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Original Research Article

Comparative study between open versus laparoscopic appendicectomy in western U.P.

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Abstract: Laparoscopic appendectomy is better than open conventional appendectomy for appendicitis. The main was to compare between open versus laparoscopic appendectomy for appendicitis in western UP. In method a total of 100 patients (laparoscopic appendectomy 40 cases and open appendectomy 60 cases) were analyzed over the age of 12 years at Muzaffarnagar medical college, Muzaffarnagar, Uttar Pradesh, between december 2013 to June 2015 for comparison between the two groups. The Results were post operative pain, duration of hospital stay, early return to work was less in laparoscopic appendectomy as compared to open appendectomy where as operating time, post operative nausea is slightly more. In Conclusion was Laparoscopic appendectomy is simple, safe and efficient technique for the treatment of appendicitis.
Keywords: Laparoscopic appendectomy, appendicitis

INTRODUCTION

Appendicitis is one of the most common acute surgical diseases. It affects all age groups, though more frequently seen in early adulthood, with a male preponderance of 1.3:1 [1]. Currently, 84% of all appendectomies are performed for acute pathology [2].

The first appendectomy was performed by Claudius Amyand in 1736. Since, then appendectomy has remained the treatment of choice for appendicitis in all its forms [3]. For more than a century open appendectomy has been the gold standard for acute appendicitis. It is considered safe and effective procedure for acute appendicitis with low morbidity, short hospitalization and minimal post operative discomfort.

But, today laparoscopic techniques hold a number of advantages over the traditional open operation described over 100 years ago. Laparoscopic appendectomy was first described by Semm *et al.*[14]*;* in 1983 in Germany. Through this study we will compare open versus laparoscopic appendectomy in western UP. This had been the goal behind this study.

MATERIALS AND METHODS

The proposed study was conducted in the Department of General Surgery, Muzaffarnagar Medical College & Hospital, Muzaffarnagar from December 2013 to June 2015, in a single surgical unit. Suspected appendicitis cases over the age of 12 years were studied prospectively under the following groups:-

- Laparoscopic Appendectomy – 40 Cases.
- Open Appendectomy – 60 Cases.

Patients inclusion Criteria

- All patients of age 12 years or more and both sexes with clinical diagnosis of acute appendicitis with symptoms for less than 24 hours and no palpable appendicular mass were considered for emergency appendectomy.
- All patients of age 12 years or more and both sexes who suffered an attack of acute appendicitis and in whom with palpable appendicular mass were clinically decided to do an interval appendectomy.

Patient's exclusion Criteria

- Presence of generalized peritonitis.
- Pregnancy
- Previous abdominal surgery.
- Presence of any cardiac or pulmonary disorder that would affect the overall prognosis of the patients.
- Any known coagulation disorder.

STATISTICAL ANALYSIS

Statistical significance of the difference between the two means or the difference between the two proportions was calculated using the Z-test and Chi-square test where it needed.

PARAMETERS TO BE EVALUATED

- Operation time in between the two groups.
- Post operative pain and nausea scoring by using visual analogue scale.

- Post operative analgesic requirement
- Duration of hospital stay.

RESULTS

The present study included 100 cases over the age of 12 years, which were studied prospectively under the following groups:

- Laparoscopic appendectomy – 40 cases
- Open appendectomy – 60 cases

OPERATION TIME

The average operating time was more in the laparoscopic appendectomy as compared to the time taken in performing open appendectomy. However, this difference will reach the statistical significant with p<5. It is to be noted that the cases of laparoscopic appendectomy which were subsequently converted to open surgery were also usually the ones which took longer time. It is also to be observed that the laparoscopic appendectomy generally took longer time during interval appendectomy than during the emergency laparoscopic appendectomy. This difference may be related to the presence of dense adhesions around the appendix if the attack of appendicitis was severe at the onset.

