



## **Evolvment of Laparoscopic Appendicectomy in a tertiary care Teaching hospital**

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### **ABSTRACT**

*Open appendicectomy is popularized by Mc-burney in 1984 for acute appendicitis, but nowadays it is seen that laparoscopic appendectomy is gold standard for acute appendicitis. In our hospital in last 5 years i.e. from May 2010 to May 2015 we evaluated the therapeutic benefits of laparoscopic appendectomy by comparing conventional open appendectomy. We collected data of 830 appendectomies done in IMS & SUM Hospital from May 2010 to May 2015 for a period of 5 years. Out of them 420 had conventional OA and 410 had LA. We compared the mean operation time, time of first oral feeding, narcotic analgesic requirement, and duration of post operative hospital stay. Laparoscopic appendectomy was safely performed in various types of patients without any adverse effect, like pediatric, pregnant women, etc. Female patient having concurrent ovarian cysts, tubal pregnancy and endometriosis can be diagnosed and managed laparoscopically in the same sitting. We found that mean operation time was 45±5.2 minute and 62±7.4 minute in LA and OA respectively. Duration of post operative hospital stay was 1.2 days shorter in Laparoscopic group. LA required 1.1 shots of less analgesic than OA. Oral feeding was resumed 21 hours earlier following LA compared to OA. Our study found that laparoscopic appendectomy is an effective and safe procedure irrespective of age and sex of the patient. LA has added advantage of early return of bowel movement, less post-op hospital stay and less requirement of narcotic analgesic.*

*Key words: Open appendectomy; laparoscopic appendectomy; acute appendicitis*

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### **INTRODUCTION**

Acute appendicitis (AA), requires a comprehensive understanding of its presentation, evaluation, diagnosis, and overall operative management. In world, approximately 7% of the population develops appendicitis in their life span, between the age of 10 and 30 the appendicitis incidences is at peak level. According to the literature, open appendectomy has been an effective operation for acute appendicitis for more than a century, thus making appendectomy the most frequently performed abdominal operation[1]. Nowadays, most authors preferred to do the laparoscopic appendectomy to perform the operation since its introduction by McBurney in 1884 as laparoscopic cholecystectomy has gained its popularity to perform cholecystectomy and has mostly replaced the old method throughout the world [2-3]. Several authors proposed that the new technique of laparoscopic appendectomy should be the preferred treatment for acute appendicitis. However, unlike laparoscopic cholecystectomy, laparoscopic appendectomy (LA) has not yet gained popularity [4]. Laparoscopic cholecystectomy is now considered a standard method of performing cholecystectomy and has mostly replaced the old method throughout the world, while appendectomy has yet to achieve such popularity [5]. Since its introduction by McBurney in 1884, appendectomy has been a treatment of choice for acute appendicitis [6]. For more than a century, open appendectomy remained the gold standard of treatment of acute appendicitis and for interval appendectomy.

In 1981, Semm, a German gynecologist performed the first laparoscopic appendectomy [7-8]. Despite its use even before laparoscopic cholecystectomy, LA has not yet emerged as gold standard appendectomy. Esposito C et al performed a retrospective comparative study of 2,332 cases in children to see the

effectiveness of Laparoscopic versus open appendectomy [9]. LA has potential advantages of shorter hospital stay, early mobilization, early return of bowel function, acceptable complication rate along with the recent enthusiasm of minimally invasive surgery, this study added more clear concept to the surgery world about LA. These definite advantages have led some authors to advocate this approach as the procedure of choice for uncomplicated appendicitis [10-11]

## PATIENTS AND METHODS

We conducted retrospective review of consecutive patients with appendectomy in IMS & SUM Hospital between May 2010 and May 2015. The hospital is situated at the center of the state, mainly deal to the odisha population and neighbor state. There are four surgical units to do all the operations at the hospital. Pre operative diagnosis was made using history, clinical examination coupled with laboratory findings and imaging studies. In open group, only appendix removed via McBurney's incision was included in the study. Patients in whom midline incisions were given were excluded from the study. Operating time was calculated from the time of first incision up to the placement of last stitch on the closing wound. Post operative hospital stay, in days, was defined as the time the patient left the operation theater up to the time of discharge from the hospital. Number of shots of injectable narcotic analgesics given to the patients postoperatively was recorded. Time of resumption of oral food, in hours, was calculated from the time of surgery.

