International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 9; Issue 03 (D); March 2020; Page No.21661-21663
DOI: http://dx.doi.org/10.24327/ijcar.2020.21663.4263

Research Article

COMPARATIVE EVALUATION OF SIMPLE LIGATION VERSUS INVAGINATION OF STUMP IN OPEN APPENDICECTOMY

Anand Rai Bansal[1], Manish Bansal[2] and Ramesh Kumar Lamba[3]

[1]Professor, [2]Senior Resident, [3]Junior Resident
Department of General Surgery, Pt B. D. Sharma PGIMS, Rohtak, Haryana, India

A R T I C L E I N F O

Article History:
Received 14th December, 2019
Received in revised form 29th January, 2020
Accepted 05th February, 2020
Published online 28th March, 2020

Key words:
Appendicectomy, Stump ligation, Appendix, Invagination

A B S T R A C T

Introduction: Acute appendicitis is the most common cause of acute abdomen in adults. The technique of appendicectomy may vary from surgeon to surgeon starting from skin incision to ligation or invagination of stump. The literature provides conflicting results with simple ligation versus invagination of stump during open appendicectomy for uncomplicated acute appendicitis.

Aims and objectives: To compare simple ligation versus invagination of stump during open appendicectomy for uncomplicated acute appendicitis.

Material and methods: The present study was a randomized prospective clinical trial on 60 patients with suspected acute appendicitis presenting to hospital emergency services, which were divided into two groups. In Group I, simple ligation or transfixation of appendiceal stump was done. While in group II, invagination of appendiceal stump by purse-string suture was done.

Observations: Mean operating time in Group I was 68.1 min whereas in group II it was 94 min. Both groups showed significant difference in operating time ($p<0.05$). Duration of hospital stay in Group I showed mean hospital stay of 3.8 days while in group II it was 4 days ($p>0.05$) indicating no significant difference in duration of hospital stay.

Conclusion: Simple ligation can be as effective as stump invagination during open appendicectomy since there is no difference in rate of wound infection and hospital stay.

INTRODUCTION

Acute appendicitis is the most common cause of acute abdomen in young population and appendicectomy is one of the most frequently performed emergency abdominal surgery (Williams, 2013). Appendicitis is diagnosed by clinical history and examination along with blood investigations. Various factors like duration of symptoms, appendicular lump formation and associated complications are taken into consideration to decide whether to operate or manage conservatively. Different surgeons prefer different techniques of appendicectomy such as ligation or invagination of appendicular stump. Several studies show that laparoscopic appendicectomy leads to decreased postoperative pain and shorter hospital stay Singh, 2012. However, open appendicectomy is still frequently performed in developing countries like India as it is quick and cost-effective (Tate, 1993).

After ligation or transfixation of appendix stump, some surgeons invaginate the stump by a purse-string stitch or a Z-stitch or doubly invaginate the stump.

Corresponding author:* **Anand Rai Bansal
Professor Department of General Surgery, Pt B. D. Sharma PGIMS, Rohtak, Haryana, India

The main reasons for invagination of appendicular stump are safety against slipping of ligature from the stump or blow out of appendicular stump, less chances of peritonitis from spillage of pathogens from the remaining stump and less incidence of postoperative wound infection (Andersson, 2008).

The literature provides conflicting results regarding the two techniques. The present study was designed to evaluate simple ligation versus invagination of stump during open appendicectomy for uncomplicated acute appendicitis.

AIMS AND OBJECTIVES

To compare simple ligation versus invagination of stump during open appendicectomy for uncomplicated acute appendicitis in terms of operative time, postoperative pain, duration of ileus, wound complications and total length of hospital stay.

