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**ORIGINAL ARTICLE**

# MANAGEMENT OF INFLAMMATORY APPENDICEAL MASS IN ZEWDITU MEMORIAL HOSPITAL, ADDIS ABABA, ETHIOPIA

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## ABSTRACT

***Background****: Appendiceal mass is one of the complications of acute appendicitis. The management of patients with appendiceal mass is controversial and different treatment options have been suggested.*
***Objective:*** *The objective of this study was to assess the results of conservative management of patients with appendiceal mass followed by interval appendicectomy.*
***Methods:*** *The study was a retrospective analysis of 73 medical records of patients with appendiceal mass who were managed conservatively between March 2007 and February 2014.*
***Results****: Fifty patients were males and 23 patients were females making the male to female ratio of 2.2:1. The mean age was 29.6±6.3 years (range 12-68 years). The maximum incidence was in the 3rd decade. Forty one (55.8%) of the patients presented one week or more after the onset of their illness. Abdominal pain, right lower quadrant (RLQ) direct and rebound tenderness were observed in all patients. Mass was detected in the RLQ in 84.9% of the patients. Sixty five patients (89%) responded to conservative treatment and these patients were discharged after a mean hospital stay of 6.5±1.5 days (range 3-12 days). Interval appendicectomy was done for 58 patients 8-16 weeks after successful conservative management. The mean hospital stay after interval appendicectomy was 3.5±0.5 days with a range of 2-5 days. One patient (1.7%) had a wound infection. There were no deaths.*
***Conclusion:*** *Initial non-operative management of appendiceal mass was successful in most cases and the complication rate after interval appendicectomy seems lower than with early operative treatment.*
***Key Words:*** *Acute appendicitis, appendiceal inflammatory mass, conservative management, interval appendicectomy*

## INTRODUCTION

Appendiceal mass is one of the complications of acute appendicitis. It may occur in patients who present late in the course of appendicitis. It is formed when inflammation in acute appendicitis is enclosed by the patient's own defence mechanisms in an attempt to prevent infection from spreading by isolating the inflamed appendix from the rest of the abdominal cavity. As a result, the omentum, small bowel and caecum wrap up the inflamed appendix and form an inflammatory mass. This appendiceal inflammatory mass may represent a pathological spectrum ranging from a simple inflammatory phlegmon to a circumscribed abscess (1-6). In most cases, it may not be clinically possible to distinguish with certainty between the two conditions but in different reports nearly half or more than half of the patients presenting with a mass proved to have phlegmons at surgery (2,6-8). Improved radiological imaging techniques have allowed a more accurate definition of appendiceal mass pathology over the past decades (5).

The management of patients with appendiceal mass is controversial and different treatment options have been suggested (2,3,6,9). Some suggest a conservative, non-surgical treatment followed by interval appendicectomy with the belief that an early appendicectomy in these patients is technically demanding and time consuming because of the distorted anatomy, and may lead to complications such as faecal fistula (5,10-21). Others advocate conservative treatment alone without appendicectomy (17,22). Still others recommend a definite and immediate surgical intervention during the first admission. Those favouring immediate appendicectomy claim an early recovery and complete cure during the same admission, avoiding the need for readmission for interval appendicectomy and immediate exclusion of other pathologies (2,6,23-26). Some reports on immediate surgical management, however, suggest a high rate of complications (7,20,24,27). There is no single study reported from Ethiopia, to our knowledge, addressing the management of appendiceal mass. This study describes the results of conservative management of patients with appendiceal mass in Zewditu Memorial Hospital (ZMH). It is hoped that the information generated may serve as a base for further study.

## MATERIALS AND METHODS

The study was conducted in the surgical unit of Zewditu Memorial Hospital (ZMH). It is one of the referral hospitals in Addis Ababa, Ethiopia. The hospi-

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tal provides medical services to patients referred from clinics, health centres, and other hospitals. Appendiceal inflammatory mass may be a simple inflammatory phlegmon with adjacent adherent organs or a circumscribed appendiceal abscess. Accordingly, subjects included in the study were those patients presenting with symptoms and signs of appendicitis as well as a tender RLQ mass who were subsequently evaluated by ultrasound. When ultrasound confirmed appendiceal abscess, immediate open surgical drainage alone or surgical drainage and appendicectomy was performed on these patients. Conversely, when ultrasound studies indicated simple appendiceal phlegmon, patients were managed conservatively without surgery. Conservative management comprised hospitalisation, nil per oral (npo), intravenous fluids and intravenous broad spectrum antibiotics (ceftriaxone and metronidazole).