The average operating time was more in the laparoscopic appendectomy as compared to the time taken in performing open appendectomy. However, this difference will reach the statistical significant with p<5, as shown in table no.1. It is to be noted that the cases of laparoscopic appendectomy which were subsequently converted to open surgery were also usually the ones which took longer time. It is also to be observed that the laparoscopic appendectomy generally took longer time during interval appendectomy than during the emergency laparoscopic appendectomy. This difference may be related to the presence of dense adhesions around the appendix if the attack of appendicitis was severe at the onset. (TABLE 1)

Table1: Duration of Operation

Operation time (min)	LA		OA	
	N	PERCENT	n	PERCENT
21-40	6	15	26	43.3
41-60	18	45	24	40.0
61-80	6	15	6	10.0
81-100	6	15	4	6.7
101-120	2	5	0	0.0
>120	2	5	0	0.0
Total	40	100	60	100.0
Mean	64.9		46.43	
SD	28.47		17.9	
Z Value	3.6502			
P value	0.0003			
95% CI				
Upper limit			- 28.38	
Lower Limit			-8.55	
The result is significant				

POST-OPERATIVE PAIN AND NAUSEA

All patients were given three doses of Inj. Diclofenac 75 mg i.m. in the post-operative period. A visual analogue scale filled by the patient indicating the level of pain and nausea on a graded scale of 0 to 10 was used. The reading was taken after 24 hours of surgery and 6 hours of the last analgesic dose. Mean pain for laparoscopic and open appendectomy is 3.25/4.13 and mean nausea for laparoscopic and open appendectomy is 0.57/0.266, as shown in table no. 2 and 3. Thus, post-operative pain is on an average more intense after open appendectomy, irrespective of whether it is done is an emergency or interval setting. Nausea, on the other hand is generally slightly intense after laparoscopic appendectomy due to the effect of general anaesthesia given to the patient. (TABLE 2&3)

Table-2: Visual Analogue Score for Nausea

VAS (NAUSEA)	LA		OA	
	N	PERCENT	n	
0	22	68.75	54	90.0
1	4	12.5	2	3.3
2	2	6.25	4	6.7
3	2	6.25	0	0.0
4	2	6.25	0	0.0
TOTAL	32	100	60	100.0
Mean	0.57		0.266	
SD	1.12		0.735	
Z Value	1.51			
P value	0.13			
95% CI				
Upper limit	-0.69			
Lower	-0.08			
The result is not significant				

Table-3: Visual Analogue Score For Pain

VAS (PAIN)	LA		OA	
	N	PERCENT	n	PERCENT
0-2	12	37.5	14	23.3
3-4	10	31.25	18	30.0
5-6	8	25	22	36.7
7-8	2	6.25	4	6.7
9-10	0	0	2	3.3
TOTAL	32	100	60	100.0
Mean	3.25		4.13	
SD	2.14		2.25	
Z Value	1.98			
P value	0.0485			
95% CI				
Upper	-0.006			
Lower	-1.754			
The result is significant				

POST-OPERATIVE HOSPITAL STAY

Mean post-operative stay in the hospital in the laparoscopic and open groups was 41.85 and 43.8 hours respectively, and the difference is statistically insignificant, as shown in table no 4. Range of stay was 24 to 80 hours in the laparoscopic group. The skewed value of 80 hours was seen in the case where a para caecal drain was put. Therefore, duration of hospital stay not shown much difference between the two groups, but it is slightly more in open appendectomy than laparoscopic appendectomy. (TABLE 4)

Table-4: Duration of Hospital Stay

STAY	LA		OA	
	n	PERCENT	N	PERCENT
<20	0	0	2	3.3
20-40	16	50	40	66.7
41-60	16	50	12	20.0
61-80	0	0	2	3.3
81-100	0	0	2	3.3
>100	0	0	2	3.3
TOTAL	32	100	60	100.0
Mean	41.85		43.8	
SD	13.15		24.14	
Z Value	0.50			
P value	0.60			
95% CI				
Upper	-5.39			
Lower	-9.29			
The result is not significant				

Abbreviations:
OA: Open Appendicectomy
LA: Laparoscopic Appendicectomy
N and n: Number of patients
VAS: Visual analogue score

DISCUSSION

Our study compared a total of 100 cases (60 open appendectomies and 40 laparoscopic appendectomies) to evaluate the safety and efficacy of the laparoscopic appendectomy and to evaluate our results in comparison with those of other reported series.

