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Research Article

A Comparative Study between Laparoscopic Appendectomy and Conventional Open Appendectomy

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Abstract: Currently, laparoscopic appendectomy is widely practiced for the management of appendicitis in developed countries, still there are many questions regarding the advantages and disadvantages of this approach in the treatment of appendicitis. Several controlled trails have been conducted, some in favor of laparoscopic appendectomy other not. The aim of this study was to evaluate laparoscopic appendectomy in comparison with open appendectomy with operative time, post operative pain, post operative hospital stay and return to normal activity.
Keywords: Open Appendectomy, Appendectomy, Post operative recovery, LA versus OA, Laparoscopic, Appendicitis.

INTRODUCTION

Appendicitis is an inflammation of the vermiform appendix. It is mostly caused by obstruction of the lumen due to hyperplasia of the lymphoid follicles at younger age or by obstruction of the lumen by fecoliths in older patients[1] .The vermiform appendix was first described by Leonardo da Vinci in 1492. Lawson Tait performed the first planned appendectomy for appendicitis in 1880[2]. Hereafter, immediate surgery for appendicitis was recommended in 1886 by Reginald Fitz[3]. Appendectomy was further popularised by Charles McBurney who introduced, in 1889, a new operating technique by performing appendectomy with the use of a less invasive muscle splitting incision and by describing in 1894 the McBurney point, localized "between an inch and a half and two inches from the anterior spinous process of the ileum on a straight line drawn from that process to the umbilicus[4,5]. At present time, appendectomy is the most common abdominal operation because of their latively high lifetime risk of men [8.6%] and women [6.7%] for developing appendicitis [6].

Despite OA being associated with low morbidity and mortality rates [7], the popular minimally invasive approach showed more advantages such as less wound infection, less pain, and faster recovery in the cost of more operating time and hospital cost[8-11]. LA can have extra benefits for female patients as decreasing adhesions and fertility problems and better cosmetic results [9].

Numerous studies have compared OA with LA, but the role of laparoscopy is still a controversial issue. Some studies have showed better clinical results for LA[13-16], while some others fail to prove a significant advantage[16-20]or demonstrated disadvantages such as higher cost or intra-abdominal abscess [17, 21-23]. With this background and considering the few studies comparing laparoscopic and open appendectomy in third-world countries this study was designed to compare the prospective outcomes of LA with OA in terms of operating time, postoperative pain, hospital stay, time to resume the normal activity, intra and post operation complications, and neuralgia.

MATERIALS AND METHODS

This prospective comparative study was performed in tertiary center hospital, from Nov 2012 to Nov 2013 . The merits and drawbacks of LA and OA were explained to all of the patients with diagnosis of appendicitis according to Alvarado score [21].Our exclusion criteria for this study were showing signs of generalized peritonitis, having a palpable mass in RLQ suggesting appendiceal abscess, or being pregnant. Patients who gave their informed consent were randomized to either LA or OA groups. The study was approved by local Ethics Committee and all of the researches obliged themselves to practice in accordance to Helsinki declaration.

All of the patients received prophylactic cefteriaxone [1 gram, every 12 hours] and

metronidazole [500 mg, every 8 hours]. All of the surgeries were performed by the same surgeon. The OA surgeries were performed through a McBurney muscle-splitting incision. For the LA patients, the classic three port technique was performed through two 10 mm [umbilical and right iliac fossa] and one 5 mm [suprapubic] ports. All of the removed appendices were sent for pathologic study.

After the operation all of the patients were NPO and received antibiotics for 48 hours. The routine analgesic used for patients was Diclofenac [5 mg intramuscular, every 8 hours]. Soft diet was started after 48 hours and patients were discharged after normal diet was tolerated. Post operation follow up visits were in weeks 1, 2 and 4. Patients were asked to contact the therapy team in case of any problem.

Patients' data such as operation time, hospital stay and intra operation complications were collected from their hospital files. Time to resume normal activity, short term complications and neuralgia data were obtained through post operative visits. The patients' pain was measured using a visual analogue scale [VAS] with 10cm line between 0 as no pain and 10 as the worst pain ever experienced. Patients mark their pain at the time they enter the post-op recovery room and in 6 hour intervals up to 24 hour after the operation.

RESULTS

The total number of 50 patients, in two groups of open and laparoscopic appendectomy, was followed up for one month in this study. The LA and OA groups participants' mean age was 27.4 and 27.5, respectively [*P*=0.411]. 11 men and 07 women's underwent LA while 21 men and 11 women's were operated by OA technique. No statistically significant difference was observed in male to female ratio [*P*=0.749] (table-1).

Table-1:Age distribution

S. No.	Age yrs	LA (n=18)	OA (n=32)
1.	15-20	05	09
2.	21-30	07	14
3.	31-40	05	06
4.	41-50	01	00
5.	51-55	00	03
	Total	18	32
Mean age		**27.4**	**27.5**

X^2 =3.96,t test =0.03, P value = 0.411

The mean skin to skin operation time was 60.8 min in LA hand and 45.7 OA hand [*P*=0.017]. No intra operative complication was encountered in operations (Table-2).