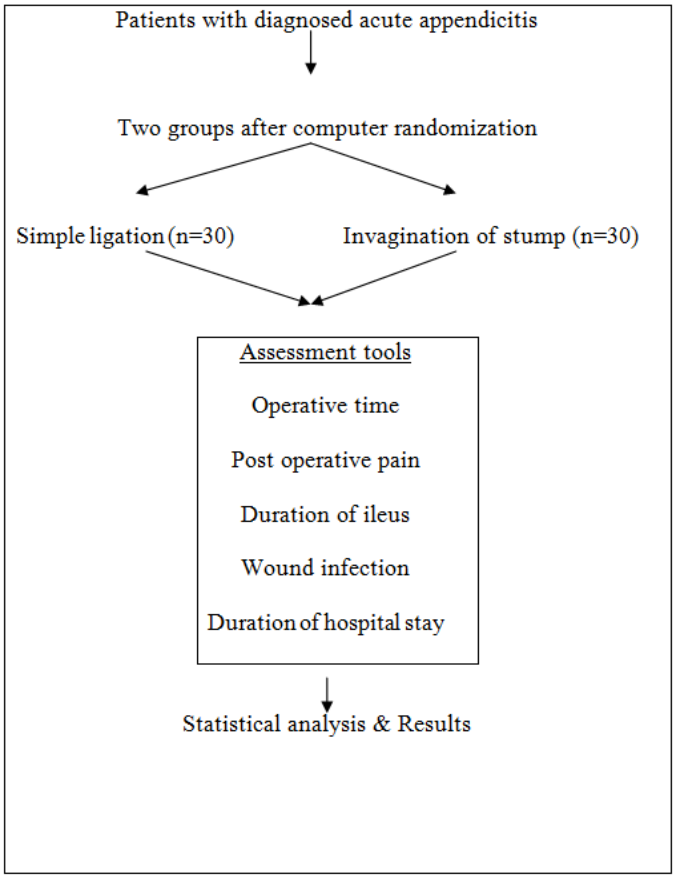
MATERIAL AND METHODS

The present study was a randomized prospective clinical trial on 60 patients with suspected acute appendicitis which were divided into two groups by computer based randomization with 30 patients in each group. Patients with Alvarado Score of 7-10 or who had score of 5-6 but were supported by abdominal ultrasonography showing inflamed appendix were

included in the study. Patients with features of appendicitis with abscess or mass formation, perforated appendicitis, patients with diabetes, hypertension and chronic respiratory disease were excluded.

In Group I, simple ligation or transfixation of appendiceal stump was done. While in group II, invagination of appendiceal stump by purse-string suture was done. No drain was put in abdominal cavity. Patients in both the groups were given intravenous injection ceftriaxone, amikacin and metronidazole till orally allowed. Analgesic and antacid were given intravenously concurrently till orally started. Oral fluids were started once patient passed flatus and bowel sounds were audible. Operative site was examined at time of discharge and then again on 7th postoperative day for any sign of wound infection.

Assessment tools included operative time, postoperative pain using Visual Analogue Scale (VAS). VAS is a 10 cm line on which '0' represents no pain and '10' the most severe pain, duration of ileus, wound complications in form of wound infection and wound dehiscence, duration of hospital stay.



Flowchart showing protocol followed during the study

STATISTICAL ANALYSIS

Mean was calculated for both the groups, Chi Square Test and Fisher Exact Test were applied and p value was calculated. A p value of less than 0.05 was considered significant.

OBSERVATIONS

The mean age of presentation of the patients involved in the study was 29.67 years. The minimum age was 15 years and the maximum age was 66 years. Of the total 60 patients involved in the study, 43 were male i.e. 71.6% and 17 were female i.e. 28.3%. Male to female ratio was 2.53:1. ASA status of almost all patients was comparable. Mean operating time in Group I where simple ligation was done, was 68.1 min whereas in group II where invagination was done along with simple ligation the operating time was 94 min. Both the groups showed significant difference in the operating time (p value <0.05), [Table 1].

Table 1 Operating time

Operating time	Group I	Group II	p value
0-30mins	0	0	
31-60mins	13	0	
61-90mins	14	14	
90-120mins	1	14	<0.05
>120mins	2	2	

Table 2 Postoperative pain by Visual analogue Scale (VAS)

VAS SCORE	GROUP I	GROUP II	P value
Mild(1-3)	2	2	
Moderate(4-6)	27	28	>0.05
Severe(7-10)	1	0	

Postoperative pain in both the groups assessed using Visual Analogue Scale on the scale of 10 shows no significant difference in both the groups with p value >0.05 (Table 2). The duration of ileus in Group I had mean duration of ileus as 23.80±4.180 hrs while in Group II it was 33.10±10.029 hrs (p value of <0.05).

Duration of hospital stay in Group I showed a mean hospital stay of 3.8 days while in group II it was 4 days with a p value of >0.05 there is no significant difference in the duration of hospital stay showing change of technique have only minor difference.

DISCUSSION

Open appendicectomy still remains a widely performed procedure in spite of increasing popularity of laparoscopic surgery. The management of appendiceal stump is important to prevent postoperative complications like fecal contamination and peritonitis. Invagination method was used to avoid leaving open mucosa free in the peritoneal cavity and to favor the serosa-to-serosa contact that was believed to be necessary for proper healing (Cubas, 2018). But purse string technique has increased the risk of ischemia around the invagination. The stump invagination approach can produce complications such as intramural abscesses and erosion of the cecal wall or fecal fistulas from reduced blood supply to the cecal wall and local ischemia. Furthermore, in the long-term it can simulate a cecal polyp on radiological imaging and potentially lead to unnecessary invasive tests in the screening of bowel cancers (Cleland, 1953).

The operating time in the present study was more in (group II) where stump invagination was done. Our study was forwarded by Afridi *et al* (2014), S Khan (2010), Mufti T *et al* (1990), Khan N *et al* (2009). However Neves L *et al* (2011) found no significant difference in the operating time between two techniques.

Post operative pain assessed by VAS score was similar in both the groups which is comparable with the literature (Singh, 2012). In present study mean duration of ileus was 23.8 hrs in group I and 32.9 hrs in group II. Similar findings were observed by Engstorm and Fenyo (1985). A further hypothesis for this finding could be that stump invagination can lead to intussusception which can lead to bowel obstruction. In

another study Cleland (1953) reported 6 cases of intussusception following open appendicectomy while Singh G *et al* (2012) and Khan S *et al* (2010) found no significant difference in duration of ileus. Wound infection noticed in both the groups was comparable with the studies conducted by Khan S *et al* (2010) and Mufti *et al* (2010). However Afridi *et al* (2014) revealed a higher infection rate in group B which can be attributed to stump burial with possible contamination of the needle. A study by Sinha (1977) indicated a higher rate of wound infection, intramural abscess and adhesions following inversion of the appendix stump. Jacobs reported an elevated wound infection rate following stump invagination in contrast with ligation only (Jacobs, 1992).