Data were analyzed using standard statistical method. Descriptive statistical including means, medians, standard deviation, percentages were used to describe study population on all variables. For categorical variables  $\chi^2$  test and Fisher exact test were used to make comparison.

### Procedure Description

Both LA & OA were done GA. For LA, we used three port techniques i.e 10mm umbilical optical port & two 5mm ports one in (rt) iliac region and (lt) iliac regions respectively. We used ultrasonic knife for controlling the appendicular artery. Before appendectomy the base of appendix was tied twice with endoloop (i.e preformed catgut 1-0). We removed specimen via umbilical port by using 5mm telescope. We used to keep routinely around 1000 ml of normal saline inside the peritoneal cavity to reduce postoperative fluid requirement.

For OA we used grid iron incision through Mc Burney's point. In some cases grid iron incision converted to rutherford's muscle cutting incision depending upon the site of appendix, status of appendicular pathology and body habitus. In grid iron incision the external oblique muscle incised along the line of skin incision followed by splitting of internal oblique & transverse abdominis muscle along their fibers. Peritoneum was incised to enter in to abdominal cavity. Caecum was identified, by tracing the taenia of caecum base of appendix was identified. Base was tied twice with 2-0 vicryl & appendicectomy performed.

All patients of LA & OA received preoperatively & post operatively ceftriaxone & we added inj amikacin & metronidazole for severe infections & sepsis. All patients were discharged after taking solid food.

## RESULTS

In our study group we undertook 830 appendicectomy in the above period. Out of 830 appedicectomy, 420 was done laparoscopically and 410 by open method. We undertook age group of patient between 11 years to 71 years. Two groups are similar with respect of clinical features, CBC, sex and age. We compared both the groups in following ways in the clinical outcome, complication rates, and identification of concomitant pathologies, post operative pain and paraesthesia, quality of life after surgeries (Table-1, 2, 3, 4, and 5). In this study mortality was zero.

On analysis of above tables we found out that laparoscopic appendectomy has added advantages i.e. it provides diagnosis of other pathologies present concomitantly and mimic like the appendicitis, can be dealt at the same time. Also morbidity of the patient is much lower in comparison to open appendicectomy.

**Table- 1**, suggested the profile of patient in the study groups.

Patient Details	LA	OA
	420 (n)	410 (n)
Females	132	153
Males	288	257
TLC	11500 /mm <sup>3</sup>	11500 /mm <sup>3</sup>
Clinical Findings (tenderness in the rt iliac fossa)	Positive	Positive

Generalized peritonitis, patients with appendicular lump and abscess were not taken in the study group.

**Table- 2**, provided clinical outcomes in both groups

Patient Details	LA	OA
Mean operative time	45±5.2 minutes	62±7.4 minutes
Requirement of IVF	288	257
Requirement of analgesics (Diclofenac/ tramadol)	12 hr	48 hr
Resumption of oral fluids	6hr after operation	24hr after operation
Resumption of solid food	12hr-24hr	24hr-48hr
Discharge from hospital	24hr	48hr-72hr
Requirement of antibiotics	3 days	5 days
Requirement of oral analgesics	24 hr	3-5 days

**Table- 3**, provided in the complications rates in both study groups in intra-operative & post-operative period

Patient Details	LA	OA
Injury to inferior epigastric artery due to trocar	2 cases	Nil
Difficulty in proceeding further due to dense adhesion	13 cases	Nil
Injury to the ileocolic artery leading to rt hemicolectomy	Nil	3 cases
Surgical site infection	3 cases	21 cases
Fecal fistula	1 case	3 cases
Major surgical site infection leading to secondary suturing	Nil	6 cases
Burst abdomen	Nil	2 cases
Surgical site hernia	2 cases (Umbilical Port)	6 cases
Common Organism detected surgical site infection	<i>Staphylococcus aureus</i> atypical mycobacterium	<i>Staphylococcus aureus</i> & <i>klebsiella</i>

