

Frequency of common complications after laparoscopic appendectomy

Muhammad Kalim, Riaz Ahmad, Farrukh Ozair Shah, Tariq Ijaz, Muhammad Yousaf

Abstract

Background: Laparoscopic appendectomy has now been improved and standardized. Laparoscopic appendectomy has advantages of decreased post-operative pain, better aesthetic result, a shorter time to return to usual activities, and lower incidence of wound infections or dehiscence. But it may require more operative time, long learning curve, more cost and wound infection is one of its complication.

Objective: To determine frequency of common complications after laparoscopic appendectomy.

Material and Methods: This descriptive cross sectional study was conducted at Surgical Unit, Khyber Teaching Hospital, Peshawar from 10th January 2015 to 25th December 2015 including 183 patients of laparoscopic appendectomy observed for frequency of surgical site infection. The data collected was analyzed with SPSS version 16.

Results: The mean age was 27 years \pm 7.1 SD. 102 (56%) patients were males and 81 (44%) patients were females. Surgical site infection was noted in 15 (8%) patients.

Conclusion: Our study concludes that overall rate of surgical site infection was low (8%) in laparoscopic appendectomy.

Keywords: surgical site infections, pelvic collection wound dehiscence, laparoscopic appendectomy

Introduction:

Open appendectomy remains the most common approach due to operative time and cost. Since 1987, however, an increasing number of surgeons have come to prefer laparoscopic appendectomy. Laparoscopic appendectomy has now been improved and standardized.¹⁻³

Laparoscopic appendectomy has some advantages, including decreased post-operative pain, better aesthetic result, a shorter time to return to usual activities, and lower incidence of wound infections or dehiscence. This procedure is cost-effective but may require more operative time compared with open appendectomy. Kouhia et al found that by 2008, operative time with laparoscopic appendectomy was only 10 minutes longer than with the open approach. In addition,

patients who underwent open appendectomy returned to work later and had more complications.⁴ Patients with appendicitis always need urgent referral and prompt treatment. Consider an appendectomy for patients with a history of persistent abdominal pain, fever, and clinical signs of localized or diffuse peritonitis, especially if leukocytosis is present. If the clinical picture is unclear, a short period (4-6 h) of watchful waiting and a computed tomography (CT) scan may improve diagnostic accuracy and help to hasten the diagnosis.⁵

Controversy continues over the operative approach for appendectomy. Open appendectomy is still the most common approach, because it is quick and cost-effective. However, an increasing number of surgeons prefer laparoscopic ap-

Received:
5th January 2017

Accepted:
20th June 2017

Hayatabad Medical Complex, Peshawar, Khyber Pakhtonkhwa
M Kaleem
R Ahmad
FO Shah
M Yosaf

Correspondence:
Dr. Muhammad Kalim,
House No. 428, Street 5, Sector N1, Phase 4, Hayatabad, Peshawar.
Cell: + 92-345-9118412
Email:
drmuhammadkalim@gmail.com

pendectomy because of the diagnostic ability of laparoscopy, especially in female patients. Some authors have criticized the cost of a laparoscopic procedure. Nevertheless, evidence indicates that in the future, laparoscopic appendectomy will be the standard treatment for patients with appendicitis and undiagnosed abdominal pain.^{5,6}

Recently, the efficacy of another laparoscopic technique, single-port appendectomy, has been investigated.⁷⁻⁹ In comparing results from 35 patients who underwent the procedure with those from 37 patients who were treated with the 3-port laparoscopic method, Lee et al determined that there were no statistically significant differences between the 2 groups with regard to surgery time, length of hospital stay, or number of times the patients received analgesic injection.¹⁰

The complication rate was 8.6% for the single-port patients, versus 2.7% for those who underwent 3-port surgery; complications included 2 cases of wound infection in the single-port group and 1 case in the 3-port group, as well as 1 case of intra-abdominal fluid accumulation in a single-port patient with perforated appendicitis. The investigators concluded that the single-port procedure is a feasible technique that, in addition to leaving a nearly inconspicuous scar, has outcomes comparable with those of 3-port appendectomy.¹⁰ This study was carried out in Surgical Department; Minia University, Egypt involving 214 patients underwent appendectomy for complicated appendicitis over three years. 132 patients underwent Laparoscopic Appendectomy. The incidence of wound infection was lower in LA than in OA (LA, 8.3%; OA, 24.4%; $P = 0.0005$). All wound infections were at skin level only without wound dehiscence.¹¹

Rationale of this study is to find the exact frequency of common complications after appendectomy for acute appendicitis in our set-up; we will compare it with international figures. If the figures in our setup are not acceptable in interval range then the reasons for discrepancy would be sorted out and will be dealt with appropriately to bring this morbidity under control.

