

Safe and Feasible Time Limit for Early Appendectomy in Appendiceal Mass

Pandit RK

¹Department of Surgery
Janaki Medical College
Janakpur, Nepal.

Corresponding Author

Rakesh Kumar Pandit
Department of Surgery
Janaki Medical College
Janakpur, Nepal.
E-mail: rakeshkp1@yahoo.com

Citation

Pandit RK. Safe and Feasible Time Limit for Early Appendectomy in Appendiceal Mass. *Kathmandu Univ Med J* 2016;55(3):210-4.

ABSTRACT

Background

Early appendectomy in appendiceal mass is gaining popularity among some surgeons. However, it is endowed with increasing operative difficulty with time, and safe and feasible timing is not yet clear.

Objective

To know safe and feasible time limit for early appendectomy in appendiceal mass.

Method

This is a retrospective study. Between May 2009 and July 2014, 114 patients of appendiceal mass who underwent early surgical intervention by a single surgeon were studied. Group I included 98 patients operated within seven days of onset of pain and group II included 16 patients operated between 8th and 15 days of pain. Type of operative procedure, difficulties and complications were analyzed.

Result

There were 58 men and 56 women. Their mean age was 24.27 ± 8.7 years. In group I, 98 (100%) patients had appendectomy and adhesiolysis was safe and feasible. In group II, 5(31.25%) patients had extra-peritoneal drainage of abscess without attempt for appendectomy. Remaining 11 patients had attempt for appendectomy, but only 3(18.75%) out of 4 patients operated on the 8th day could have appendectomy. Six (37.5%) patients had just drainage of abscess. Two (12.5%) patients, operated on the 12th and 15th days of pain had just open-closed due to dense adhesion and both resolved. One patient operated on the 10th day sustained ileal injury. Surgical site infection occurred in 16.6% (14 in 86) in group I and 33.3% (5 in 15) in group B ($P=0.001$). Mean operative time was 34.4 ± 9.23 minutes and 43.7 ± 16.38 minutes for group I and group II respectively. Mean hospital stay after surgery was 2.9 ± 1.1 days and 5.5 ± 1.37 days in group I and group II respectively.

Conclusion

Early appendectomy in appendiceal mass seems safe and feasible up to 7th day since onset of pain in my experience. However, this limit may vary with surgeon's experience, and further studies are required to better clarify this issue.

KEY WORDS

Appendiceal mass, early appendectomy, safe and feasible timing

INTRODUCTION

Management of appendiceal mass (AM) is controversial, notably between conservative approach and early surgical intervention (ESI). Existing evidences are insufficient to prove superiority of one approach over the other.¹⁻³ A most important reason for contention with ESI is potential morbidity related to operative difficulty due to inflammatory adhesion. This article is dedicated to rectify the contention.

Proponents of ESI opine that earlier belief that adhesiolysis and dissection of appendix in the mass is more difficult and the bowel loops are more friable is not a valid argument to preclude ESI.^{4,5} However, many studies have reported difficult dissection and localization of appendix and injury to bowel.^{5,6} Kaya et al. reported major procedure like right hemicolectomy for suspicion of caecal tumor and inflammation, though none proved out to be malignancy.⁷ Intestinal injury and fecal fistula have also been reported.^{8,9}

So, it a different point that overall benefits of ESI outweigh risks in their view; but literature does witness operative difficulty and complications. These evidences seem to make ESI less appealing to many surgeons, and blemish this approach in opponents view. The fact that adhesion in AM does escalate with time and at a point dissecting out the appendix through the mass becomes unsafe need not be overemphasized. However, optimum timing is not yet clear.¹⁰ Defining a practically safe and feasible time limit for early appendectomy in AM would help one decide on definitive treatment more predictably and safely in patients presenting late, and yet avoid undesirable and morbid hunt for appendix in few patients presenting even later. It would also then nullify the contention.

