Original Research Article

Diagnostic laparoscopy, it is worthwhile remove appendix

T.G.Raghu*

Associate Professor of General Surgery, Sreenarayana Institute of Medical Sciences, Chalakka,Ernakulam, Kerala, India

Received: 13-07-2020 / Revised: 11-09-2020 / Accepted: 24-09-2020

Abstract

Introduction: The most common acute abdominal complication involving emergency surgical therapy appears to be appendicitis. Open appendectomy (OA) has been safe and effective surgical procedure for treating acute appendicitis since it invented by McBurney in 1894. Laparoscopy, also known as diagnostic laparoscopy, is a minimally invasive approach for diagnosis intra-abdominal diseases by close examination of intra-abdominal organs.The aim of the study was to evaluate the potential benefits and role of diagnostic laparoscopy in removal of appendix. **Material and Method:**Total 100 patients between age group 10-60 years who fulfilled the inclusion criteria were included in this study after taking informed written consent. The prospective study was conducted in the department of Surgery at Jubilee Mission Medical College and Research Institute Thrissur is the place of study. From 2009 March to 2010 April. Diagnostic laparoscopy was conducted using the open Hasson technique.In open appendectomies, the appendix was either opened by the appendix incision of Mcburney or Lanz, or sometimes by right paramedian incision.The data were computed in Excel. Frequencies/ descriptive, contingency coefficient and t test were employed. All the data analysed by SPSS vs 20.0.**Result:** Total 100 patient of 10-60 years age group were included among them 50 patients undergone diagnostic laparoscopic appendicectomy and 50 patients undergone open appendicectomy. The mean age of Diagnostic Laparoscopic appendicectomy was 24.6 years while open appendicectomy were 20.4 years. About 64% patients of the higher socio economic patient's preferred laparoscopic appendicectomy while 46% patients underwent open appendicectomy. Although there was no significant difference in the need for extra analgesics, patients underwent laparoscopic appendicectomy had significantly less pain in the post-operative period, shorter hospital stay, moved bowels earlier and resumed daily work earlier than those underwent in the open appendicectomy.**Conclusion:**This study conclude that diagnostic laparoscopy is worthwhile to remove appendix as it a feasible and safe procedure. Diagnostic laparoscopy appendicectomy could be the standard approach for appendix removal. Postoperative recovery was good in Hospital stay, it was significantly shorter and return to normal activity.

Keywords: Diagnostic Laparoscopy, Laparoscopic Appendicectomy (LA),Open Appendicectomy (OA), Appendicitis, Appendix

Introduction

The most common acute abdominal complication involving emergency surgical therapy appears to be appendicitis. Open appendectomy (OA) has been safe and effective surgical procedure for treating acute appendicitis since it invented by McBurney in 1894 [1].

Laparoscopy, also known as diagnostic laparoscopy, is a minimally invasive approach for diagnosis intra-abdominal diseases by close examination of intra-abdominal organs[2]. Tissues biopsy, culture acquisition and a number of clinical treatments are also allowed by exploratory laparoscopy. While invasive, diagnostic laparoscopy can be both diagnostic and therapeutic[3,4].This was the appendectomy from which did not improve much until almost a century later, when the first laparoscopic appendectomy was described by Semn in 1983.

**Correspondence*
Dr. T.G.Raghu
Associate Professor of General Surgery, Sreenarayana Institute of Medical Sciences, Chakkala,Ernakulam , Kerala, India
E-mail: gogulrag@gmail.com

Laparoscopic appendicectomy (LA) is considered safe and efficient for appendicitis[2]. Laparoscopic appendicectomy considered as gold standard procedure for removal of appendix in many hospital because of its benefits [5,6]. Mixed findings were reported by various previous studies[7]. A study at the Israeli hospital favoured open appendicectomy over laparoscopic approach[8,9].As described earlier, the diagnostic capacity of LA is particularly important and helpful in women, as many gynaecological disorders can resemble appendicitis symptoms. Furthermore, LA is now seen as a suitable alternative for pregnant women. Seventy five percent of experts surveyed found LA to be a contraindication during breastfeeding[10]. while invasive, diagnostic laparoscopy can be preferable in the evaluation of female adnexal organs to transabdominal or transvaginal ultrasonography when the diagnosis is in doubt. Larsson et al prospective randomized the open or laparoscopic of 110 women of childbearing age with right lower abdominal pain and alleged or suspected appendicitis[11].Since non-invasive diagnostic technology has achieved such sophistication, it must be emphasized that laparoscopy is still an invasive procedure. It has to show its worth in terms of both positive diagnosis and protection as well. Careful clinical evaluation must still be practiced and the greatest importance is in contrast with other medical aids[12]. the trend towards minimally invasive surgery has prompted general surgeons to scrutinize all surgical operations with the laparoscopic technique to be adapted[13].The aim of the study was to evaluate the potential benefits and role of diagnostic laparoscopy in removal of appendix.