Additional patients in whom appendiceal mass was found incidentally during laporatomy were identified and ultimately excluded if appendicectomy was continued, or included if it was decided to managed such patients conservatively.

Patients were then followed in the hospital with respect to subjective symptoms and objective findings. The progress of the mass was observed and the vital signs were recorded regularly to monitor the response to conservative management. Decrement of abdominal pain, improvement in appetite and decrement in the size of the RLQ mass were evidence of good response which warranted continuation of the conservative management until the mass had disappeared or was reduced to a small nontender lump. Patients were discharged with oral antibiotics (amoxacillin and metronidazole) to make the total antibiotic course of 10-14 days and with advice to return in 8-12 weeks for interval appendicectomy.

Failure of conservative management was entertained when a patient, during follow-up, developed fever, tachycardia, increment in the size and tenderness of the RLQ mass and when repeat WBC count showed raised leucocytosis or ultrasound study confirmed appendiceal abscess. Such patients were subjected for surgery.

Medical records of patients with simple inflammatory appendiceal mass who were conservatively managed between March 2007 and February 2014 were retrospectively reviewed. Variables were extracted on a structured questionnaire and data were analysed for age, sex, presenting symptoms and symptom duration, clinical signs, duration of intravenous antibiotics, length of hospital stay and outcome using SPSS version 20.0 statistical window package. Association tests were carried out as necessary and p values less than 0.05 were considered statistically significant.

## RESULTS

A total of 182 patients were diagnosed to have appendiceal mass during the study period. Out of these, 107 were cases of appendiceal abscess and all were treated surgically. Seventy-five of the patients were found to have simple inflammatory appendiceal mass (phlegmon). Of these, immediate appendicectomy had been done for 2 patients for acute appendicitis, and hence excluded from the study. Fifty patients were males and 23 patients were females, indicating a male-to-female ratio of 2.2:1. The mean age was 29.6±6.3 years (range 12-68 years). The incidence of simple appendiceal phlegmon was significantly higher in males than in females ($p<0.005$). The maximum incidence was in the 3rd decade of life. Table 1 shows the age and sex distribution.

Table 1: Demographic characteristics in 73 patients with simple Appendiceal Inflammatory Mass, ZMH, March 2007-February 2014

| Age in Years | Male | Female | Total (%) |
|---|---|---|---|
| 11-20 | 6 | 3 | 9 (12.3) |
| 21-30 | 24 | 11 | 35 (47.9) |
| 31-40 | 12 | 4 | 16 (21.9) |
| 41-50 | 4 | 3 | 7 (9.6) |
| 51-60 | 2 | 1 | 3 (4.1) |
| 61-70 | 2 | 1 | 3 (4.1) |
| Total (%) | 50 (68.5) | 23 (31.5) | 73 (100) |

Table 2 shows the frequency distribution of duration of illness at presentation. The mean duration of presentation was 6.6±1.2 days (range 1-12 days). Forty-one (55.8%) of the patients presented one week or more after the onset of their illness. Twenty-five (34.2%) of the patients came 4-6 days after the onset of their illness, and seven (10%) of patients presented within the first three days of their illness. Two of the latter presented within one day. Clinical presentation of the patients is depicted in Table 3. Abdominal pain, RLQ direct and rebound tenderness were observed in all patients. Anorexia was found in 90.4% of the patients and RLQ mass was detected in 84.9% of the patients. The diagnosis of appendiceal mass was made during surgery for 13 patients; two of these underwent immediate appendicectomy, and for 11 patients the masses were left untouched for conservative management. Appendiceal mass was diagnosed before surgery in 84.9% of the patients ($p<0.0001$).

Table 2:Frequency Distribution of Duration of Illness at Presentation in 73 patients with simple appendiceal inflammatory mass, ZMH, March 2007-February 2014

| Duration of illness at presentation in days | Number (%) |
|---|---|
| 1-3 | 7 (10.0) |
| 4-6 | 25 (34.2) |
| 7-9 | 31 (42.1) |
| 10-12 | 10 (13.7) |
| Total | 73 (100) |

Table 3: Clinical Presentation in 73 patients with simple appendiceal inflammatory mass, ZMH, March 2007-February 2014

| Clinical Presentation | Number (%) |
|---|---|
| SYMPTOMS | |
| Abdominal pain | 73 (100) |
| Anorexia | 66 (90.4) |
| Vomiting | 55 (75.3) |
| Fever | 52 (71.2) |
| SIGNS | |
| RLQ tenderness | 73 (100) |
| Rebound tenderness | 73 (100) |
| RLQ mass | 62 (84.9) |

Seventy- three of the patients were started on conservative treatment of whom 65 patients (89%) responded to the treatment ($p<0.0001$). These patients were discharged after a mean hospital stay of 6.5±1.5 days (range 3-12 days). The mean duration of intravenous (IV) antibiotics administration (IV ceftriaxone and metronidazole) was 6.5±1.5 days (range 3-12 days). For 8 patients (11%) the conservative management failed and they developed an appendiceal abscess. Abscess drainage was done in 6; abscess drainage with appendicectomy was done in 2 patients and these experienced uneventful postoperative courses. Interval appendicectomy was done for 58 patients 8-16 weeks after successful conservative management.