DURATION OF OPERATION

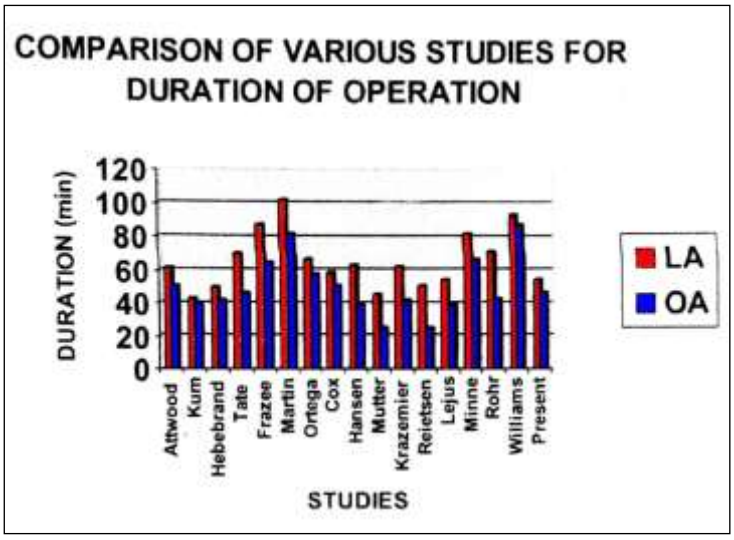
The definitions of operating times in the various randomized controlled trials done so far have been highly variable. Minne *et al.*[15]*;* didn't count the time necessary for setting up the laparoscopic equipment. Williams *et al.*[16]*;* mentioned the exact duration from incision to dressing. Apart from this, most studies show a significantly longer operation time for laparoscopic appendectomy. In our study duration of operation was defined as the time taken from the moment of making an incision to the time of last stitch to close the incision.

We demonstrated a range of 30 min. to 85 min for laparoscopic appendectomies which were completed successfully and 22 min. to 90 min. for open appendectomy, with a mean time difference of 7.75 min., laparoscopic appendectomy being relatively more time consuming. Nonetheless this result was also statistically significant with p<5. We could achieve a mean operating time of 64.9/46.43min for laparoscopic/open appendectomy. In comparison, the various studies under review had shown a mean operating time as varyingly as 102/81.7 to 43/40.

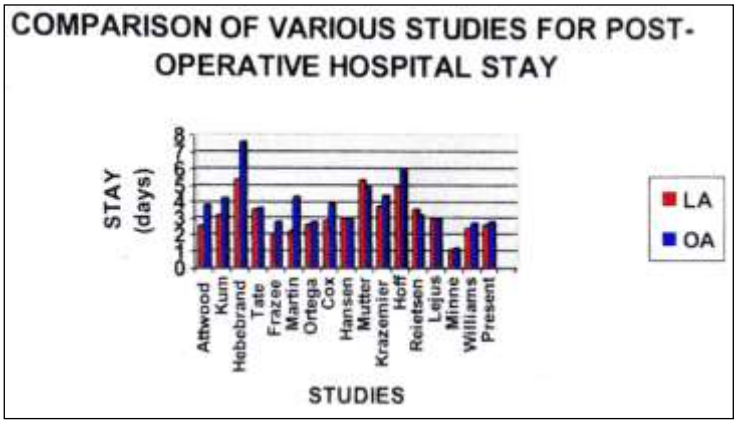
Therefore, the following studies are also in favour of my study, as shown in graph no 1. It is to be noted that on an average the time taken for interval laparoscopic appendectomy (mean = 61.44 min.) was more than the time taken for emergency laparoscopic appendectomy (mean = 44.88 min.). This difference may be related to the presence of adhesions which are difficult to remove.