Materials and method

Total 100 patients between age group 10-60 years who fulfilled the inclusion criteria were included in this study after taking informed written consent. The prospective study was conducted in the department of Surgery at Jubilee Mission Medical College and Research Institute Thrissur is the place of study. From 2009 March to 2010 April. After approved by the ethical committee.

Inclusion criteria: patients between ages 10-60 years and clinically and radio-logically diagnosed with appendicitis and were willing to undergo laparoscopic appendectomy.

Exclusion criteria: Patients less and more than 10-60 years. Patients who were not given informed written consent.The demographic data including age, sex, history and symptoms were collected after interviewed the patients. Findings like vitals, clinical signs, clinical examination, abdominal ultrasound, urine routine examination and Blood investigation (Complete Blood Count, Liver function test, urea and creatinine) were recorded on predesigned form. Appendicitis was confirmed by ultrasound of abdomen and pelvis preoperatively and then treatment was schedule. The preoperative preparation consisted of bed rest, oral nullity, and intravenous fluid and antibiotic preoperative dosage.In open appendectomies, the appendix was either opened by the appendix incision of Mcburney or Lanz, or sometimes by right paramedian incision. In several examples, the appendicular stump has been linked and invaginated, and ligated to several other stumps alone[7].Diagnostic laparoscopy was conducted using the open Hasson technique with a 1-cm incision was made in the skin near the umbilicus; a 10 mm trocar and cannula were inserted in the periumbilical region. A 0°or 30° telescope was then inserted based on the choice. Other ports can be added, depending on the laparoscopic results, to allow further analysis and for the therapeutic purposes. For example, two other 5mm ports were normally inserted in the suprapubic and right iliac fossa region laparoscopic appendectomy.By using the camera , the cecum and appendix are visualized and manipulated using a Babcock clamp, the mesoappendix was separated with an endoscopic stapler or harmonic scalpel, and the appendix base was linked with either and endoscopic stapler or endoloop. Using an endobag, the appendix was taken from the peritoneal cavity[7].The clinical diagnosis and any discrepancies observed, including the subsequent shift in management secondary to diagnostic laparoscopy, where then compared with the operative results of those patients. Complication rates and conversion rates were reported for diagnostic laparoscopies.

Statistical analysis: The data were computed in Excel. Frequencies/ descriptive, contingency coefficient and t test were employed. All the data analysed by SPSS vs 20.0.

Result

In this study total 100 patient of 10-60 years age group were included among them 50 patients undergone diagnostic laparoscopic appendicectomy and 50 patients undergone open appendicectomy. The mean age of Diagnostic Laparoscopic appendicectomy was 24.6 years while open appendicectomy were 20.4 years. About 64% patients of the higher socio economic patient's preferred laparoscopic appendicectomy while 46% patients underwent open appendicectomy.

Table 1: Demographic profile of the patients.

Variables	Open appendicectomy (N=50)	Laparoscopic appendicectomy(N=50)
Mean age (years)	20.4	24.6
Sex ratio (F/M)	56.2/43.8%	60/40%
Socio-economic status; lower/higher	54/46%	36/64%