The mean hospital stay after interval appendicectomy was 3.5±0.5 days with a range of 2-5 days. No difficulty in localising the appendices was documented nor was there a record of difficult adhesiolysis or significant bleeding. One patient (1.7%) had a surgical wound infection. No gross appendiceal pathology was reported in post interval appendicectomy specimens other than macroscopic changes consistent with previous periappendiceal inflammation. Thirteen patients were lost to follow up. There were no deaths.

## DISCUSSION

Appendiceal mass develops in 2-6% of cases following acute appendicitis (1,5). The male to female ratio of 2.2:1 in our study is comparable to the studies by Bahram (2), Okafor et al (13) and Shinholimath et al (26). Malik et al (6) and Partecke et al (28) observed a male

to female ratio of 1.8:1 and 1.5:1, respectively. Skoubo -Kristensen et al (10), however, reported a slight female predominance with a male to female ratio of 1:1.2. The mean age in this study was 29.6±6.3 years and this was similar to that of 24±8.8 years by Bahram (2), 25.1±8.4 years by Malik et al (6), and 27 years by Okafor et al (13). Tekin et al (29) and Lai et al (30) reported a mean age of 46.4 years and 53.6 years, respectively. The maximum incidence in this series was in the 3rd decade and this was shown to be in the 2nd decade (10) and 5th decade (13) in other studies.

The majority of our patients presented one week or more after their illness began; similar results were reported by Skoubo-Kristensen et al (10) and Okafor et al (13). The mean duration of symptom presentation was 6.6±1.2 days in this study and duration was 7.8±2.7 days in a study by Erdogan et al (20). Duration of illness ranged from 1 to 12 days in our series compared to 4-10 days in the study by Shinholimath et al (26). In our study, a small percentage of patients (10%) presented with a history of symptoms within 3 days. While the Skoubo-Kristensen et al study observed nearly a third of patients presenting within three days of symptoms (10), our findings are compatible with most studies suggesting that generally patients who present with appendiceal mass experience symptoms for a longer duration, usually at least 5-7 days (1). However, in this and the study of Skoubo-Kristensen (10) it is clear some patients do present within even 24h of symptom onset suggesting that mass formation in some cases develops promptly with symptomatic appendiceal inflammation.

Conservative management was successful in 89% of our patients and comparable results were observed by McPherson et al (4), Skoubo-Kristensen et al (10), Vargas et al (19) and Thomas (31). Failure to respond to conservative management was observed in 11% of the patients who needed delayed operation and a comparable result was reported by Skoubo-Kristensen et al (10) and Erdogan et al (20).

The mean hospital stay in our conservatively managed patients was 6.5±1.5 days. One advantage generally accepted with early operative treatment is a relatively shorter hospital stay. However, not all authors favouring early operative management substantiated this in their studies. Bahram (2), Samuel et al (25) and Shinholimath et al (26) showed a mean hospital stay of 3±0.25 days, 4.8±0.4 days and 6 days, respectively, in surgically treated patients. Conversely, Jordan et al (7) and Bradley et al (27) reported an average hospital stay of 16 days and 17 days for primary operative treatment. respectively. There was no significant difference in the mean hospital stay between conservatively managed patients (8.9±2.6 days) and surgically treated patients (8.7±3.2 days) in the study by Erdogan et al (20).

One disadvantage mentioned against the initial conservative management was refusal of a large number of patients for readmission for operation once their acute illness resolved (2,6,9,32). However, 81.7% of our patients were readmitted for interval appendicectomy and were discharged after an average hospital stay of 3.9±0.5 days. The majority of patients were also readmitted for elective appendicectomy in the studies of Malik et al (6), Skoubo-Kristensen et al (10), Erdogan et al (20), Okune et al (24) and Samuel et al (25).

