Section: General Surgery

Original Research Article

LAPAROSCOPIC APPENDICECTOMY VERSUS OPEN APPENDICECTOMY: A COMPARATIVE ASSESSMENT WITH RESPECT TO OUTCOMES

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ABSTRACT

Background: In comparison with open appendectomy, laparoscopic appendicectomy has been safe and suitable. Despite the advancement in the laparoscopic technology into the field of surgery, laparoscopic appendicectomy has not shared the privilege of wide acceptance for appendicectomy. The cardinal reason could be due to cynicism towards its ability to improve upon the traditional incision method. The objective is to compare the outcomes of Laparoscopic Appendicectomy versus Open Appendicectomy in Acute Appendicitis with respect to postoperative pain, hospital stay and in-hospital complications.

Materials and Methods: The present Prospective, comparative hospital-based study was carried out in 100 patients diagnosed with Acute Appendicitis undergoing either Laparoscopic Appendicectomy or Open Appendicectomy in MIMSR YCRH, Latur. The patients were divided into two groups, 50 in laparoscopic appendectomy group and 50 in open appendectomy group. Data was analysed using SPSS 20.0 version.

Results: 29 males and 21 females have undergone laparoscopic appendectomy while 34 males and 16 females underwent open appendectomy. Post operative complication was found to be statistically significant during week 2 ($P<0.025$) and week 3 ($P<0.049$) review of the patients. Pain score (VAS) for laparoscopy was 1.08±0.08 hours as compared to open procedure i.e. 5±1.2 hours ($p<0.01$) which shows that pain was more in open procedure. Duration of hospitalization for laparoscopy was 2.26±0.44 days as compared to open procedure i.e. 5.34±1.26 days ($p<0.01$) which shows that hospitalization days were more in open procedure.

Conclusion: Laparoscopic appendectomy is safer surgical procedure compared to open appendectomy.

Keywords: Open appendectomy, laparoscopic appendectomy, postoperative pain, hospital stay.

INTRODUCTION

It was only in the 19th century that the term appendicitis had spotlight in clinical picture since owing to the difficult anatomic identification. The term "vermiform appendix" was first coined by Verneys in 1710 meaning worm shaped. It was in 1894 when McBurney first described the right lower quadrant muscle-splitting incision for the removal of appendix but previously in 1889, he had previously described the typical attribute of the referred pain as well as the localization of the pain along an oblique line from the anterior superior iliac spine to the umbilicus.[1-3] Usually the incidence of acute appendicitis is observed in high numbers during the second and third decades of life but occurrence is seen among all ages.[4] Open appendicectomy has been the gold standard in treatment for acute appendicitis since McBurney introduced it in 1889. When in 1983, Semm performed the laparoscopic appendectomy, it changed the surgical field dramatically and it was then widely used. In comparison with open appendectomy, laparoscopic appendicectomy has been safe and suitable. In

addition to its widespread utility in improving diagnostic precision, laparoscopic appendicectomy provide lesser degree of pain, it enhances quick wound healing and short duration of hospital stay.[5-8]

Despite the advancement in the laparoscopic technology into the field of surgery, laparoscopic appendicectomy has not shared the privilege of wide acceptance for appendicectomy. The cardinal reason could be due to cynicism towards its ability to improve upon the traditional incision method. Hence, the present study is to bring out the comparative outcomes of laparoscopic appendicectomy and open appendicectomy with regards to postoperative pain, duration of hospital stays, its complications, duration of analgesic use, secondary wound infection, and quality of life with respect to return to routine work.

Objectives: To compare the outcomes of Laparoscopic Appendicectomy versus Open Appendicectomy in Acute Appendicitis with respect to postoperative pain, hospital stay and in-hospital complications.

MATERIALS AND METHODS

Study Population: All patients diagnosed with Acute Appendicitis undergoing either Laparoscopic Appendicectomy or Open Appendicectomy in MIMSR MC Latur.

Study Design: Prospective, comparative hospital-based study.

Study Duration: 12 months (January 2024-December 2024)

Sample Size: Totally 100 patients were included in the study during the study period according to inclusion and exclusion criteria. The patients were divided into two groups randomly by chit method, 50 in laparoscopic appendectomy group and 50 in open appendectomy group.

Statistical Tool Used: Chi-square test and Mann Whitney U test for qualitative data. Data was tabulated in excel and analysed used SPSS software version 24.