METHODS

This is a retrospective and descriptive study conducted at Janaki Medical College Teaching Hospital and Godavari Modern Hospital, Janakpur, Nepal between May 2009 and July 2014. Record files of 386 patients, who underwent emergency appendectomy, were found. Reasonable amount of information was available for 252 patients out of which 190 were operated by the author. Among the 190 patients, 114 with AM were included in the study. Remaining patients who had no clear diagnosis of AM were excluded. The diagnosis of AM was made clinically in 71 (62.3%) patients, abdominal ultrasound in another 16 (14%) patients and intra-operatively in the other 27 (23.7%) patients. All the patients had early to well organized mass at operation with or without abscess. In five patients who had only extraperitoneal drainage of abscess, abscess was diagnosed by ultrasound. However, preoperative diagnosis of appendicitis was made only in four patients. In another one patient diagnosis was ascertained after intraoperative finding of typical pus and fecolith. Twenty three (20.2%) patients had presented directly and 91 (79.8%) patients

after initial treatment elsewhere. Mean Duration of symptoms at presentation was 5.27 ± 1.8 (range 2-15) days, and at surgery was 5.87 ± 1.97 (4-15) days. 102 (89.4%) patients were operated within 24 hours and 12 (10.6%) patients after 24 hours but within three days of presentation.

Informed consent for surgery was taken for all the patients. However, ethical approval was not taken because all surgeries were performed by qualified surgeon (not residents) as a routine procedure, and some extension of the operative day is not unusual with experience. There was no standard protocol for management of early AM.

Operative technique

All patients had open surgery. Usually spinal anesthesia and occasionally general anesthesia with ET intubation was used. Site of incision was best determined by site of mass palpable after anesthesia, usually through McBurney points and extended superolaterally or inferomedially as needed. Three patients with features generalized peritonitis had lower midline laparotomy. The peritoneum was incised carefully taking care of bowel. Blunt finger dissection around and into the mass often opened up abscess cavity when present. The abscess was drained and fecolith, which was often present, removed.

Dissection of appendix in early AM need not be overemphasized here. In a more organized mass, blunt finger dissection often discerned a plane between the inflamed appendix and the omentum or bowel. Appendix was held by Babcock tissue forceps and gentle traction helped delineate a portion of mesoappendix and peritoneal folds. Ligating bits of strands of mesoappendix and peritoneal folds close to appendix under vision maintained meticulous hemostasis and facilitated progressive dissection. Occasionally when subserosal plane of appendix was entered dissection along this plane was also safe. Gangrenous and perforated appendix was at times removed in pieces. When the base was identified early, retrograde appendectomy was done. Complete dissection was ensured when the base clearly appeared to funnel out into the caecum. The base was ligated by number 0 silk or chromic catgut. The stump was not buried. When the appendix was perforated at the base and appeared to involve adjacent caecum, it was sutured with 2-0 chromic catgut interrupted sutures taking relatively healthy caecum. When the mass was densely organized and dissection appeared unsafe, search for appendix was withheld, and only abscess, when present, was drained. In a few late presenters with large abscess, extraperitoneal drainage alone was done without an attempt for appendectomy. Drain was placed in selected patients with appendectomy and all patients with abscess drainage without appendectomy.

Post-operative management and follow up

All patients were given IV ceftriaxone 1 gm 12 hourly and metronidazole 500 mg 8 hourly, switched to oral forms

on first to third postoperative day and continued for total of seven days. Oral intake was allowed after 12-24 hours. They were advised for follow up if they had any problem.

Based on personal experience the patients were divided into two groups depending on timing of surgery in order to make relevance of description more explicit. Group I consisted of 98 patients who were operated within seven days of onset of pain and Group II consisted of 16 patients operated after seven days of pain. In group I, Mean duration of symptoms at presentation and operation was 4.8 ± 1.68 (range: 2-7) days and 5.2 ± 1.07 (range: 4-7) days respectively. In group II, mean duration of symptoms at presentation and operation was 8.2 ± 2.24 (range: 6-15) days and 9.7 ± 1.9 (range: 8-15) days respectively.