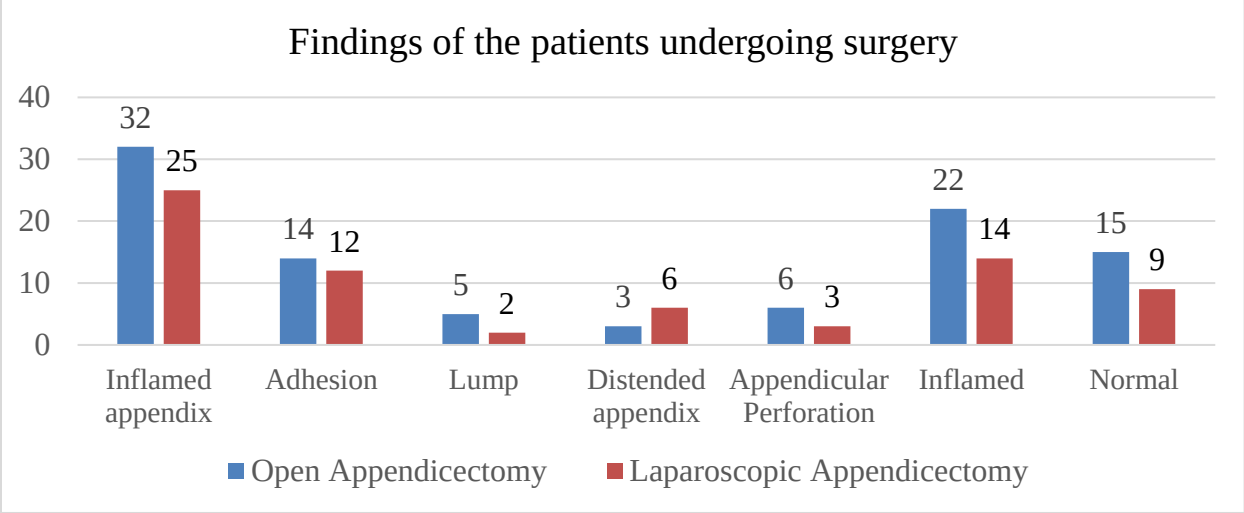

Fig 1: Appendix as noted during operation.

Table 2: Comparative evaluation of intraoperative parameters in two groups.

		Open appendicectomy (N=50)	Laparoscopic appendicectomy(N=50)	P value
Post-op pain VAS score (Mean±SD)	DOS*	8.2±1.6	6.4±1.8	0.001
	POD# 1	4.7±1.3	3.2±1.5	0.003
	POD# 2	2.4±1.1	1.2±1.0	0.034
Duration of Surgery Mean±SD	In minute	67.8±12.5	77.3±15.1	0.028
Duration of hospital stay (Mean±SD)	In days	10.4±5.1	4.7±2.9	0.017
		Number (%)	**Number (%)**	
`Post-operative bowel motion	1-2 days	38 (76%)	44 (88%)	0.026
	>2 days	12 (24%)	6 (12%)	
Requirement of extra analgesic	Yes	8 (16%)	3 (6%)	0.31
Post-op complications	All wound	13 (26%)	2 (4%)	0.03
Post-op cosmesis (at 12 weeks)	Very good	16 (32%)	37 (74%)	0.0028
	Good	21 (42%)	8 (16%)	
	Satisfactory	12 (24%)	4 (8%)	
	Poor	1 (2%)	1 (2%)	

*DOS - Day of surgery, #POD – Post-operative day, NS- Non significant

Although there was no significant difference in the need for extra analgesics, patients underwent laparoscopic appendicectomy had significantly less pain in the post-operative period, shorter hospital stay, moved bowels earlier and resumed daily work earlier than those underwent in the open appendicectomy (table 2).

Table 3: Post-operative complications

Complications	Laparoscopic appendicectomy (N=50)	Open appendicectomy (N=50)
Port infection/wound	00 (00)	04 (8%)
Fistula	00 (00)	1 (2%)
Late intestinal obstruction	2 (4%)	2 (4%)
Port site Hernia /incisional	00 (00)	3 (6%)
Bleeding from port/ secondary hemorrhage	00 (00)	00 (00)
Injury to other organs	00 (00)	00 (00)
Pelvic abscess	00 (00)	03 (6%)
Total	**2 (4%)**	**13 (26%)**

The overall complications and rate of infection were accounted significantly lower in patients underwent laparoscopic appendicectomy (table 3).