The observations show that there is increased incidence of duration of ileus with invagination of stump which could possibly be due to longer operative time. To add to the above greater manipulation of caecum is necessary to make the stump invagination possible. Also sometimes a larger incision is required to perform caecal delivery, Finally due to anatomical distortion of caecum the peristaltic waveform may be disturbed which may further contribute to prolonged ileus in the group in which stump invagination was done.

There was no difference between two groups on the basis of stay in hospital and this is comparable with the studies done by Afridi *et al* (2014), Khan S *et al* (2010) and Chaudhary IA *et al* (2005). On the other hand Ximenes *et al* (2014) concluded that there is tendency of larger hospital stay in the stump invagination.

CONCLUSION

Although the most widely practised way to do appendicectomy still remains inversion of stump following appendicectomy but the observations of the present study may lead us to say that simple ligation can also be as effective as stump invagination during open appendicectomy since there is no difference in rate of wound infection and hospital stay. Moreover because of its simplicity and also lesser incidence of prolonged ileus the procedure of simple ligation may be propagated and practised more widely. Also in poor and developing country like India there seems to be a definite advantage of using lesser number of suture material during simple ligation as usually a separate suture material is required while carrying out stump invagination of appendiceal stump after appedicectomy.

References

1. Afridi NG, Iqbal Z, Nazeem S, Ahmad S. Simple ligation versus invagination of stump in open appendicectomy. J Med Sci 2014; 22: 93-95.
2. Andersson M, Andersson R. The appendicitis inflammatory score: a tool for the diagnosis of acute appendicitis that outperforms the alvarado score. World J Surg 2008; 32: 1843-9.
3. Chaudhary IA, Samiullah, Mallhi AA, Afridi Z, Bano A. Is it necessary to invaginate the stump after appendicectomy? Pak j Med Sci 2005; 21: 35-38.
4. Cleland G. Caecocolic intussusception following appendicectomy. Br J Surg 1953; 41: 108-109.
5. Cubas V, Karim A, Waterland P. Simple ligation versus stump inversion in open appendicectomy: a systematic review and meta- analysis. Int Surg J 2018; 5: 1-10.
6. Engstrom L, Fenyo G. Appendicectomy: assessment of stump invagination versus simple ligation: a prospective, randomized trial. Br J Surg 1985;72:971.
7. Jacobs PP, Koeyers GF, Bruyninckx CM. Simple ligation superior to inversion of the appendiceal stump; a prospective randomized study. Ned Tijdschr Geneeskd 1992; 136: 1020-1023.
8. Khan N, Bangash A, Mushthaq M, Muzaffaruddin S, Imran M. Simple ligation versus ligation and burial of stump in appendicectomy in patients with clinical diagnosis of acute appendicitis. JPMI 2009; 23: 74-80.
9. Khan S. Assessment of stump invagination versus simple ligation in open appendicectomy. J Inst of Med 2010; 32: 7-10.
10. Mufti T, Sultan S, Ahmed R, Ali G, Azizi A, Nawaz M. Simple ligation versus stump invagination during appendicectomy – a prospective trial. MJIRI 1990; 4: 21-23.
11. Neves LJVA, Wainstin AJA, Mathias WC, Costa FPD, Castro JHD, Savassi- Rocha PR. Simple ligation or ligation and purse string invagination fot the treatment of the appendiceal stump: a prospective, randomized trial. Arq Bras Cir Dig 2011; 24: 15-19.
12. Singh G, Pandey A. Management of appendix stump: the technique. Med J DY Patil Univ 2012; 5: 106-109.
13. Sinha AP. Appendicectomy: an assessment of the advisability of stump invagination. Br J Surg, 1977; 64: 499-500.
14. Tate JJT, Chung SCS, Dawson J, Leong HT, Chan A, Lau WY, *et al*. Conventional versus laposcopic surgery for acute appendicitis. Br J Surg 1993; 80: 761.
15. Williams NS, Bulstrode CJK, O'Connell PR (eds). The vermiform appendix. In: Bailey and Love Short Practice of Surgery. 26th ed. CRC Press, Taylor & Francis Group, pp 1199-1214, 2013.
16. Ximenes AM, Mello FS, Lima-Junior ZB, Ferreira CF, Cavalcanti AD, Dias-Filho AV. Hospitalization time after open appendectomy by three different surgical techniques. Arq Bras Cir Dig 2014; 27: 188-190.

How to cite this article:

Anand Rai Bansal, Manish Bansal and Ramesh Kumar Lamba (2020) 'Comparative Evaluation of Simple Ligation Versus Invagination of Stump in Open Appendicectomy', *International Journal of Current Advanced Research,* 09(03), pp. 21661-21663. DOI: http://dx.doi.org/10.24327/ijcar.2020.21663.4263

****