

CRITICAL ANALYSIS OF THE ROLE OF LAPAROSCOPY IN APPENDICECTOMY: AN INSTITUTIONAL STUDYK. Senthil Kumar¹, R. Anantharamakrishnan²**HOW TO CITE THIS ARTICLE:**

K. Senthil Kumar, R. Anantharamakrishnan. "Critical Analysis of the Role of Laparoscopy in Appendicectomy: An Institutional Study". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 24, March 23; Page: 4186-4194, DOI: 10.14260/jemds/2015/602

ABSTRACT: OBJECTIVE: To evaluate the outcomes of routine open and laparoscopic appendectomy in patients with suspected appendicitis. This is a retrospective study of the outcomes of patients undergoing laparoscopic appendectomy compared with outcomes for patients undergoing open appendectomy during 3year study period. **METHODS:** It is a retrospective study done in the Department of General Surgery, Chettinad Medical College & Hospital, kelambakkam during the period Jan 2011 – Dec 2013. A total of 100 patients were studied –open (n-50) and laparoscopic procedure (n-50).Results of patients managed with open and laparoscopic procedure for suspected acute appendicitis were reviewed and analyzed. The preoperative and intraoperative findings were recorded. The clinical outcomes were compared in those patients. The various factors like technique of surgery, Duration of surgery, Post-operative morbidity, Analgesic requirement, Antibiotic requirement, Post-operative hospital stay, Complications, Resumption of normal diet, Return to normal activity, Cosmesis were studied. **RESULTS:** Mean operation time was longer in Lap (45 minutes) as compared to Open (35 minutes).Wound infection regarding skin was seen in 1 patient compared to 3 in open procedure, as the appendix was pulled into the trocar before removing. This maneuver minimizes the chances of wound infection to the skin.¹Post operative pain and discomfort is less in patients undergoing laparoscopic appendicectomy. Antibiotic and Analgesic requirement was less in Lap group.^{2,3} Mean hospital stay was nearly 1/3 rd in Lap group. Better Cosmesis found in Lap group compared to open appendicectomy. Conversion rate was 8% compared to 2 – 5 % in literature.^{2,3} This is attributed to increase number of complicated cases with adhesions. Post – op complications were seen in 2.5 % of cases compared to 3 – 5 % in literature. **CONCLUSIONS:** We conclude that laparoscopy procedure for suspected acute appendicitis is safe and is associated with a significantly shorter hospital stay. Other intra-abdominal pathologies can also be diagnosed more accurately with the laparoscopic approach.

KEYWORDS: Appendicitis, open appendicectomy, Laparoscopic appendectomy.

INTRODUCTION: The Spectrum of Laparoscopic Operations as detailed below has necessitated the Present Comparative Study entitled "Analysis of the Role of Laparoscopy in Appendicectomy". The modern era of laparoscopic surgery has evoked remarkable changes in approaches to surgical diseases. The trend toward minimal access surgery (MAS) has prompted general surgeons to scrutinize nearly all operations for possible conversion to laparoscopic techniques.

GROUP I: Operations where the laparoscopic approach provides an undoubted benefit and has replaced open intervention. Cholecystectomy, cardiomyopathy, nerve sections, antireflux surgery and splenectomy.

ORIGINAL ARTICLE

GROUP II: An operation where the laparoscopic approach appears to be beneficial and safe, but more information is needed. Hernia repair, appendicectomy, adhesiolysis, surgical treatment of duct calculi, segmental colonic resection for diverticular disease or sessile polyps, rectopexy, enucleation of insulinomas, nephrectomy for benign disease, distal pancreatic resections, oesophagectomy for cancer.

GROUP III: Operations are currently under evaluation and should not be attempted outside clinical trials. Resection for potentially curable invasive cancer.

GROUP IV:

- Unsuitable operations. No benefit, increased risk.
- Pancreatico duodenectomy, D2 resection for carcinoma stomach.

OBJECTIVES OF THE STUDY:

- To critically analyse the current role of laparoscopic surgery in appendicectomy.
- To analyse the advantages of laparoscopic surgery over the conventional open procedures for commonly performed surgeries like Appendicectomy.