Discussion

Appendicitis is the most prevalent condition faced by general surgeons in India and the most accepted method and easy to do open appendicectomy and another is diagnostic laparoscopy. From McBurney's single large incision and other open procedure, surgical appendicitis management has progressed dramatically to minimally invasive techniques[14]. The understanding of appendicitis pathophysiology and its treatment has come a long way since the first appendectomy was performed in 1736 by Claudius Amy[15,16].The open appendicectomy and laparoscopic appendicectomy mean was 67.8±12.5 and 77.3±15.1 minutes respectively which was statistically significant (P=0.028). Similar observations was reported by Geeta KR et al [17] whereas no significant difference in duration was observed by Minutolo et al[18]. Longer time was taken by diagnostic laparoscopic observed in this study similar observation reported longer time taken by laparoscopic technique[19].During the post-operative period, patients in the laparoscopic appendicectomy had slightly less pain over all the days observed. The mean age group in this study was 20.4 years and 24.6 years in the open and laparoscopic group respectively and Shaikh et al, reported lower analgesic requirement following laparoscopic appendicectomy [20]. Li et al have reported similar findings in a meta-analysis[21].In the present study, patients in the laparoscopic appendectomy patients moved their bowel earlier, stabilized normal activity earlier and remained postoperatively in the hospital for a shorter period compared to open appendicectomy patients. Both their differences were significant statistically. In a Bangladeshi study of 763 appendicectomies, Islam and Pasha et al have noted these benefits of laparoscopic appendicectomy over open appendicectomy[22].Similar beneficial effects of laparoscopic appendicectomy were observed in a retrospective analysis by Biondiet al[23] A large meta-analysis of 7618 laparoscopic 43757 open appendicectomies have found shorter hospital stays following laparoscopic appendicectomy[24]. However, no advantages of laparoscopic appendicectomy regarding these factors were found in an indian study in 2016 and an American study in 2005[25,26].The hospital stay period was shorter for the diagnostic laparoscopic appendicectomy patients (Mean±SD 4.7±2.9 days) than open procedure (Mean±SD 10.4±5.1days) (P=0.017). Similar observation were observed by other studies[20,24,27].Post-operative wound infection rate was 4(8%) in patients underwent to open appendicectomy where no any wound infections were found in the patients underwent laparoscopic appendicectomy. In this study, postoperative complications were mainly mild complications, with none requiring reoperation. In open appendicectomy, several study reported a higher rate of wound infection[24,27-29].The diagnostic laparoscopic appendicectomy over all advantages were found and the disadvantages such as longer duration of surgery, higher costs, as well as technical limitations, intra haemorrhage control, technical difficulty are questions which remains

further analysis needed to improve the usefulness of prognostic scores and several real advantages of a laparoscopic approach.

Conclusion

These studies conclude that diagnostic laparoscopy is worthwhile to remove appendix as it a feasible and safe procedure. Diagnostic laparoscopy appendicectomy could be the standard approach for appendix removal. Postoperative recovery was good in Hospital stay,it was significantly shorter and return to normal activity.