The data were analyzed in MS excel 2010. Demographic parameters, duration of symptom (pain), types of operative procedures, intraoperative difficulty, operative time, complications and length of hospital stay were studied. Chi-square test was used to measure the association and unpaired t-test to measure the significance of difference.

RESULTS

There were 58 men and 56 women. The mean age was 24.27 ± 8.7 (range: 6-42) years. In group I 98(100%) patients had appendectomy. In group II, out of 16 patients, 5(31.25%) had large abscess and had extra-peritoneal drainage without attempt for appendectomy. Remaining 11 patients had attempt for appendectomy, however only 3(18.75%) patients had appendectomy on the 8th day after onset of pain. Another 1(6.25%) patient operated on the 8th day and 5(31.25%) patients operated thereafter had just have drainage of abscess. The other 2(12.5%) patients, operated on the 12th and 15th days of pain, had mass with very dense adhesion and no abscess. Both were just closed and the mass resolved.

Periappendiceal abscess or pus was present in 45(45.9%) and 13(81.2%) patients in group I and group II patients respectively. Among group I patients with abscess, 40(88.9%) had perforation and/or gangrene. Out of 40, 35(87.5%) patients had viable residual stump of appendix and the rest 12.5% had no viable stump left.

Though adhesion escalated with time, adhesiolysis was safe and feasible in all patients in group I, and none had bowel injury. However, adhesiolysis was more difficult from 8th day onward (group II). One patient (age 42 years), operated on the 10th day of pain, sustained ileal injury (1.5 cm rent) which was closed by 2-0 chromic catgut. Abscess was drained and appendectomy abandoned. However, he developed feculent drain on the third postoperative day which never exceeded 250 ml per day and gradually stopped in 10-12 days. The drain was removed in two weeks. In other patients, drain was removed in 2-3 days after appendectomy and 3-6 days after abscess drainage without appendectomy.

Surgical site infection (SSI) developed in 19 out of 101 (18.8%) patients who had this record. It was 16.6% (14 out of 86) and 33.3% (5 out of 15) in group I and II respectively, and the difference was significant ($P=0.001$). Combined, it was 10.41% (5 in 48) in presence of phlegmon and 26.4% (14 in 53) in presence abscess and perforation. Deep SSI developed in only one patient in group I.

Overall mean operative time was 35.7 ± 10.9 (range: 20-90) minutes, and group wise it was 34.4 ± 9.23 (range: 20-70) minutes and 43.7 ± 16.38 (range: 25-90) minutes for group I and group II respectively. Overall mean hospital after surgery was 3.3 ± 1.4 (range: 1-8) days, and group wise it was 2.9 ± 1.1 (range: 1-7) days and 5.5 ± 1.37 (range: 3-8) days in group I and group II respectively. The difference in hospital stay was statistically significant ($p=0.001$).

No patient in group I had any significant complication on follow up visits. However, three patients from group II came with recurrent appendicitis. One patient previously had abscess drainage without appendectomy four months before. His appendectomy was done and the finding was a 3 cm long inflamed stump of appendix. Another patient previously had extraperitoneal drainage of huge abscess two and half months before. She was again operated in two days of onset pain. Intraoperatively, she had thick residual abscess behind caecum which was drained. But appendectomy was not feasible owing to dense adhesion. The third patient had just open-close seven weeks before. She was advised for appendectomy but she went home and did not turn up. Another patient with ileal injury had visited last 5-6 months later for lower urinary tract infection but was otherwise well.