Study Procedure: A study of 100 cases of Acute Appendicitis patients was carried out in the Department of General Surgery, MIMSR YCRH, Latur. After obtaining a well-informed written consent, the data was entered in a proforma approved by the guide. A detailed history including the identification of the patient, presenting complaints, was obtained. General Examination and detailed clinical examination were done. Basic biochemical and hematological investigations was done. Cases which underwent Laparoscopic Appendicectomy and those which underwent Open Appendicectomy was grouped separately. Both groups were assessed for post-operative pain using visual analogue scale, length of hospital stay, in-hospital complications and rate of routine discharge and quality of life with respect to return to routine work. The patients were followed up daily till discharge and then weekly for 4 weeks, in outpatient department. Wound complications such as seroma formation, pus discharge, abscess and wound dehiscence in need for secondary suturing was assessed. Postoperative pain was assessed using visual pain analogue scale.

Inclusion Criteria

1. All patients diagnosed as Acute Appendicitis undergoing either Laparoscopic Appendicectomy or Open Appendicectomy in Surgery department
2. Those who gave informed consent to be part of the study

Exclusion Criteria

1. Children <9 years
2. Pregnant women
3. Patients with appendicular mass on clinical examination
4. Patients undergoing appendicectomy as a part of other procedures
5. Those who refused informed consent
6. Perforated or gangrenous appendix.

RESULTS

Totally 100 patients were included in the study, out of which 63% were males and 37% were females. 29 males and 21 females have undergone laparoscopic appendectomy while 34 males and 16 females underwent open appendectomy. 14% of patients who have undergone laparoscopic appendectomy experienced post operative pain while it was 82% in open appendectomy group which was found to be statistically significant with P<0.001 [Table 1].

Table 1: Post operative complication among patients according to type of procedure

Post operative complications		Type of procedure		P-value
		Laparoscopic	Open	
Post operative infection	Yes	8%	2%	0.169
	No	92%	98%	
Fever	Yes	42%	50%	0.422
	No	58%	50%	
Post operative pain	Yes	14%	82%	<0.001
	No	86%	18%	

Table 2: Post operative complication among patients according to weeks

Post operative complications according to weeks		Type of procedure		P-value
		Laparoscopic	Open	
Week 1	Complications	6%	18%	0.065
	No complications	94%	82%	
Week 2	Complications	4%	18%	0.025
	No complications	96%	82%	
Week 3	Complications	1%	12%	0.049
	No complications	99%	88%	
Week 4	Complications	1%	18%	0.065
	No complications	99%	82%	
3rd month	Complications	0%	18%	0.065
	No complications	100%	82%	

Post op complications were found in 6% in laparoscopic and 18% in open appendicectomy at the end of first week (P>0.05). Post op complications were found in 4% in laparoscopic and 18% in open appendicectomy at the end of second week (P<0.05). Post op complications were found in 1% in laparoscopic and 12% in open appendicectomy at the end of third week (P<0.05). Post op complications were found in 1% in laparoscopic and 18% in open appendicectomy at the end of fourth week (P>0.05). Post op complications were found in 0% in laparoscopic and 18% in open appendicectomy at the end of three months (P>0.05).Post operative complication was found to be statistically significant during week 2 (P<0.025) and week 3 (P<0.049) review of the patients.

Table 3: Association between variables in regard to duration of stay, duration of procedure, duration of hospital stays and Alvarado score

Variable	Type of procedure	Mean	SD	Median	p-value
Age	Lap	28.86	11.15	28	0.017
	Open	23.46	11.85	24	
	Open	80.4	6.05	80	
Alvarado Score	Lap	7.5	0.81	8	0.555
	Open	7.62	0.73	8	
Duration of procedure (in hours)	Lap	1.7	0.51	2	< 0.001
	Open	1.16	0.37	1	
Pain Score	Lap	1.08	0.08	2	< 0.001
	Open	5	1.2	5	
Duration of hospital stay	Lap	2.26	0.44	2	< 0.001
	Open	5.34	1.26	5	

Duration of procedure for laparoscopy was 1.7±0.51 hours as compared to open procedure i.e. 1.16±0.37 hours (p<0.01). Pain score (VAS) for laparoscopy was 1.08±0.08 hours as compared to open procedure i.e. 5±1.2 hours (p<0.01) which shows that pain was more in open procedure.

