ORIGINAL ARTICLE

PROSPECTIVE EVALUATION OF THE NECESSITY OF INTERVAL APPENDECTOMY AFTER RESOLUTION OF APPENDICEAL MASS

Tamer Youssef,[1] Adel Badrawy[2]

[1] Surgery Department, [2] Diagnostic and interventional radiology Department, Faculty of Medicine, Mansoura University, Egypt

Correspondence to: Tamer Youssef, Email: tamyousif@yahoo.com

Abstract

Aim: The aim of this prospective nonrandomized study was to assess the necessity of interval appendectomy (IA) after successful conservative treatment of appendiceal mass.

Methods: A total of 69 patients with appendiceal mass (phlegmon or abscess) who received conservative treatment were included prospectively in the study. Failure of resolution occurred in 3 patients. The remaining patients (n =66) were followed up at the outpatient clinic and were nonrandomly assigned into 2 groups according to the treatment modality selected by patients.

Results: Four patients were lost to follow and one patient revealed cancer colon on colonic evaluation. Group I included 10 (16.4%) patients who underwent IA before a recurrence of appendicitis. Group II included 51 (83.6%) patients who underwent follow up without IA for 2 years. The rate of recurrent appendicitis was 17.6% (9/51). Of these recurrences, 7 (77.8%) occurred in the first 6 months.

Conclusion: IA may be considered in selected patients after resolution of appendiceal mass. Otherwise, asymptomatic patients can be followed up without IA until appendicitis recurs since the recurrence rate is low and most of the recurrences occur with the first 3 to 6 months; therefore, many of the early recurrences may not be prevented by IA.

Keywords: appendicitis, appendiceal mass, interval appendectomy, recurrent appendicitis.

INTRODUCTION

An appendiceal mass results from appendicitis that is localized by edematous, adherent omentum and loops of small bowel.(1) Pathologically, it may present in a spectrum of severity, ranging from phlegmon to abscess caused by a walled-off appendiceal perforation.(2,3) Conservative treatment of appendicitis presenting with appendiceal phlegmon or abscess has been shown to be safe and effective since McPherson and Kinmonth in 1945 presented good results and a low complication rate with such management.(4) Emergency appendectomy in these situations is technically more difficult leading to injury of adjacent loops of small bowel. A right hemicolectomy or ileocecal resection is often the result.(5)

Controversy exists regarding the necessity for an interval appendectomy (IA) following successful initial nonoperative management of appendiceal mass. Advocates of IA propose that since there is a perceived

risk of recurrent appendicitis,[6-8] appendectomy seems the only way to definitely solve the problem. Appendectomy can also provide a definitive diagnosis and may sometimes reveal an unexpected malignancy.[9] Others have opposed this policy as the reported incidence of recurrent appendicitis is between 5% and 25.5% [4,10-12] and the complication rate of IA was not low (9-19%).[6,11,12]

Traditionally, IA has been recommended routinely to patients with appendiceal mass that are successfully treated nonoperatively at our institution. However most of these patients were refusing to undergo IA after hospital discharge and prefer to wait until a recurrence occurs. The aim of this prospective nonrandomized study was to assess the necessity of IA after successful conservative treatment of appendiceal mass.

PATIENTS AND METHODS

Among the patients admitted with a diagnosis of acute appendicitis between October 2005 and March 2008 at Emergency Mansoura University Hospital, 69 patients were not operated upon immediately owing to the presence of an appendiceal mass and they received conservative treatment initially.

The diagnosis of appendiceal mass (phlegmon or abscess) was based on clinical findings of right lower abdominal pain for more than 3 days, fever, a right lower abdominal tenderness and mass (if present) and leukocytosis. The diagnosis was confirmed by abdominal ultrasound (US) or computed tomography (CT). Conservative treatment included intravenous fluid hydration, empiric antibiotic therapy, and nothing per mouth. US- guided drainage was performed if large amount of pus was present initially or symptoms of fever or abdominal pain failed to diminish after 3 days of conservative treatment with the abscess still present. Surgical drainage without appendectomy was performed if a multifocal abscess was demonstrated on US or CT. Resolution was defined if regression of the mass occurred clinically and by US or CT, the patients were clinically well (no abdominal pain with the fever subsided) with a low leukocyte count and good oral intake resumed. Failure of resolution inspite of antibiotic therapy with or without abscess drainage occurred in 3 patients.

The remaining 66 patients in whom conservative treatment (with or without abscess drainage) was successful were followed up at the outpatient clinic of Mansoura University Hospital. Colonic evaluation (colonoscopy, barium enema, or small bowel series) was carried out in patients with a history suspicious for another diagnosis or those with risk for cancer which includes patients older than 50 years, with unexpected anaemia, family history of colon and rectal cancer, weight loss or diarrhoea.[13] Patients were nonrandomly assigned into 2 groups according to the treatment modality during follow up. The treatment modality was selected by the patients after careful explanation of the clinical condition and the options of treatment and informed consent was obtained from all patients in the 2 groups. Group I included patients who underwent IA (appendectomy before a recurrence). IA was suggested 6 to 12 weeks after hospital discharge. Group II included patients who underwent follow up without IA. Follow up was scheduled monthly for the first 3 months and then every 6 months for a rest of 2 years. If the patient developed signs suggestive of recurrent appendicitis during this period, CT was repeated and appendectomy was performed if the diagnosis was confirmed.