DISCUSSION

Conventionally the standard treatment of an AM, which usually forms after 48-72 hours of acute appendicitis, is conservative, i.e. the Ochsner-Sherren regimen.¹¹ The decision is based on the fact that nature has already localized the lesion and inadvertent surgery at this time is difficult, bloody and dangerous.¹² However, later on various studies showed that, with increasing experience, EA in an AM is feasible and appropriate.¹³⁻¹⁵

In a study by Samuel et al. EA in pediatric patients presenting with AM was safer.⁴ Nine patients had symptoms of 5.7 ± 0.4 days at presentation and were operated 4.2 ± 1.8 days after admission.⁴ Twenty five patients were operated after 6.2 ± 1.1 days of symptoms.⁴ The timing of surgery is comparable to that of group I patients in the present study.

Bahram reported EA in 45 out of 46 patients of AM with symptoms of 4-12 days. However, there was difficulty in dissection in 3(7%) patients, serosal tear in ileum and caecum in 3(7%) patients, and appendix was difficult to localize due to difficult adhesiolysis in 4(10%) of patients.⁶ Arsad et al. found difficulty in localization of appendix in 41(46.6%), difficulty in adhesiolysis in 23(26.1%), minor

Table 1. Group I and combined data of present study compared with other studies.

	Group I	Combined group I & II	Bahram ⁶	Arsad et al. ⁵	Kaya et al. ⁷
Intestinal injury (%)	0	0.87 (major)	7 (minor)	14.8 (minor)	-
Mean operative time (min)	34.4±9.23 (20-70)	35.7±10.9 (20-90)	72±18.56	30t-120	30-150
Post-op hospital stay (days)	2.9±1.1 (1-7)	3.3±1.4 (1-8)	3±0.25	2-20	5.48±5.21
Wound sepsis (%)	16.6	18.8	26	19.3	27.7

trauma to bowel in 13(14.8%) and Bleeding in 11(12.5%) patients.⁵ However, it is not clear when such difficulties became pronounced and injury to bowel occurred. This aspect has been tried to be clarified in the present study by categorizing relatively difficult patients in group II.

When surgery is contemplated on the later days, variable procedures are likely to be performed. Kaya et al. studied 47 patients operated for AM with the mean duration of symptoms of 4.06 ± 2.50 (range: 1-15) days at the time of operation.⁷ Appendectomy was performed in 38 (80.9%) patients and others had right hemicolectomy (none reported malignancy), appendectomy and ileum resection, appendectomy with oophorectomy, and drainage of abscess without appendectomy.⁷ The finding that EA is feasible in majority of the patients is in concordance with the present study. However, aggressive surgery was not entertained in difficult circumstances in the present study.

There exists heterogeneity in studies regarding complications of EA also. Cunnigaiper reported no major complications in 114 patients operated with AM.¹⁶ However, others reported that EA is associated with significant complication like dissemination of infection, intestinal injury and fecal fistula.^{8,9} In the present study combined results of group I and group II patients regarding operative time, hospital stay and complications are comparable to other studies (Table 1).

Though many studies advocate EA in presence of AM, concerns about operative difficulties, potential need for more extensive procedure out of diagnostic dilemma and increased risk of injury to the bowel may outweigh the benefits of EA. So, in order to safeguard the real benefit of EA, it is necessary to define safe and feasible timing for surgical intervention. When the inflammatory process is

less severe and the extent of adhesion is less pronounced EA may be feasible even on later days. However, it is difficult to predict preoperatively. And the objective of this study can be met only if it defines safe and feasible timing in presence of more pronounced inflammation and adhesion. The results of this study should be interpreted in the light of the fact that the author has tried to expand this time limit as far as he felt safe and practical in his own hand as well as in the hands of majority of surgeons with reasonable experience.

The most important limitation of the study is the fact that the results are based on single surgeon's experience. However, the kind of issue in question may not be practical or ethical to be resolved by randomized studies involving surgeons with variable experience. Secondly, histopathological examination of the appendix was not routinely done. Only ten patients had reports of histopathological examination and none reported malignancy. In a review, Sah reported that the coincidence of malignancy in association with AM ranged from 0 to 4%.¹⁷ My experience has been that association of acute appendicitis with malignancy is poor in this territory. Thirdly, long term follow-up of the patients are not available.