Duration of hospitalization for laparoscopy was 2.26±0.44 days as compared to open procedure i.e. 5.34±1.26 days (p<0.01) which shows that hospitalization days were more in open procedure.

DISCUSSION

Worldwide many prospective randomized studies were conducted to evaluate the effectiveness between conventional open appendectomy and laparoscopic appendectomy. Despite many evidences conducted all over the world by medical centers, laparoscopic procedure has an edge over conventional open procedure is still debatable. Various studies have pointed out the difference among these procedures is more appreciated in the wound complications following procedures which was significantly reduced compared to open appendectomy. Even though wound complications that are minimal with laparoscopic procedures that minimizes the cost, laparoscopic procedures tend to be costlier than conventional open surgery. But the operating time tends to be longer compared to open procedure which in reality is of little significance.

In the present study, post operative pain, hospital stay after procedure and operating time has been found to be statistically significant during laparoscopic appendectomy; this is more similar with other studies globally. Pain score was found to be lesser in the study conducted by Deshmukh9 among laparoscopically operated patients for acute appendicitis compared to open appendectomy. Other studies conducted by Atul Kumar Gupta10, Neeraj Sharma,[11] Sivakumar,[12] Adrian E Ortega,[13] Hellberg,[14] and Milewczyk,[15] all proved to show that post operative pain was comparatively minimal after laparoscopic surgery when compared to open appendectomy which was similar to the present study which was statistically significant. Hospital stay following surgery has always been a important parameter considering the fact that the patients can return back to normal life or activity which is beneficial for patients and their family members. Comparative study done by Basavaprabhu et al,[16] showed decreased hospital stay and reduced time for return to duty with lesser complications. Further studies done by Atul Kumar Gupta,[10] Neeraj,[11] Utpal De,[17] Sivakumar,[12] Amna Nazir,[18] Abdul

Razak Shaikh,[19] Ulrich Guller,[20] Adrian E Ortega,[13] and Tate,[21] all have suggested that laparoscopic surgery favored early discharge with reduced hospital stay which was similar to the finding in the present study which was statistically significant.

Reduced hospital stay means reduced post operative complications which had good prognosis in wound healing among patients. In the present study there was no statistical significance regarding post operative complications among the study procedures. But longitudinal follow up for the patients during second week and third week post operative complications were significant statistically while the fourth week and third month follow up for complications were found to be non-significant. The reason for the insignificance following second and third significant weeks may be cited to unknown reasons which warrants for investigation with the patients regarding wound care etc. Complications were found to lesser during laparoscopic patients compared to open surgery for acute appendicitis during study done by Atul Kumar Gupta10. Other studies done by Neeraj Sharma,[11] Sivakumar,[12] Aamina Nazir,[18] Abdul Razak Shaikh,[19] Piskun,[22] and Ulrich Gulle,[20] showed lesser complication after laparoscopic appendectomy compared to open appendectomy.

Even though laparoscopic procedure have revolutionized the surgical field, one of the main drawback of laparoscopic procedures was that it consumed longer time or in other words increased operating time during procedure which was similar to the present study where open appendectomy consumed lesser time than laparoscopic appendectomy. Studies that opted open appendectomy superior to laparoscopic appendectomy like studies done by Lawrence et al,[23] and Namir et al,[24] the operating time was still longer in laparoscopic appendectomy than open appendectomy. All studies which mostly favored laparoscopic appendectomy still had the drawback of longer operating time in patients undergoing laparoscopic appendectomy over open appendectomy. Peculiarly studies by Basavaprabhu,[16] Vishnu,[25] and Atul,[10] had lesser operating time during laparoscopic appendectomy while compared to open appendectomy. The main reason for lesser operating time during laparoscopic in the above-mentioned studies may be justified by the availability of advanced facilities, complications encountered during surgery and skills of the operating surgeon which varies across the world.

CONCLUSION

Laparoscopic appendectomy has been the safest surgical procedure compared to open appendectomy. Laparoscopic appendectomy has following advantages over open appendectomy in the following aspects- less post operative pain and less duration of hospital stay. The present study not only has health care indications on clinical patient care and their benefit, but also its implication on financial constraint during hospital stay. The benefits of laparoscopic appendectomy require the need for more comprehensive economic perusal to determine its ideal role in practice.

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