

Original Research Article

A study of outcome of non-operative versus operative management in 50 cases of appendicular lump

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ABSTRACT

Background: Appendicitis is the most common cause of pain requiring surgery. The objective of this study was to compare the different modes of management of appendicular lump whether traditional emergency operation or non-operative management.

Methods: This is a retrospective observational study of total 50 cases of complicated appendicitis with appendicular lump/abscess. 18 patients were treated for emergency operations and rest were treated non-operatively with antibiotics alone (n=26) and antibiotics with percutaneous drainage (n=6). 24 patients who were treated non-operatively later on planned for interval operations.

Results: The mean age of the patients was 50.8 years, and the ratio of men to women was 27:23. Among them, the emergency surgery (operative) group included 18 patients (36%) and the non-operative treatment group included 32 patients (64%). Duration of symptoms was 7 days in group 1 compared to 9 days in group 2. White blood cells count was similar in both groups. During emergency surgery, three patients (15%) require resection, whereas none underwent in planned group. Duration of surgery was 115 and 100 min in emergency and planned groups, respectively. The complication rate was higher almost twice in emergency group compared to planned group. The hospital stay was 12 and 19 days in emergency and planned groups, respectively.

Conclusions: Therefore, as treatment for appendicitis associated with an abscess or mass, the decision whether to perform initial emergency surgery or to perform non-operative managements, and if non-operative managements are performed, whether to perform interval surgery after a certain period or to perform only the ambulatory follow-up observation depends on the surgeon's overall evaluation of the clinical features of the individuals.

Keywords: Appendicitis, Lump, Mortality, Morbidity, Non-operative management, Operative management

INTRODUCTION

Appendicitis is the most common cause of pain requiring surgery. The lifetime risk of developing appendicitis is 8.6% for males and 6.7% for females, with the highest incidence in the second and third decades.¹ The yearly incidence rate of perforated appendicitis is about 2 per 10,000. The proportion of perforated appendicitis is commonly around 25%. Children less than 5 years of age

and patients more than 65 years of age have the highest rates of perforation (45% and 51%) respectively.² The proportion of perforation increases with increasing duration of symptoms.

In many cases, rupture is contained and patients display localized peritonitis. In 2%-6% of cases, a palpable mass is detected on physical examination. This could represent a phlegmon, which consists of matted loops of bowel

adherent to the adjacent inflamed appendix or a periappendiceal abscess.

When emergency surgery is performed on such cases, due to inflammation in a wide area within the abdominal cavity, adhesion of the intestines, sepsis after surgery, fluid collection within the abdominal cavity, and re-surgery for adhesion of the intestines, healing of surgical wounds has been shown to be delayed substantially.

Therefore, recently, for patients suspected of having appendicitis associated with an abscess in the peri appendix, instead of traditional emergency surgery, the trend has been to perform non-operative treatments, for example, ultrasound-guided Percutaneous drainage and antibiotic treatments first and subsequently to perform an interval appendectomy after a certain time: nonetheless, until now, standard treatment protocols have not been established, so this issue is still controversial.

In addition, in regard to the interval appendectomy being always required, recently the recurrence rate has been reported not to be high, approximately 7%, in several studies; thus, after successful non-operative management, an interval appendectomy is not always necessary.

METHODS

A retrospective study was performed on 50 patients diagnosed as having acute appendicitis by Physical examination, Ultrasonography and Abdominal Computed Tomography(CT) at the Department of General Surgery, V.S. General Hospital, from January 2010 to October 2014.

Patients who underwent emergency surgery were defined as the emergency surgery group (Group 1). Patients treated with conservative management through the use of antibiotics with or without ultrasound-guided percutaneous drainage were defined as the conservative treatment group (Group 2), which was subdivided into the interval surgery group whose patients underwent surgery at a certain time after the initial treatments (Group 2A), the ambulatory follow-up observation group whose patients underwent ambulatory follow-up observation continuously (Group 2B) and the those patients of follow-up who underwent appendectomy for recurrent appendicitis (Group 2C).