Table-2: Operating time

S.No.	Operation time (min)	LA(n=15)		OA(n=32)	
		N	%	n	%
1.	21-40	00	00%	14	43.8%
2.	41-60	9	60%	13	40.6%
3.	61-80	03	20%	03	09.4%
4.	81-100	03	20%	02	6.2%
5.	101-120	0	0%	0	00%
6.	>120	0	0%	0	00%
	Total	**15**	**100%**	**32**	**100%**
Mean Operating Time		**60.8**		**45.7**	

X^2=10.10, t test =15.10, P value <0.017

17% [3 out of 18] LA to OA conversion were encountered in operation. . Post-operative complication rate was higher in OA group [n=02] compared to LA [n=05].The mean post-operative pain score in OA 4.8 and 3.2 in LA. Patients' mean hospital stay was 41.5 and 55.5 hours in LA and OA groups, respectively [*P*=0.025]. Time to resume normal activity was 9.6 and 10.9 in LA and OA, respectively [*P*=0.003]. LA has less complications and cosmetic scar with the cost rate.

Table-3: Post operative pain

S.No.	VAS* (Pain)	LA(n=15)		OA(n=32)	
		N	**%**	**n**	**%**
1.	0-2	7	46.66	4	12.5
2.	3-4	4	26.67	08	25
3.	5-6	3	20	16	50
4.	7-8	1	6.67	03	9.3
5.	9-10	0	0	01	3.2
	Total	**15**	**100**	**32**	**100**
Mean Pain Score		**3.2**		**4.8**	

X^2 =7.94,t test=2.63, P value <0.093

Table-4: Post operative Hospital Stay

S.No.	Stay (hours)	LA(n=15)		OA(n=32)	
		n	**%**	**n**	**%**
1.	21-40	8	53.3%	8	25%
2.	41-60	6	40%	12	37.5%
3.	61-80	1	6.7%	10	31.3%
4.	81-100	0	0%	1	3.1%
5.	>100	0	0%	1	3.1%
	Total	**15**	**100%**	**32**	**100%**
Mean Post op. Hospital Stay		**41.5**		**55.5**	

X^2 =6.00, t test=2.31, P value <0.025

Table-5: Return to Normal Activity

S. No.	Return to activity (days)	LA(n=15)		OA(n=32)	
		N	**%**	**N**	**%**
1.	7-8	7	46.7	1	3.2
2.	9-10	4	26.7	14	43.7
3.	11-12	3	20	11	34.4
4.	13-14	1	6.6	6	18.7
5.	15-16	0	0	0	0
	Total	**15**	**100**	**32**	**100**
Mean		**9.6**		**10.9**	

X^2=13.86, P value<0.003

DISCUSSION

Laparoscopic and open appendectomy have been compared several times, since the introduction of minimally invasive technique as a diagnostic as well as a therapeutic measure, in an effort to establish the supremacy of one above the other. While the case has been strong enough for laparoscopic cholecystectomy as the preferred method of treatment for symptomatic gall stone disease, it has not been the same for laparoscopic appendectomy. Our study compared a total of 50 cases 32 open appendectomies and 18 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.

We demonstrated a range of 45 min. to 145 min. with mean time being 60.8 min for laparoscopic appendectomies which were completed successfully and 25 min. to 90 min. with mean of 45.7 min for open appendectomy, with a mean time difference of 15.1 min between the two procedures, laparoscopic appendectomy being relatively more time consuming. Statistical analysis shows the P value <0.001 thus the difference being significant.

In present study mean pain score for appendectomy was 3.2 and 4.8 for the laparoscopic and open approach respectively. Thus, post operative pain is on an average more intense after open appendectomy. But on statistical analysis the P value is equal to 0.093 thus suggesting a non significant association; this finding may be due to small sample size and the subjective nature of the VAS.

We found no significant difference in the post operative complications between the two procedures. Fever occurred in 2 patient of interval open appendectomy group. We encountered wound infection in 2 cases of laparoscopic and 3 cases of open appendectomy group.

The mean time to return to normal activity was 9.6 and 10.9 days in the laparoscopic and open

appendectomy groups respectively. This difference can be beneficial in financial terms for the patients as well as the country. Our results demonstrate a significantly earlier return to full activity for laparoscopic than with open appendectomy.

P value<0.003, there is significance difference in between two group thus showing the difference to be statistically significant meaning the patients undergoing LA returned to the normal activity earlier than those undergoing OA.

CONCLUSIONS

We conclude that LA is a considerably better procedure as compared to OL as Less operating time less post operative pain less hospital stay earlier return to normal activity Better cosmetic acceptability of scar.

The power of study was low as the sample size was small; we recommend study with lager sample size to validate the results in order to establish laparoscopic appendectomy as a gold standard procedure.

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