Patients from medically less privileged community who present late with AM would benefit best from definitive surgery. Notably, most patients who presented late did so within seven days. Appendix should not only be regarded as the domain of surgical trainee. A touch of experienced hand can have remarkable impact on treatment of such patients. However, the article is not intended to advocate routine appendectomy during this period. But the knowledge of safe timing would help young surgeons to make more appropriate decision depending on specific circumstances. For the patients presenting very late, less invasive alternative approaches should be pursued depending on availability of facilities, patient's circumstances and surgeon's experience.

CONCLUSION

Early appendectomy in an appendiceal mass seems safe and feasible up to 7th day since onset of pain in my experience. Thereafter, appendectomy appears to be more difficult and less safe. However, this limit can vary with surgeon's experience and further studies are required to better define this issue.

REFERENCES

- Ahmed I, Deakin D, Parsons SL. Appendix mass: do we know how to treat it? *Ann R Coll Surg Engl*. 2005 May;87(3):191-5.
- Meeks DW, Kao LS. Controversies in appendicitis. *Surg Infect (Larchmt)*. 2008 Dec;9(6):553-8.
- Irfan M, Hogan AM, Gately R, Lowery AJ, Waldron R, Khan W, et al. Management of the acute appendix mass: a survey of surgical practice. *Ir Med J*. 2012 Oct;105(9):303-5.
- Samuel M, Hosie G, Holmes K. Prospective evaluation of nonsurgical versus surgical management of appendiceal mass. *J Pediatr Surg* 2002;37:882-6.
- Arshad Malik, Aziz Laghari A, Qasim Mallah, Altaf Hussain Talpur K. Early appendicectomy in appendicular mass dA LIAQUAT University hospital experience. *J Ayub Med Coll Abbottabad*. 2008;20(1):70-2.

6. Bahram MA. Evaluation of early surgical management of complicated appendicitis by appendicular mass. *Int J Surg*. 2011;9(1):101-3.
7. Kaya B, Sana B, Eris C, Kutanis RI. Immediate appendectomy for appendiceal mass. *Turkish J Trauma Emerg Surg* 2012;18:71-4.
8. Jordan JS, Kovalcik PJ, Schwab CW. Appendicitis with a palpable mass. *Ann Surg*. 1981;193:227-9.
9. Oliak D, Yamini D, Udani VM, Lewis RJ, Vargas H, Arnell T, et al. Nonoperative management of perforated appendicitis without periappendiceal mass. *Am J Surg*. 2000;179:177-81.
10. Meshikhes AW. Management of appendiceal mass: controversial issues revisited. *J Gastrointest Surg*. 2008 Apr;12(4):767-75.
11. Ochsner AJ. The cause of diffuse peritonitis complicating appendicitis and its prevention. *JAMA*. 1901;26:1747-54.
12. Mann CV, Russel RCG, Williams NS. The vermiform appendix. In: Bailey & Love's short practice of surgery; 22nd edi. 1995. pp. 828-41.
13. De U, Ghosh S. Acute appendectomy for appendicular mass: a study of 87 patients. *Ceylon Med J*. 2002 Dec; 47(4):117-8.
14. Khan AW, Sheikh SH, Rahman MA. Results of emergency appendectomy for appendicular mass. *Mymensingh Med J*. 2007 Jul;16(2):209-13.
15. Garg P, Dass BK, Bansal AR, Chitkara N. Comparative evaluation of conservative management versus early surgical intervention in appendicular mass-a clinical study. *J Indian Med Assoc*. 1997 Jun;95(6):179-80, 196.
16. Cunnigaiper ND, Raj P, Ganeshram P, Venkatesan V. Does Ochsner-Sherren regimen still hold true in the management of appendicular mass? *Ulus Travma Acil Cerrahi Derg*. 2010;16:43-6.
17. Sah JN. Interval appendectomy, is it necessary? *JSSN*. 2007 Sept; 10(3):34-46.