The clinical characteristics of patients, the type of surgery, and the follow-up observation were analyzed based on medical records. The follow-up observation period was from the day of the first visit to the most recent visit to our outpatient clinic. As clinical characteristics, the gender of the patients, age, major symptoms, the duration of pain prior to admission, body temperature at the time of admission, heartbeat, the number of leukocytes, the presence or absence of an abscess or masses in the peri appendix and size, and associated chronic diseases were assessed.

With regards to treatment, whether emergency surgery was performed, whether percutaneous drainage was performed, and whether interval surgery was performed after the initial conservative treatments were assessed. In the ambulatory follow-up observation group, recurrence and surgery during the ambulatory follow-up observation period were assessed.

Regarding patients who underwent surgery, the period from the onset of symptoms to the day of operation, surgical methods, operation time, the postsurgical hospitalization period, and postsurgical complications were analyzed. For statistical validation, the student t-test, Pearson's chi-square test, and Fisher's exact test were performed. $P < 0.05$ was determined to be statistically significant.

RESULTS

The mean age of the patients was 50.8 years, and the ratio of males to females was 27:23. Among them, the emergency surgery group included 18 patients (36%) and the non-operative treatment group included 32 patients (64%). During the period, the number of patients who underwent an appendectomy at our hospital was 5,203 patients, and our subjects accounted for approximately 0.96% of all appendicitis patients.

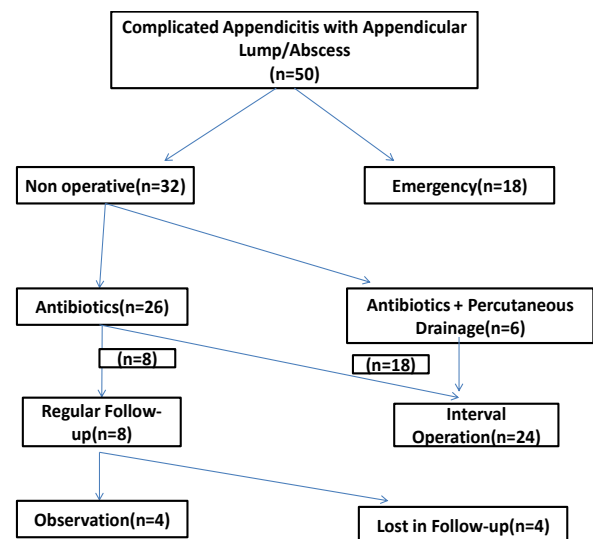


Figure 1: Patients' recruitment procedure.

Clinical characteristics of the emergency operation group (Group 1)

The maximum patients of this category were of the age group of 40-50 years and the ratio of males to females was 12:6. The major symptom was pain (15 patients, 83%), and the interval from the onset of symptoms to hospital visit was an average 6.8 days. In addition, nausea and vomiting were associated with 5 patients (27.8%), fever with 1 patient (5%), and a mass in the right lower abdomen with 1 patient (5%). On the physical

examination performed at the time of admission, the body temperature was an average 37.1°C, and the heart beat was an average 87.5 beats/minute. On the blood test, the number of leucocytes was an average 13,253.8/mm². In CT or ultrasonography, an abscess in the peri appendix was noted in 13 patients (72%) and a mass in 5 patients (27%), and the size of abscess was an average 4.9 cm (range, 3.0 to 6.1 cm). Patients with underlying diseases were 7 (38%): 4 (22%) with hypertension, as well as cardiac diseases and 1(16%) each with diabetes, chronic renal failure, and liver cirrhosis.

Clinical characteristics of the non-operative management group (Group 2)

The average patients of this group belonged to 50-60yrs age group and the ratio of males to females was 18:14. As major symptoms, abdominal pain was associated with 31 patients (96.8%), which was most prevalent, and the average period from the onset of symptoms to the hospital visit was 9.7 days. In addition, fever was associated with 12 patients (37.5%), and abdominal distension with 2 patients (6.2%). At the time of admission, on physical examination, the body temperature was an average 36.7°C, and the heart beat was an average 85.7 beats/minute. On the blood test, the number of leucocytes was an average 13,201.3/mm². On CT or Ultrasonography, 20 (62.5%) patients were diagnosed as having an abscess in the peri appendix, and 12 (37.5%) were diagnosed as having a mass; the abscess size was an average 4.4 cm (range, 2.5 to 7.5 cm). Of the 19 (59.3%) patients with underlying diseases, 7 (21.875%) patients had hypertension and cardiac diseases, 7 (21.875%) patients had diabetes, 4 (12.5%) patients had ongoing tuberculosis and other chronic respiratory diseases. The clinical characteristics of the non-operative management and the emergency operation groups were not statistically different (Table 1).