**Table 4**, provided with dealing concomitant pathologies, advantages and disadvantages of both study groups

Patient Details	LA	OA
Viewing of entire abdomen	2 cases	Nil
Detection of pathological ovarian cyst & tubo-ovarian mass & dealing in same sitting	6 cases	Nil
Dealing I symptomatic gall stone disease of same sitting	7 cases	Nil
Detection & management of un-ruptured tubal pregnancy	3 cases	21 cases
Conversion of LA to OA	13 cases	Nil
Detection of symptomatic and asymptomatic meckle's diverticulum	12 cases	15 cases
Detection of mesenteric adenitis with normal appendix	3 cases	7 cases
Detection of uterine fibroid	5 cases	Nil
Detection of malrotation of gut	6 cases especially in paediatric age group	Nil

**Table -5**, provided with long term morbidity of the procedures

Patient Details	LA	OA
Short term requirement of analgesic for vague pain at surgical site (10 days)	2 cases	25 cases
Long term requirement of analgesic off & on for vague pain (4 weeks)	Nil	6 cases
Requirement of second operation i.e hernioplasty	2 cases	6 cases
Long term pain free status	All (except complication)	373 cases
Development of keloid or hypertrophied scar at surgical site	Nil	9 cases
Parasthesia at surgical site	Nil	16 cases

## DISCUSSION

Nine patients were above the age of 60 years. We didn't encounter any problem, while operating on these patients. LA was not attempted on patients with heart failure, COPD since any increased intra-abdominal pressure could compromise their cardiovascular hemodynamics [12-13].

We commonly do not come across morbid obese patient in our hospital set up. It is difficult to perform OA on these patients through McBurney's incision and often the incision is extended. Hence LA in such patients has extra advantage in this scenario [14].

Since, co-existing pelvic pathologies can be diagnosed and managed during laparoscopic, we could manage cases of ectopic pregnancy and ovarian cysts in women of reproductive age group. We could also remove gall bladders for USG confirmed symptomatic gall stones, while performing LA [15-16]. In such cases, conventional 4 ports were used as in Lap chole while avoiding any extra port for removal of appendices. Complications following LA are less than in OA [17].

We used double ligature to secure appendicular base in our study. In cases of perforated appendix i.e. pus collection, suction was used to remove the pus from the peritoneal cavity while avoiding irrigation. A recent article concluded that there is no significant difference in outcome between suction & irrigation combined; and suction alone during LA in cases of perforated appendix [18].

In our study, the incidence of residual abscess was found to be less in case of LA in comparison to OA. Minimally invasive LA warrants a shorter hospital stay as compared to OA. Since our hospital is a tertiary care set-up, patients come from far off places hence they are discharged after ruling out any immediate post operative complications.

Post surgical adhesions are common following intra-abdominal operations [19]. A study has shown that adhesions following LA are less (5%) as compared to OA (70%) 3 months after the surgery [20].

Regarding indication of LA, we may include obese patients, cirrhosis of liver, doubtful diagnosis of appendicitis [15], recurrent appendicitis<sup>21</sup>, high working class, sickle cell disease and immune-compromised patients and females of reproductive age group<sup>22</sup>. LA should be avoided in cases of previous lower abdominal surgery, generalized peritonitis and stem appendicitis.

## CONCLUSION

The observations in the study have far reaching consequence with respect to health care delivery and socioeconomic status of individual. No doubt, OA has been the mainstay of treatment for acute appendicitis, but this study throws light on lap appendectomy as an effective and safe option for most patients regardless of age, sex and BMI. It requires less operative time, has minimal complications and less hospital stays and has the advantage of managing concomitant pathologies.

## DISCLOSURE

All the authors declared no competing interest.