MATERIALS AND METHODS: This is a retrospective study done in the Department of General Surgery, Chettinad Medical College & Hospital, kelambakkam during the period Jan 2011 – Dec 2013. The patients studied are admitted in General Surgical ward (above 12 years) for Appendicectomy.

INCLUSION CRITERIA:

- Patients aged more than 12 years both males and females.
- History of medical ailments such as Diabetes, hypertension IHD were enquired. History of previous abdominal surgeries were noted.

EXCLUSION CRITERIA: Children and pregnant women.

METHOD OF COLLECTION OF DATA: The patients who underwent surgery for common Appendicitis were evaluated and the advantage of laparoscopic surgery over open producers was studied.

METHODOLOGY AND TECHNIQUES:

- Study of Appendicectomy Classical 50 patients,
- Laparoscopic 50 patients were included for comparative study.
 - Classical Procedures: Appendicectomy Incision - Lanz/ McBurney.
 - Laparoscopic Procedures Appendicectomy – 3 port technique.

The aim of the study is to compare classical procedures with that of laparoscopic procedures on the following aspects:

1. The technique of surgery.
2. Duration of surgery.

ORIGINAL ARTICLE

3. Post-operative morbidity.
4. Analgesic requirement.
5. Antibiotic requirement.
6. Post-operative hospital stay.
7. Complications.
8. Resumption of normal diet.
9. Return to normal activity.
10. Cosmesis.

STATISTICAL ANALYSIS: Descriptive analysis of demographic, clinical and surgery related parameters were made. Quantitative parameters were presented as mean and standard deviation, categorical variables were presented as frequencies and percentages. The mean differences in various outcome parameters like duration of surgery, duration of antibiotic treatment, duration of hospital stay etc. between the two exposure groups, (i.e. open and laparoscopic appendicectomy) were calculated. Independent sample t test was used to assess the statistical significance, 95% CI of mean differences. IBM SPSS version 21 was used for analysis.

OBSERVATION AND RESULTS:

APPENDECTOMY:

Total cases studied = 100.

Classical Appendicectomy = 50 cases.

Laparoscopic appendectomy = 50 cases.

Male: Female Ratio: 1.2:1

Age Incidence:

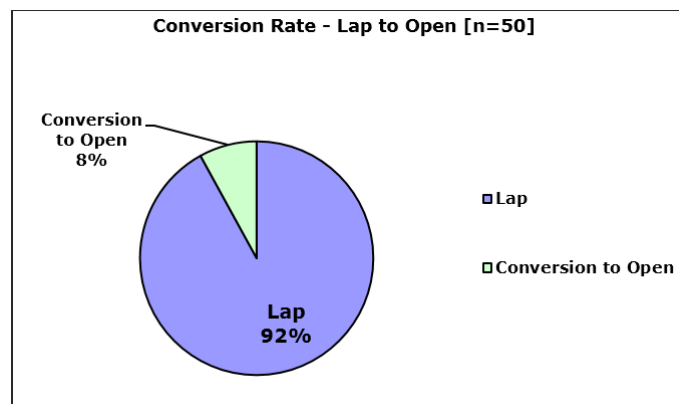
Peak range: 21-40 years.

Low: 14 years.

High: 50 years.

All cases were operated electively.

CONVERSION RATE: No. of Cases converted to open – 4/50.



ORIGINAL ARTICLE

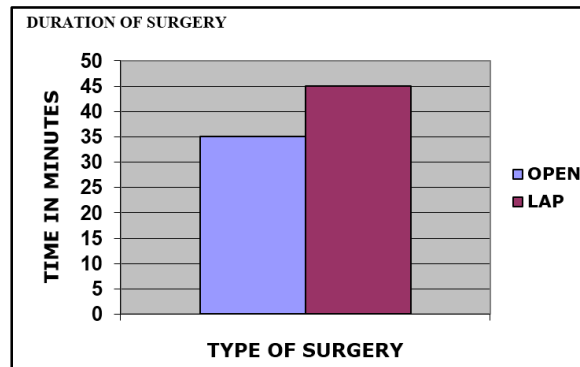
Conversion Rate = 8%.

Standard^{2,3} = 2 - 5%.