Table 1: Comparison of clinical characteristics between emergency and non-operative groups.

	Group-1	Group-2
Sex (M:F)	10:8	17:15
Mean age	47.64	52.71
Duration of symptoms	6.79	9.74
Body temperature (°C)	37.13	36.74
Heart rate (pulse/min)	87.52	85.76
WBC count	13,253	13,2013
Size of abscess (cm)	4.41	4.95

Analysis of the patient group requiring surgery after non-operative management (Group 2A)

Among patients treated with non-operative management in the initial period, 26 patients (81.25%) were treated with only antibiotics, and 6 patients (18.75%) were treated with antibiotics in parallel with ultrasound-guided percutaneous drainage. Interval surgery after non-

operative management was performed on 24 patients (81.2%, interval surgery group), and 8 patients (25%) underwent only follow-up observation, out of which 4 with no intention to undergo interval surgery and 4 were lost in follow up. The mean age of the interval surgery group (24 pts.) was 49.2 years, and the ratio of males to females was 10:14. The period from the onset of symptoms to hospital visit was an average 9.7 days. At the time of admission, the body temperature was 36.5°C, and the heart beat was an average 84.5 times/minute. On the blood test, the number of leucocytes was an average 13,847.3/mm², the size of the abscess was an average 4.6 cm (range, 3 to 5.5 cm).

Interval surgery was performed after an average of 24 days (range, 5 to 64 days) from the time of initiation of non-operative management. 17 patients (70.83%) had symptoms that improved.

Comparison of the results of surgery in the emergency surgery group (Group 1) with the interval surgery group (Group 2A)

Surgery was determined according to the inflammation level at the time of surgery. In the interval surgery after non-operative management group (n = 24), a simple appendectomy was performed on 21 patients (87.5%), an ileocectomy was performed on 2 patients (8.33%), and a right hemicolectomy was performed on 1 patient (3.125%). The interval from the onset of initial symptoms to the day of surgery was an average 26 days. Post-surgical complications developed in 3 patients (12.5%): wound infection in 3 cases.

In the emergency surgery group, a simple appendectomy was performed on 16 patients (88.88%), an ileocectomy was performed on 2 patients (11.11%). Postsurgical complications developed in 2 patients (11.11%): surgical wound infection in 2 cases.

When the emergency surgery group and the interval surgery group were compared, surgical methods, operation time, postsurgical complications, and the postsurgical hospitalization period were not statistically significantly different (Table 2).

Table 2: Comparison of surgical outcomes between emergency and delayed operation groups.

	Group 1 (n=18)	Group 2A (n=24)
Operations		
Appendicectomy	16	21
Ileocectomy	2	2
Right hemicolectomy	-	1
Operation time (mins)	104.82	88.19
Post-op complications	3	4
Post-op hospital stays	9.43	9.0

Analysis of the ambulatory follow-up observation group without planned interval surgery after non-operative management (Group 2B)

The mean age of the group that only underwent ambulatory follow-up observation without interval surgery after non-operative management (n = 8) was 56.7 years, and the ratio of males to females was 3:5. The interval from the onset of symptoms to hospital visit was an average 9.7 days. At the time of admission, the body temperature was an average 36.6°C, and the heart beat was an average 86.9 beats/minute. On the blood test, the number of leucocytes was an average 12,438.7/mm², and the size of the abscess was an average 5.3 cm (range, 2.5 to 7 cm). In 7 patients (87.5%), only antibiotic treatments were performed, and in the remaining 1 patient (12.5%), ultrasound-guided percutaneous drainage was additionally performed. When the interval surgery group (Group 2A) and the ambulatory follow-up observation group (Group 2B) were compared, gender, age, the duration of pain prior to admission, body temperature, heartbeat, number of leucocytes, and size of the abscess were not statistically significant; nonetheless, in the interval surgery group, the number of patients who underwent ultrasound-guided percutaneous drainage was significantly higher (Table 3).