## REFERENCES

1. Antonacci N, Ricci C, Taffurelli G, Monari F, Del Governatore M, Caira A, et al. (2015). Laparoscopic appendectomy: Which factors are predictors of conversion? A high-volume prospective cohort study. *Int J Surg*. 21:103-7.
2. Kumar B, Samad A, Khanzada TW, Laghari MH, Shaikh AR. (2008). Superiority of Laparoscopic appendectomy over open appendectomy: The Hyderabad experience. *Rawal Med J*; 33:165-8.
3. Chang HK, Han SJ, Choi SH, Oh JT. (2013). Feasibility of a laparoscopic approach for generalized peritonitis from perforated appendicitis in children. *Yonsei Med J*. 54(6):1478-83.
4. Peiser JG, Greenberg D. (2002). Laparoscopic versus open appendectomy: results of a retrospective comparison in an Israeli hospital. *Isr Med Assoc J*; 4: 91-4.
5. Kehagias I, Karamanakis SN, Panagiotopoulos S, Panagopoulos K, Kalfarentzos F. (2008). Laparoscopic versus open appendectomy: which way to go? *World J Gastroenterol*. 14: 4909-1.
6. McBurney C. IV. The Incision Made in the Abdominal Wall in Cases of Appendicitis, with a Description of a New Method of Operating. *Ann Surg* 1994; 20: 38-43.
7. Chung RS, Rowland DY, Li P, Diaz J. (1999). A meta-analysis of randomized controlled trials of laparoscopic versus conventional appendectomy. *Am J Surg*; 177: 250-6.
8. Semm K. (1983). Endoscopic appendectomy. *Endoscopy*; 15: 59-64.
9. Esposito C, Borzi P, Valla JS, Mekki M, Nouri A, Becmeur F. (2007). Laparoscopic versus open appendectomy in children: a retrospective comparative study of 2,332 cases. *World J Surg*. 31(4):750-5.
10. Gross E, et al. (1998). Laparoscopic versus conventional appendectomy - a comparison with reference to early postoperative complication. *Zentralbl Chir*; 123: 858-62.
11. Tranoff M, Atabek U, Goodman M, Alexander JB, Chrzanowski F, Mortman K, et al. (1998). A comparison of laparoscopic and open appendectomy. *J Soc Laparoendosc Surg*; 2: 153-8.
12. Markar SR, Black S, Zaidi A. (2012). Laparoscopic vs open appendectomy in older patient. *JAMA Arch Surg*; 147(6): 557-562.
13. Taguchi Y, Komatsu S, Sakamoto E, Norimizu S, Shingu Y, Hasegawa H. (2016). Laparoscopic versus open surgery for complicated appendicitis in adults: a randomized controlled trial. *Surg Endosc*; 30(5):1705-12.

14. Mason RJ, Moazzez A, Moroney JR, Katkhouda N. Laparoscopic vs Open Appendectomy in Obese Patients: Outcomes Using the American College of Surgeons National Surgical Quality Improvement Program Database . *Journal of the American College of Surgeons* 2012; 215 (1): 88-89.
15. Sauerland S, Jaschinski T, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. *Cochrane Database Syst Rev*. 2010 Oct 6;(10):CD001546 .
16. Singh MK, Kumar MK, Mohan L. Suprapubic approach for laparoscopic appendectomy. *J Nat Sci Biol Med*. 2013 Jul. 4(2):389-92.
17. Liu Y, Seipel C, Lopez ME, Nuchtern JG, Brandt ML, Fallon SC, et al. (2013). A retrospective study of multimodal analgesic treatment after laparoscopic appendectomy in children. *Paediatr Anaesth.*; 23(12):1187-92.
18. St Peter SD, Adibe OO, Iqbal CW, Fike FB, Sharp SW, et al. (2012). Irrigation versus suction alone during laparoscopic appendectomy for perforated appendicitis. *Annals of Surgery*; 256(4): 581-585.
19. Cho J, Park I, Lee D, Sung K, Baek J, Lee J. (2015). Risk Factors for Postoperative Intra-Abdominal Abscess after Laparoscopic Appendectomy: Analysis for Consecutive 1,817 Experiences. *Dig Surg*. 32 (5):375-81.
20. Cushiery A, (1997). Appendectomy- Laproscopic or open? *Surg Endosc* ; 11:319-320.
21. Varela JE, Hinojosa MW, Nguyen NT. (2008). Laparoscopy should be the approach of choice for acute appendicitis in the morbidly obese. *Am J Surg*. Aug. 196(2):218-22.
22. Wu JM, Chen KH, Lin HF, Tseng LM, Tseng SH, Huang SH. (2005). Laparoscopic appendectomy in pregnancy. *J Laparoendosc Adv Surg Tech A*. Oct. 15(5):447-50.

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