Another disadvantage mentioned against the conservative approach is the chance of misdiagnosis and inappropriate initial treatment of conditions such as intussusception and carcinoma of the caecum (9,32). Okune et al detected one case of mucinous adenocarcinoma of the appendix and another case of appendiceal carcinoid tumour at interval appendicectomy (24). In our setting, the appendiceal specimens were not generally forwarded for histopathological study unless there was gross pathologic findings; hence, in this series no gross appendiceal pathology was reported other than macroscopic changes consistent with previous periappendiceal inflammation. Primary operation may be beneficial in exclusion of pathologies other than appendiceal mass. However, meticulous clinical evaluation, imaging modalities, response of the patients to conservative management with strict follow-up may also be beneficial to exclude other pathologies.

One of the advantages of conservative management followed by interval appendicectomy over immediate appendicectomy is the low rate of complications. In this study complication was observed in only 1.7% of our patients after interval appendicectomy. Various reports on immediate operative management suggest a high rate of complications (6,7,27). Malik et al showed higher rates of wound sepsis, residual abscess and wound dehiscence in patients for whom immediate appendicectomy was done than in the group with the conservative approach (6). Erdogan et al showed a complication rate of 26% in the group of patients who were operated on immediately (20). The wound infection rate was higher (27.3%) in the group of patients who were treated by early surgical interference as reported in the study by Okune et al (24). Jordan et al (7), and De et al (15) showed wound infection rates of 35.7% and 17%, respectively, in patients who underwent immediate surgery. Samuel et al in their comparative study showed wound infection rates of 11.8% and 0% in the immediate and interval appendicectomy groups, respectively (25).

The benefit of interval appendicectomy has been questioned in several recent studies. The argument is that therapeutic gain, such as avoidance of recurrences, and identification of malignant or potentially malignant lesions, is minimal. However, there is a wide variation in the rate of recurrent appendicitis after an attack of appendiceal mass (29-34). Tekin et al prospectively followed 94 patients for 3 years after they were conser-

vatively managed for appendiceal mass. The mean reported incidence of recurrent appendicitis was 14.6% and the authors concluded that routine appendicectomy after initial successful non-operative management is not justified (29). Lai et al, in a retrospective review of 165 patients who were managed conservatively for appendiceal mass, showed a recurrence rate for acute appendicitis of 25.5%, with the risk of recurrence being highest during the first 6 months. In 3.0% of their patients the histological specimen revealed colon cancer. Interval appendicectomy was not recommended (30). Kaminiski et al, in a large retrospective cohort study involving 1012 patients who presented with appendiceal mass and underwent initial successful conservative management, reported a recurrence rate of 5% for acute appendicitis after a mean follow up of 4 years and the authors concluded that routine interval appendicectomy was not justified (33).

Willemsem et al, based on their retrospective review of 233 appendicectomies done after successful initial conservative management of appendiceal mass, reported a recurrence rate for acute appendicitis of 2% and a complication rate due to interval appendicectomy of 18%, and they suggested that routine interval appendicectomy was unnecessary (34). On the other hand, numerous other authors, have argued for interval appendicectomy after initial successful conservative management claiming that it would help avoid risk of recurrent acute appendicitis, establish a definitive diagnosis, rule out an underlying malignancy, and was further justified by the low complication rate (10,18,35,36). Yamini et al have reported that interval appendicectomy is safe with a complication rate of 10% and with mean length of hospital stay of 1.4 days (37).

In our series, the rate of complications was low. No gross appendiceal pathology was reported in post interval appendicectomy specimens other than macroscopic changes consistent with previous periappendiceal inflammation. In our hospital setting patients usually present late after the onset of their illness and hence when acute appendicitis recurs there could be a chance that patients would come even later with complications. Moreover, diagnostic facilities such as colonoscopy and barium enema are not readily available to investigate further etiologies after the initial successful conservative management. As a result interval appendicectomy is beneficial for it would prevent the ill effect of late presentation and help establish a definitive diagnosis.

It is clear that a true controversy exists as to the best approach towards the management of appendiceal mass. This study showed the effectiveness of conservative management in the treatment of patients with appendiceal mass and the results are consistent with a number of studies (4,10,14,20,31). While operative problems such as localisation of the appendix, adhesiolysis and bleeding were considered to be more pronounced and troublesome with interval appendicectomy in a study by Malik et al (6), these were not supported in our study.

In conclusion, appendiceal mass was more prevalent in the 3rd decade of life, more males are affected than females, and most cases can be diagnosed with clinical examination and ultrasound studies, although a few needed surgical exploration for diagnosis. Initial non-operative management of appendiceal mass is successful in most cases and the complication rate after interval appendicectomy seems lower than with early operative treatment.

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