Reasons for Conversion:

Sl. No		No. of patient	Percentage
1.	Adhesions	3	75%
2.	Retrocaecal Appendix	1	25%
3.	Bleeding	Nil	-
4.	Bowel Injury	Nil	-

Table 1



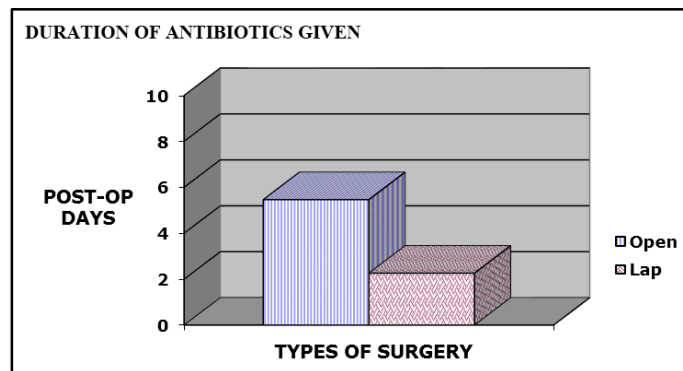
Average operating time for Open - 35 min.

Average operating Time for Lap - 45 min.

POST-OPERATIVE PAIN: Number of patients in whom Analgesics required.

Post-operative day	Open Appendicectomy	Lap Appendicectomy
I	50	50
II	50	30
III	35	7
IV	20	-
V	10	-
VI	5	-

Table 2



ORIGINAL ARTICLE

Average Post op antibiotics given for Open Method –5 Days.

Average Post op antibiotics given for Lap Method – 2 Days.

Complications:

Intra Operative Complications:

Complications	Open (n=50)	Lap (n=50)
Bleeding	1	2
Bowel Injury	-	-
Others	-	-
Total	1	2

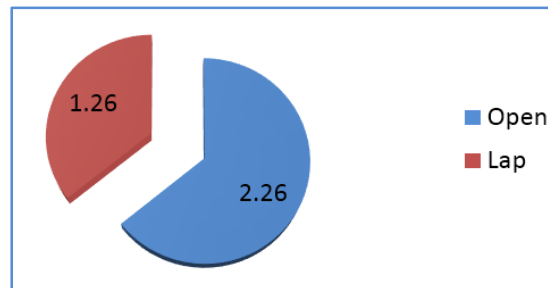
Table 3

Post-Operative Complications:

Complications	Open (n=50)	Lap (n=50)
Bleeding	-	-
Wound/ Port Site Infection	3	1
Intra-Abdominal Collection	1	-
Others	-	-
Total	4	1

Table 4

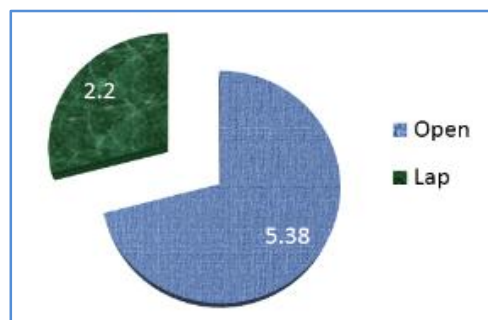
RESUMPTION OF NORMAL DIET:



Average Post op resumption of normal diet for Open – 2 Days.

Average Post op resumption of normal diet for Lap – 1 Days.

HOSPITAL STAY:



ORIGINAL ARTICLE

Average Post op hospital stay for open – 5 Days.

Average Post op hospital stay for lap – 2 Days.

Variables	Open Appendectomy	Lap Appendectomy
Age(years)	27.52	26.12
Sex ratio(M/F) nos.	25/25	30/20
Duration of Surgery (min)	35	44.52
Analgesic requirement (Days)	3.60	1.75
Antibiotic requirement (Days)	5.35	2.30
Post Op Complications (%) [N=50]	8%	2%
Resumption of Normal Diet (Days)	2.30	1.30
Post-operative Hospital stay (Days)	5.45	2.25

Table 5

STATISTICAL ANALYSIS:

