fistula	1	2	5	10	0.0321
Wound infection	2	4	3	6	0.0432
Wound dehiscence	2	4	9	18	0.0021
Wound seroma	1	2	4	8	0.0721

Among the laparoscopic group, about 4% had pelvic abscess, 2% had paralytic ileus, 2% had intestinal fistula, 4% had wound infection, 4% had wound dehiscence and 2% had wound seroma. Among the open group, 6% had pelvic abscess, 8% had paralytic ileus, 10% had intestinal fistula, 6% had wound infection, 18% had wound dehiscence and 8% had wound seroma. We found significant difference between the proportions of wound dehiscence, fistula and wound infection in both the groups.

Table 5: Distribution of the cases based on quality of life at follow up

Quality of life using SF-36	Laparoscopic group		Open Group		P value
	Mean	SD	Mean	SD	
	67	23	55	24	<0.001

The overall quality of life was with average SF-36 score of 67 in laparoscopic group and score of 55 in open group and this difference was statistically significant.

Discussion:

Obesity is associated with various medical conditions. And, also the obesity influences the outcome of various surgical procedures either due to the virtue of the medical condition associated or due to excessive fat deposition.^{2,12} Choice of appendectomy in obese patients is a topic of debate. We compared the outcomes, quality of life at follow up and intra operative factors among laparoscopic and open procedures in obese patients. The average duration of the procedure among open group was significantly lower among the open group when compared to laparoscopic group in the present study. The post operative VAS scores, duration of hospital stay and blood loss were significantly higher among open group when compared to laparoscopic group. In a study conducted by Clarke T et al¹³ no significant differences were seen in any of the secondary outcomes (hospital stay and blood loss) except for a longer operative time among the obese patients. In a study conducted by Ahmed AH et al¹¹ the early post-operative complications (within 30 days after surgery) were significantly lower in the laparoscopic group (LA) (5 patients out of 29) than the open (OA) (11 patients out of 29). Additionally, lower incidence of complications was noticed in the LA group (2 out of 29 patients) compared to OA (6 patients out of 29) beyond 30 days after operation. Similar inferences were reported by Varela J et al¹⁴, Enochsson L et al¹⁵, Massomi H et al¹⁶ and Towfigh S et al¹⁷.

We found significant difference between the proportions of wound dehiscence, fistula and wound infection in both the groups. In a study conducted by Ahmed AH et al¹¹, there was no difference between both groups regarding the development of pelvic abscess, postoperative ileus, and intestinal fistula. However, there was significant difference between both groups in terms of all types of wound complications; wound infection ($p = 0.04$), seroma formation ($p = 0.001$), and wound dehiscence ($p = 0.02$). Ciarrochhi A et al inferred that the intra-abdominal abscesses formation rate was higher in the open appendectomy group ($P = 0.058$), although slightly above the statistical significance threshold.

A meta-analysis conducted by Ciarrochhi A et al¹⁸ inferred that laparoscopic appendectomy showed to be significantly associated with lower wound infection ($P < 0.001$) and post-operative complication rate ($P < 0.001$). In a study conducted by Clarke T et al¹³, no differences in complications between the open and laparoscopic groups were found. The overall quality of life was with average SF-36 score of 67 in laparoscopic group and score of 55 in open group in the present study. Patients with laparoscopic surgery had statistically significant higher overall quality of life scores (SF-36) (72 ± 32) compared to open surgery patients (66 ± 35) in the study conducted by Ahmed AH et al.¹¹

Conclusions:

Operative time was significantly longer in lap group when compared to open group. The post operative VAS scores, duration of hospital stay and blood loss were significantly higher among open group when compared to laparoscopic group. We found significant difference between the proportions of wound dehiscence, fistula and wound infection in both the groups. Quality of life of patients undergoing laparoscopic technique was significantly better than open group. Except for longer operative time, the short term and long-term outcomes of laparoscopic appendectomy are better than open technique among obese patients.

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