Table 3: Comparison of surgical outcomes between emergency and delayed operation groups.

	Group 1 (n=24)	Group 2A (n=8)
Sex (M:F)	11:13	3:5
Age	49.27	56.77
Duration of pain	9.72	9.76
Body temp	36.57	36.58
Heart rate	84.57	86.95
WBC count	13847.31	12438.78
PCD	6	2
Size of abscess	4.65	5.33

The mean follow-up observation period of the ambulatory follow-up observation group was an average 37.8 months (range, 1 to 82.2 months). Surgery was performed on 2 patients (26.5 %, Group 2C) for recurrent appendicitis. The period after conservative management to the recurrence of symptoms was an average 42.3 days, and the interval from the onset of the initial symptoms to the day of surgery was an average 56.7 days. As postsurgical complications, surgical wound infection occurred in 1 patient (33%). When the interval surgery group and the recurrence surgery group were compared, surgical method, operation time, postsurgical complications, and postsurgical hospitalization time were not statistically significant.

DISCUSSION

In acute appendicitis patients, the proportion of cases associated with an abscess or a lump in the peri appendix

has been reported to be approximately 2% to 7%. When emergency surgery is performed in such patients, the incidence of complications is reported to be up to 26%.^{3,4} If surgery is performed, the inflammation may spread over a wide area. In addition, because of oedema and the vulnerability of the adjacent small intestine and large intestine, injury may occur or secondary fistulas may develop. Furthermore, in emergency surgeries, the approach to the appendix is difficult due to inflamed tissues, and surgery may be technically difficult due to deformation of anatomical structures and location. For such cases, instead of completing surgery after a simple Appendectomy, some cases require an ileocectomy in areas with inflammation and adhesion or rarely even a right hemicolectomy.^{3,5,6}

In addition, in cases with the possibility of tumours, lesions cannot be assessed accurately because of inflammation in the peri appendix; thus, an en-bloc resection and extended lymphadenectomy may not be sufficient.⁷

The advantages of performing emergency surgery are that frequent follow-ups and tests are not required in comparison with non-operative managements and that re-hospitalization after a certain time for the planned surgery is not required.^{8,9} Nonetheless, in recent numerous studies, in appendicitis associated with abscess and/or mass, after non-operative managements, high success rates of 76% to 97% and low incidences of complications have been reported; thus, performing non-surgical treatments, such as antibiotic treatments and ultrasound guided percutaneous drainage, during the initial period have been proven to be effective and safe.^{5,10-13}

Brown et al, conducted studies on the incidence of complications after nonsurgical treatments in patients with an abscess in the periappendix, and the results showed that the incidence of complications in patients who underwent conservative managements was 15%, and it was 58% in the group that underwent surgical treatments, which was very high.¹⁴

CONCLUSION

In our study, among the total 50 patients, non-operative managements were performed on 32 patients (64.0%), and in 28 of those patients (90.0%), symptoms improved by early non-operative management. The remaining four patients (10%) required surgery due to worsening symptoms. Similarly, between the group that underwent interval surgery after non-operative managements and the group that underwent emergency surgery, treatment outcomes, such as the frequency of an enterectomy, operation time, complications, postsurgical hospitalization period, etc. were not statistically different. Therefore, in our study, similar to the results of other previous studies, early conservative management of appendicitis associated with an abscess or mass was confirmed to be safe. The incidence of postsurgical

complications in emergency surgery group was slightly more.

The necessity of interval surgery after the improvement of symptoms through initial non-operative management is still controversial. The recurrence rate after non-surgical treatments has been reported to vary from 5% to 37. In recent studies, low recurrence rates have been reported, with recurrence being most prevalent within 2 years of the development of initial symptoms, after which recurrence rates decreased. In addition, reports indicate that if recurrence of appendicitis is detected early by intensive follow-up observation for a certain time after conservative management and is treated surgically, it can be treated safely.

In present study, in 8 patients out of 32 patients (25.0%), only follow-up observation was performed without interval surgery because they belonged to high risk group. Appendicitis recurred in 3 of those 8 patients (37.5%), and a simple emergency appendectomy was performed. This confirmed that with intensive follow-up observation after non-operative management, recurrence of appendicitis could be detected early and surgical treatments could be administered safely.

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