Group Statistics				
	Category	N	Mean	Std. Deviation
Age	Open appendectomy	50	26.820	8.0729
	Laprosopic appendectomy	50	25.900	9.7672
Duration of surgery (min)	Open appendectomy	50	41.600	12.1823
	Laprosopic appendectomy	50	44.800	11.9932
Analgesic Requirement (Days)	Open appendectomy	50	3.700	.8631
	Laprosopic appendectomy	50	1.860	.6392
Antibiotic Requirement (Days)	Open appendectomy	50	5.460	.6764
	Laprosopic appendectomy	50	2.280	.4536
Resumption of Normal Diet (days)	Open appendectomy	50	2.280	.4536
	Laprosopic appendectomy	50	1.280	.4536
Hospital Stay (Days)	Open appendectomy	50	5.380	.6354
	Laprosopic appendectomy	50	2.280	.5360

Table 6

	P-value	Mean Difference	95% Confidence Interval of the Difference	
			Lower	Upper
Age	.609	.9200	-2.6362	4.4762
	.609	.9200	-2.6378	4.4778
Duration of surgery (min)	.189	-3.2000	-7.9977	1.5977
	.189	-3.2000	-7.9977	1.5977
Analgesic Requirement (Days)	.000	1.8400	1.5386	2.1414
	.000	1.8400	1.5383	2.1417
Antibiotic Requirement (Days)	.000	3.1800	2.9514	3.4086
	.000	3.1800	2.9510	3.4090

ORIGINAL ARTICLE

Resumption of Normal Diet (days)	.000	1.0000	.8200	1.1800
	.000	1.0000	.8200	1.1800
Hospital Stay (Days)	.000	3.1000	2.8667	3.3333
	.000	3.1000	2.8666	3.3334

Table 7

Parameter	Treatment	Mean	Mean difference	P value	95% CI	
					Lower	Upper
Duration of surgery(min)	OPEN	41.60±12.18	3.2	0.19	1.59	7.99
	LAP	44.80±11.99				

Table 8: Comparative analysis of Duration of surgery between the two study groups

The mean duration of surgery was 41.6 minutes in open appendicectomy group and 44.80 minutes in laparoscopic group. So it was which was 3.2 minutes lesser in Open appendicectomy group but was not statistically significant (95% CI 1.59 to 7.99, p value 0.19).

Sex * Category Cross tabulation					
		Category			Total
		Open appendicectomy	Laparoscopic appendicectomy		
Sex	F	Count	25	20	45
		% within Category	50.0%	40.0%	45.0%
	M	Count	25	30	55
		% within Category	50.0%	60.0%	55.0%
Total	Count	50	50	100	
	% within Category	100.0%	100.0%	100.0%	

Table 9

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.010 ^a	1	.315		
Continuity Correction ^b	.646	1	.421		
Likelihood Ratio	1.012	1	.314		
Fisher's Exact Test				.422	.211
N of Valid Cases	100				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 22.50.

b. Computed only for a 2x2 table

Table 10

ORIGINAL ARTICLE

DISCUSSION: On analysis, laparoscopic appendectomy was the most common laparoscopic procedure done in department of general surgery. Conversion rate was 8% compared to 2 – 5 % in literature.^{2,3} This is attributed to increase number of complicated cases with adhesions. Post – op complications were seen in 2.5 % of cases compared to 3 – 5 % in literature.

Mean operation time was longer in Lap (45 minutes) as compared to open (35 minutes). Main reason for the delay, which we noted, was not during operation rather before starting the actual operation in position the patient. Adjusting different tubes, cables, and video apparatus around the patient.

Wound infection regarding skin was seen in 1 patient compared to 3 in open procedure, as the appendix was pulled into the trocar before removing. This maneuver minimizes the chances of wound infection to the skin.¹

Post-operative pain and discomfort is less in patients undergoing laparoscopic appendectomy. Antibiotic and Analgesic requirement was less in Lap group.^{2,3}

Mean hospital stay was nearly 1/3 rd in Lap group.

Better Cosmesis found in Lap group compared to open appendectomy.

Initial studies of laparoscopic appendectomy suggested higher costs because of the expense for equipment and the longer operative times.⁵ As surgeons and centers have gained experience, it is no longer clear that there is a higher cost with laparoscopy. The small differences in operative costs are offset by gains attributable to shorter hospital stays and quicker returns to work.^{6,7}

Studies^{8,9} show little difference in complications suggesting that with added experience surgeons can reduce the rate of abscess formation. In the morbidly obese, longer trocars and instruments may be needed.⁴

A meta-analysis of 28 trials available by 1998,⁴ found that the laparoscopic approach took about 16 minutes longer but resulted in less post-operative pain on day one, shorter hospital stays (15 hours) and quicker return to full activities (5-9 days sooner). Complication rates were comparable, except that wound infections were slightly lower after laparoscopic appendectomy. More recent updates by these authors^{10,11} analyzing 45 and 54 studies confirm that the open procedure is shorter (12 minutes) but results in more pain and longer stays.