References

1. McBurney C. The incision made in the abdominal wall in cases of appendicitis, with a description of a new method of operating. Ann Surg. 1894;20:38-43.
2. Naik S, Yadav N, Firoz. Laparoscopic versus open appendectomy: A comparative study. International Journal of Applied Research 2017; 3(8): 471-474.
3. [Guideline] Guidelines for diagnostic laparoscopy. Society of American Gastrointestinal and Endoscopic Surgeons. Available at https://www.sages.org /publications/guidelines/ guidelines-for-diagnostic-laparoscopy/.April 2010; Accessed: January 14, 2020.
4. Karateke F, Özdoğan M, Özyazıcı S, Daş K, Menekşe E, Gülnerman YC, et al. The management of penetrating abdominal trauma by diagnostic laparoscopy: a prospective non-randomized study**.** Ulus TravmaAcilCerrahiDerg. 2013 ; (1):53-7.
5. C, Proscurshim I, Gama-Rodrigues J. "Laparoscopic versus standard appendectomy outcomes and cost comparisons in the private sector". J Gastrointest Surg 2005; 9: 1174-1180.
6. Milewczyk M, Michalik M, Ciesielski M. "A prospective, randomized, unicenter study comparing laparoscopic and open treatments of acute appendicitis". SurgEndosc 2003; 17:1023-1028
7. Gupta AK, Chawda V, Gupta S, Goel A, Bhagat TS, Agarwal A. Comparative evaluation of laparoscopic versus open appendicectomy in cases of acute appendicitis. Int Surg J. 2017; 4(8):2637-41.
8. Khalil J, Muqim R, Rafique M, Khan M. Laparoscopic versus open appendectomy: A comparison of primary outcome measures. Saudi J Gastroenterol. 2011; 17:236-40.
9. Ortega AE, Hunter JG, Peters JH, Swanstrom LL, Schirmer B. Laparoscopic appendectomy study group. A prospective, randomized comparison of laparoscopic appendectomy with open appendectomy. Am J Surg. 1995; 169(2):208-13.
10. N. Vettoretto, S. Gobbi, A. Corradi, "Consensus conference on laparoscopic appendectomy: Development of guidelines," Colorectal Disease, 2011; 13(7):748–754
11. Larsson PG, Henriksson G, Olsson M, et al. Laparoscopy reduces unnecessary appendice-ctomies and improves diagnosis in fertile women. A randomized study. SurgEndosc 2001; 15:200-2.
12. Nar AS, Bawa A, Mishra A, Mittal A. Role of diagnostic laparoscopy in chronic abdominal conditions with uncertain diagnosis. *Niger J Surg*. 2014; 20(2):75-78.
13. Eubanks Schaver PR. Laparoscopic surgery. In: Sabiston DC Jr, H Kim lyerly, W.B Saunders. Textbook of surgery. Edn 15. Prism Books (Pvt) Ltd, 1997, 791-807.
14. Joliat GR, Uldry E, Demartines N et al. Single-incision versus conventional laparoscopic appendectomy: A case-match study. SAGE Open Med 2014; 2: 2050312114524195.
15. Momin ER, Shukla K, Kamat MM, Gosavi M, Kumar S, Upadhye A. Feasibility of single incision laparoscopic appendectomy with conventional instruments. Int J Sci Study. 2016;4(5):29-33.
16. Ellis H, Nathanson LK. Appendix and appendectomy. In: Zinner MJ, Schwartz SI, Ellis H, editors. Maingot's Abdominal Operations. 10th ed. Singapore: McGraw-Hill; 2001:1191-1227.
17. Geeta KR, AnnappaKudva, Bhavatej. Laparoscopic appendicectomy versus open appendicectomy: A comparative study of clinical outcome and cost analysis – Institutional experience. Indian J Surg. 2009; 71(3):142- 146.
18. Minutolo V, Licciardello M, Stefano BD, Arena M, Arena G, Antonacci V. Outcomes and cost analysis of laparoscopic versus open appendectomy for treatment of acute appendicitis: 4-years' experience in a district hospital. BMC Surg. 2014; 14:14.
19. Katkhouda N, Mason RJ, Towfigh S, Gevorgyan A, Essani R. Laparoscopic versus open appendectomy a prospective randomized double-blind study. Ann Surg. 2005; 242:439-50.

20. Shaikh AR, Sangrasi AK, Shaikh GA. Clinical outcomes of laparoscopic versus open appendectomy. JSLS. 2009; 13:574-80.
21. Li X, Zhang J, Sang L, Zhang W, Chu Z, Li X. Laparoscopic versus conventional appendectomy- a meta-analysis of randomized controlled trials. BMC Gastroenterol. 2010; 10:129.
22. Islam SR, Pasha K, Rahman S, Nasir E, Hanif E, Barman A. Laparoscopic vs open appendectomy: a comparative study. Bangladesh J Endosurg. 2014; 2(1):5-8.
23. Biondi A, Stefano CD, Ferrara F, Bellia A, Vacante M, Piazza L. Laparoscopic versus open appendectomy: a retrospective cohort study assessing outcomes and cost-effectiveness. World J Emerg Surg. 2016; 11:44.
24. Guller U, Hervey S, Purves H, Muhlbaier LH, Peterson ED, Eubanks S, et al. Laparoscopic versus open appendectomy outcomes comparison based on a large administrative database. Ann Surg. 2004; 239(1):43-52.
25. Karatparambil A, Kummankandath SA, Mannarakkal R, Nalakath MR, Babu D. Laparoscopic versus open appendicectomy: a comparative study. Int Surg J. 2016; 3(1):128-34.
26. Katkhouda N, Mason RJ, Towfigh S, Gevorgyan A, Essani R. Laparoscopic versus open appendectomy a prospective randomized double-blind study. Ann Surg. 2005; 242:439-50.
27. Sauerland S, Lefering R, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev. 2004; 18: CD001546.
28. Khan MN, Fayyad T, Cecil TD, Moran BJ. Laparoscopic versus open appendectomy: the risk of postoperative infectious complications. JSLS. 2007; 11:363-7.
29. Merhoff AM, Merhoff GC, Franklin ME. Laparoscopic versus open appendectomy. Am J Surg. 2000; 179:375-8.

Source of Support:Nil
Conflict of Interest: Nil