PAIN AND NAUSEA

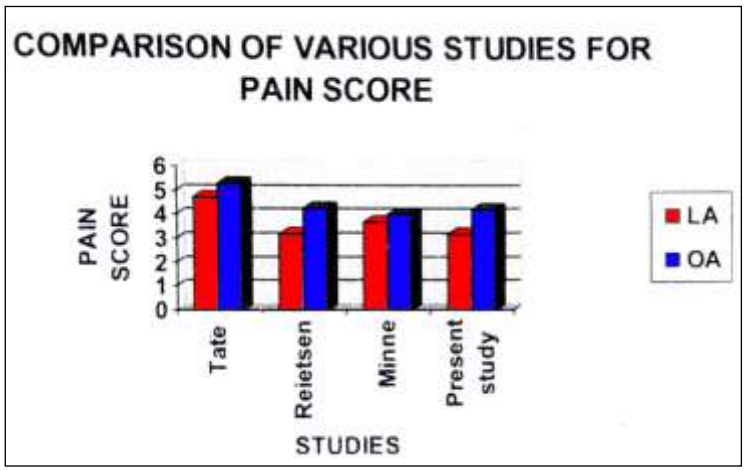
Use of visual analogue scores as end points to study the pain is ethically criticisable. However, the patient himself is the best judge for the degree of his pain, with the extreme points of 0 and 10 being fixed as no pain and pain, which the patient had at the start of his or her treatment. The difference in the degree of pain between laparoscopy and open procedure was significant (Z-value = 1.98) in our study.



Graph No. 1: Comparison of various studies for duration of operation



Graph No. 2: Comparison of various studies for post operative hospital stay.



Graph No. 3: Comparison of various studies for pain score

This is in consistency with the result of some other studies. Where laparoscopy is said to cause significantly less pain to the patient as compared to the open procedure [4, 5, 6]. Mean pain for the laparoscopic and open approach is 3.25/4.13, respectively. Similarly mean nausea score for the laparoscopic and open approach is 0.57/0.26. Thus, post-operative pain is on an average more intense after open appendectomy, irrespective of whether it is done in an emergency or interval setting. Nausea, on the other hand, is generally more intense after laparoscopic appendectomy. This may be due to the effects of general anaesthetic drugs

used in laparoscopic appendectomy. Therefore, the following study is also in favour of my study, as shown in graph no 2.

HOSPITAL STAY

Minne *et al.*[15]*;* reported a median hospital stay of LA 1.1 vs OA 1.2 days compared with means of 5.3 vs 7.6 days for Hebe brand *et al.*[17]*;* in Germany and 5.3 vs 4.9 for Mutter *et al.*[18]*;* in France. This underscores that this parameter may be affected by hospital or cultural biases rather than reflecting differences due to the technique itself. Lejus *et al.*[19]*;* showed significant differences in the postoperative course concerning pain, analgesic requirements and time to normal walking when vs non-abscessed appendices were analyzed independent of the technique abscessed.

This signifies that, time to normal activity and the hospital stay may all be related to the severity of appendicitis and the type of method used for appendectomy [7-10]. The similar fact has been highlighted by our study where operating time and hospital stay, for cases with severe acute gangrenous appendicitis or for interval cases with adhesions due to severe appendicitis attack at the onset, were much longer than usual cases.

In our study, difference in the postoperative stay in the hospital was 4.74 hours (Z-value = 0.59, which is statistically insignificant) between the laparoscopic and open appendectomy groups. The range of post-operative stay in the hospital was 24 to 55 hours for the laparoscopic group. On the other hand, the range of post-operative stay in the hospital for the open appendectomy group was 24 to 144 hours. There was slightly significant difference seen in the duration of hospital stay in the emergency appendectomies performed by laparoscopic or open technique; as also for interval appendectomies performed by laparoscopic or open technique. These results further confirm the status of laparoscopic appendectomy, as being a procedure of choice in appendicitis as compared with open technique [11-13]. Therefore, the following studies are also in favour of my study, as shown in graph no 3.

CONCLUSION

We conducted a prospective study on 100 patients of acute appendicitis within affixed protocol. The purpose of the study was to assess and compare the role of laparoscopic appendectomy with traditional open appendectomy.

In conclusion postoperative pain, duration of hospital stay and early return to work were more in open appendectomy as compare to laparoscopic appendectomy whereas, postoperative nausea and operation time was slightly increased in laparoscopic appendectomy were seen in this study. Cases of gangrenous appendicitis with chronic inflammation and fibrosis were also completed by laparoscopically and, also where diagnosis was in doubt. Thus, laparoscopic appendectomy is a safe, simple and an efficient technique for treatment of acute appendicitis when results were compared with the open appendectomy.

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