CONCLUSION:

1. Laparoscopic appendectomy was the most common lap procedure done in our department. Conversion rate was 8% compared to 2 – 5 % in literature. Post – op complications were seen in 2 % of cases compared to 3 – 5 % in literature.

Laparoscopic surgery has almost replaced the classical procedure for appendectomy.

2. In addition to the advantage of excellent visualization during dissection, laparoscopic surgery for the patients with right iliac fossa pain often diagnosed to be appendicitis, has the advantage of diagnosing the other pathologies if any like Meckel's diverticulitis or pelvic inflammatory disease in females which are often missed in open surgeries.
3. The laparoscopic approach may convey some advantages over the open approach in access to the appendix, visualization, and decrease in wound complications.
4. We conclude that laparoscopy procedure for suspected acute appendicitis is safe and is associated with a significantly shorter hospital stay.

REFERENCES:

1. Nguten Nt, Zainanbadi K, Mavanadadi B At Al Trends In Utilization And Outcomes Of Laparoscopic Versus Open Appendectomy Ass 2004: 188: 813-820.
2. Scott-Conner Ceh, Hall Tj, Angling Bl, Laparoscopic Appendicectomy: Initial Experience in A Training Program, Ann Surg 1992; 215: 660-8.
3. S. Sauerland, R Lefering, Laparoscopic Vs Conventional Appendecotomy – A Meta – Analysis of Randomized Controlled Trails. Langenbeck's Arch Surg 1998 383: 289 – 295.
4. Enochsson L, Hellberg A, Rudberg C, Fenyo G, Gudbjartson T, Kullman E, Ringqvist I, Sorensen S, Wenner J. (2001) Laparoscopic vs open appendectomy in overweight patients. Surg Endosc 15: 387-392
5. McCahill LE, Pellegrini CA, Wiggins T, Helton WS (1996) A clinical outcome and cost analysis of laparoscopic versus open appendectomy. Am J Surg 171: 533-537.
6. Martin L, Puente I, Sosa J, Bassin A, Breslaw, R, McKenney M, Ginzburg, E, Sleeman D, (1995) Open versus laparoscopic appendectomy: a prospective randomized comparison. Ann Surg 222: 256-262.
7. Long KH, Bannon MP, Zietlow SP, Helgeson ER, Harmsen WS, Smith CD, et al (2001). A prospective randomized comparison of laparoscopic appendectomy with open appendectomy: clinical and economic analysis. Surgery 129: 390-400.
8. Katkhouda N, Mason RJ, Towfigh S, Gevorgyan A, Essani R. (2005). Laparoscopic versus open appendectomy, a prospective randomized double-blind study. Ann Surg 242: 439-449.
9. Frizelle FA, Hanna GB (1996) Pelvic abscess following laparoscopic appendectomy. Surg Endosc 10: 947-948.
10. Eypasch E, Sauerland S, Lofering R, Neugebauer EAM (2002). Laparoscopic versus open appendectomy: between evidence and common sense. Dig Surg 19: 518-522.
11. Sauerland S, Lefering R, Naugebauer EAM (2006) the Cochran Library. vol. 3.

AUTHORS:

1. K. Senthil Kumar
2. R. Anantharamakrishnan

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Surgery, CHRI.
2. Associate Professor, Department of General Surgery, CHRI.

FINANCIAL OR OTHER**COMPETING INTERESTS:** None**NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. K. Senthil Kumar,
108 (3/2), F-2,
Sahana Flats, Sri Sayee Nagar,
5th Street, Virugambakkam,
Chennai-600092, Tamilnadu, India.
E-mail: drsenthil_psg@yahoo.co.in

Date of Submission: 18/02/2015.
Date of Peer Review: 19/02/2015.
Date of Acceptance: 18/03/2015.
Date of Publishing: 23/03/2015.