Material and Methods:

This descriptive cross sectional study was conducted at General Surgical Unit, Khyber Teaching Hospital, Peshawar over a period of one year from 10/1/2015 to 25/12/2015 recruiting 183 patients through non probability consecutive sampling. All Patients of 18-60 years who had Laparoscopic Appendectomy (LA) of either gender were included in this study. While patients with Complicated appendicitis (mass, perforation, gangrene, abscess) were excluded. Moreover all patients who had gone through interval appendectomy for appendicular mass or Laparoscopic appendectomy converted to open appendectomy or previous abdominal surgery and patients having comorbidities like uremia, coagulopathy, Diabetes Mellitus etc. were also excluded from this study. The above mentioned conditions act as confounders and if included had introduce bias in the study results.

Acute appendicitis was defined as Sudden onset of pain in right iliac fossa (on history), Vomiting (forcible ejection of gastric contents even once) on history, tenderness in right iliac fossa on physical examination and raised white cell count of $\geq 10,000$ cm³/dl on laboratory investigation. Surgical site infection was defined as an infection that occurs in incision line within 30 or less days after appendectomy for complicated appendicitis and identified by presence of history of pain in wound, redness, swelling and purulent discharge from wound, detected by clinical examination and confirmed by culture of pus in laboratory will be considered as surgical site infection.

This study was conducted after approval from the ethical board and research committee. All admitted patients meeting the criteria was included in the study. The purpose and benefits of study and complete procedure of appendectomy was explained to the patients and a written informed consent was obtained. After ascertaining complete history, thorough clinical examination was done and a complete set of routine investigations were send. All the surgeries was done by the same surgeon having more than five year

Table 1: Surgical site infection (n = 183)

SSI	Frequency	Percentage
Yes	15	8.20%
No	168	91.80%
Total	183	100%

Table 2: Stratification of surgical site infection with age (n = 183)

SSI	Age in years				Total
	18-30	31-40	41-50	51-60	
Yes	5(2.73%)	4(2.18%)	3(1.63%)	3 (1.63%)	15 (8.20%)
No	88 (48.09%)	57 (31.14%)	19 (10.38%)	4 (2.18%)	168 (91.80%)
Total	93(50.82%)	61(33.33%)	22(12.01%)	7(3.82%)	183(100%)

Chi Square test was applied in which P value was 0.0041

Table 3: Stratification of surgical site infection with gender (n = 183)

SSI	Male	female	Total
Yes	8 (4.37%)	7 (3.82%)	15 (8.20%)
No	94(51.36%)	74 (40.43%)	168 (91.80%)
Total	102(55.73%)	81(44.26%)	183(100%)

Chi Square test was applied in which P value was 0.8448

experience under general anesthesia through standardized techniques with aseptic measures.

Patients diagnosed with acute appendicitis was admitted through emergency and out-patient department for surgery, these patients were operated next morning and was discharged within 24hrs. The patients were followed for one month for SSI. To collect the information for each patient, a study proforma was used. Strict exclusion criteria was followed to control confounders and bias in study results.

The data collected from the patients through proforma was entered in SPSS version 16. Mean±SD was calculated for quantitative variable like age. Frequencies and percentages were calculated for categorical variables like gender and SSI. Surgical site infection was stratified among the age, gender to see the effect modifications. Post-stratification was done through Chi square test using p value < 0.05 was significant. Final results were presented as tables and graphs.

Results:

Mean age was 27 years with SD±7.1. Among 183 patients, 93(51%) patients were in age range of 18-30 years, 61(33%) patients were in age range of 31-40 years, 22(12%) patients were in age

range of 41-50 years and 7(4%) patients were in 51-60 years of age. Male patients were 102(56%) while 81(44%) patients were females.

Frequency of surgical site infection among 183 patients was analyzed as 15(8%) patients had surgical site infection while 168(92%) patients didn't had surgical site infection. (Table 1)

Stratification of surgical site infection with age and gender is given in Table 2 & 3 which showed the increasing age significantly affect the rate of infection while gender has no effect.

Discussion:

Surgical site infections are a major source of post-operative illness, accounting for approximately a quarter of all nosocomial infections. They are, along with urinary tract infections, pneumonia and blood borne infections, ranked as the second or third most common type of hospital acquired infections. National studies have defined the patients at highest risk for infection in general and in many specific operative procedures.¹² The use of antibiotic prophylaxis before surgery has evolved greatly in the last 20 years. Improvements in the timing of initial administration, the appropriate choice of antibiotic agents, and shorter durations of administration have defined more clearly the value of this technique in reducing post-operative wound infections.¹²

Our study shows that 51% patients were in age range 18-30 years, 33% patients were in age range 31-40 years, 12% patients were in age range 41-50 years and 4% patients were in above 51-60 years of age. Mean age was 27 years with SD±7.1. One hundred and two 56% patients were males and 44% patients were females. Fifteen (8%) patients had surgical site infection while 168(92%) patients didn't had surgical site infection. Similar results were observed in another study conducted by Khan TJ et al¹³ in which a total 120 patients were underwent laparoscopic appendectomy. The mean age was 31.7, standard deviation 11.5, Age range 18-60) y, with 73 male (60.8%) and 47 female (39.1%) subjects. Post-operative complications were identified in 12 patients. 10 patients were

wound infection was managed by opening and packing the wound (8.3%) and 2 intra-abdominal abscesses were managed by percutaneous drainage (1.6%).

Similar result was found in another study which was carried out in Surgical Department; Minia University, Egypt involving 214 patients underwent appendectomy for complicated appendicitis over three years. 132 patients underwent laparoscopic appendectomy. The incidence of wound infection was lower in laparoscopic appendectomy than in open appendectomy (LA, 8.3%; OA, 24.4%; $P = 0.0005$). All wound infections were at skin level only without wound dehiscence.¹¹ Similar results were observed in another study conducted by Gul T et al¹⁴ in Khyber Teaching Hospital Peshawar in which 292 patients were analyzed (146 in group A and 146 in group B). The mean age of patients in group A was 26.5 ± 7.1 year and 25.2 ± 6.5 year in group B. The male to female ratio in group A was 1.21:1 compared to 1.28:1 in group B. Surgical site infection was observed in 10 patients in group A and in 6 patients in group B. There was no significant difference between the two procedures regarding overall SSI rate ($p = 0.304$). Similar results were observed in another study conducted by Suh YJ et al¹⁵ in which the overall SSI rate was not different between the two groups (2.8% for the OA group vs. 4.6% for the LA group, respectively, $P = 0.204$), but the superficial SSI rate was significantly lower in the LA group (3.2% vs 0.6%, $P = 0.016$). In addition, the difference in the superficial SSI rate was more significant in severe forms of appendicitis, such as suppurative, gangrenous or perforated appendicitis.

Conclusion:

Our study concludes that overall rate of surgical site infection was significantly low (8%) in laparoscopic appendectomy. The results of this study would be a helpful guide for us to illustrate future research and management strategies.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Dr. Muhammad Kalim, trainee Registrar, Department of Surgery, Hayatabad Medical Complex, conceive the idea and wrote the initial write-up

Dr Riaz Ahmad, collected the data and references

Dr Farrukh Ozair Shah, has been collecting the data and helped in introduction writing

Dr Tariq Ijaz, collected the data and references and helped in writing of material and methods and results

Dr Muhammad Yousaf, critically review the article and made the final changes

References:

- Williams NS, Bulstrode CJK, O'Connell PR. The vermiform appendix. Baileys and Love short practice of surgery. 25th ed. London: Arnold, 2008;1204-16.
- Guercio G, Augello G, Licari L, Dafnomili A, Raspanti C, Bagarella N, et al. Acute appendicitis: should the laparoscopic approach be proposed as the gold standard? Six-year experience in an Emergency Surgery Unit. *G Chir* 2016 Jul-Aug;37(4):174-179.
- Kang BH, Yoon KC, Jung SW, Ra Lee G, Lee HS. Feasibility of single-incision laparoscopic appendectomy in a small hospital. *Ann Surg Treat Res* 2016 Aug;91(2):74-9.
- Williams NS, Bulstrode CJK, O'Connell PR. Surgical infection. Baileys and Love short practice of surgery. 25th ed. London: Arnold, 2008;43.
- Malik SA, Yaseen MA, Nasreen G. Single and simple antibiotic prophylaxis for elective cholecystectomy. *J Coll Physicians Surg Pak* 2009;19:154-7.
- Voit SB, Todd JK, Nelson B, Nyquist AC. Electronic surveillance for monitoring surgical antimicrobial prophylaxis. *Pediatrics* 2005;116:1317-22.
- Anderson BR, Kallehave FL, Anderson HK. Antibiotic versus placebo for the prevention of postoperative infection after appendectomy. *The Cochrane Database of Systemic Reviews* 2005; 3: CD001439
- Mui LM, Ng CS, Wong SK, Lam YH, Fung TM, Fok KL, et al. Optimum duration of antibiotics in acute non-perforated appendicitis. *ANZ J Surg.* 2005;75:425-8.
- Liu CD, McFadden DW. Acute abdomen and appendix. In: Greenfield LJ, Mulholland MW eds. *Surgery Scientific principles and practice.* 2nd ed. Baltimore: Williams & Wilkins, 1997:1246-61.
- Cope's. The early diagnosis of acute abdomen by W Sillen, 15th ed. New York: Oxford University press. 1979.
- Graffeo CS, Counselman FL. Appendicitis. *Emerg Med Clin North Am* 1996;14:653-71.
- National Nosocomial Infections Surveillance (NNIS) System. National Nosocomial Infections Surveillance (NNIS) System report: data summary from January 1992 to June 2002, issued August 2002. *Am J Infect Control* 2002;30:458-475.
- Khan TJ, Khan JJ, Khan PJ. Frequency of common com-

- plications after laparoscopic appendectomy. *KJMS* 2014; 7(2):222-5
14. Gul T, Bilal M, Gul A, Sahar S, Kamran W, Akhunzada TS. Surgical Site Infection in Open Versus Laparoscopic Appendectomy. *J Surg*. 2014; 19 (1):1-4.
15. Suh YJ, Jeong SY, Park KJ, Park JG, Kang SB, Kim DW, Oh HK, Shin R. Comparison of surgical-site infection between open and laparoscopic appendectomy. *J Korean Surg Soc*. 2012 Jan; 82(1): 35-39.