The results are expressed as mean values with standard deviation. Fischer Exact test was used to compare groups. P-values < 0.05 were considered statistically significant.

RESULTS

The mean age of the patients included in the study was 31.75±9.29 years (range 16 to 58 years), 43 (62.3%) were males and 26 (37.7%) were females. The body temperature on admission was 37.71±0.92oC and the white blood cell count was 14.123±3568 / mm3.

Out of the 69 patients, appendiceal abscess was diagnosed in 14 (20.3%) patients; 8 on admission, and 6 after failure of improvement inspite of 3 days of conservative treatment of appendiceal mass. US-guided drainage was performed in 10 patients and surgical drainage (without appendectomy) in one patient while the remaining 3 patients received conservative treatment without drainage. Failure of resolution inspite of antibiotic therapy with or without abscess drainage occurred in 3 patients. Surgical exploration was needed in 2 of these patients; one patient underwent appendectomy and drainage and the other underwent right hemicolectomy because of difficulty in carrying out appendectomy. Postoperative pathological examination in the latter patient revealed Crohn's disease. The remaining patient had persistence right iliac fossa mass inspite of resolution of the acute stage. Colonoscopy and biopsy was done which revealed cecal carcinoma, subsequently the patient underwent right hemicolectomy.

Among the 66 patients in whom conservative treatment (with or without abscess drainage) was successful, 4 (6.1%) patients were lost to follow up and 1 (1.5%) patient revealed carcinoma of the ascending colon on colonic evaluation. The remaining 61 patients were nonrandomly divided into 2 groups. Group I included 10 (16.4%) patients who underwent IA before a recurrence of appendicitis. IA was performed during a mean of 94±45.02 days (range 40 to 186 days) after hospital discharge. Postoperative complications occurred in one (10%) patient (postoperative ileus). A fecolith was also identified during IA in one (1 / 10, 10%) patient. Group II included 51 (83.6%) patients who underwent follow up without IA and completed the follow up schedule.

Table 1. Patient distribution (n =69).

Variable		Number of patients (%)
Conservative		59/69 (75.5%)
Conservative + drainage		11/69 (15.9%)
Failed conservative	Appendectomy + drainage	1/69 (1.4%)
	Right hemicolectomy	2/69 (2.9%)
Lost to follow up		4/66 (6.1%)
Diagnosis changed during follow up		1/66 (1.5%)
Group I (IA)		10/61 (16.4%)
Group II (follow up without IA)		51/61 (83.6%)
Recurrence of appendicitis		9/51, (17.6%)
Appendectomy for recurrent appendicitis		8/51 (15.7%)
Conservative treatment for recurrent appendiceal mass		1/51 (1.9%)

During follow up, 9 (9/51, 17.6%) patients were readmitted to the hospital with recurrent acute appendicitis without mass in eight patients and recurrent appendiceal mass in one patient. The eight patients with recurrent appendicitis underwent appendectomy and the patient with the recurrent appendiceal mass was again treated nonoperatively. The mass resolved completely, however this patient refused to undergo IA after hospital discharge and he was recurrence-free for the rest of the follow up schedule Table 1. Postoperative complications occurred in one (12.5%) patient (wound infection). The remaining 42 (82.4%) patients were recurrence-free throughout the follow up period.

Five (55.6%) patients among the 9 patients who suffered recurrent appendicitis and 5 (11.9%) patients among the 42 patients who were recurrence-free reported recurrent intermittent lower quadrant abdominal pain ($P < 0.05$). Similarly four (4/9, 44.4%) and 2 (2/42, 4.8%) patients were found to have a fecolith among the patients who suffered recurrent appendicitis and the patients who were recurrence-free respectively ($P < 0.001$). A fecolith was diagnosed on CT (Figs. 1a,b) at initial admission in 3 patients and it was identified during appendectomy in the other 3 patients.

The rate of recurrent appendicitis was 17.6% (9/51). Of these recurrences, 7 (77.8%) occurred in the first 6 months (Fig. 2). Four (4/9, 44.4%) of recurrences occurred before 6 weeks, two (2/9, 22.2%) occurred between 6 and 12 weeks, and three (3/9, 33.3%) occurred after 12 weeks.

1a

1b

Fig 1. A: Non-contrast CT abdomen showing fecolith surrounded by soft tissue mass (appendiceal mass). B: Post contrast (oral and intravenous) CT abdomen showing mild enhancement with no liquefaction of the appendiceal mass.

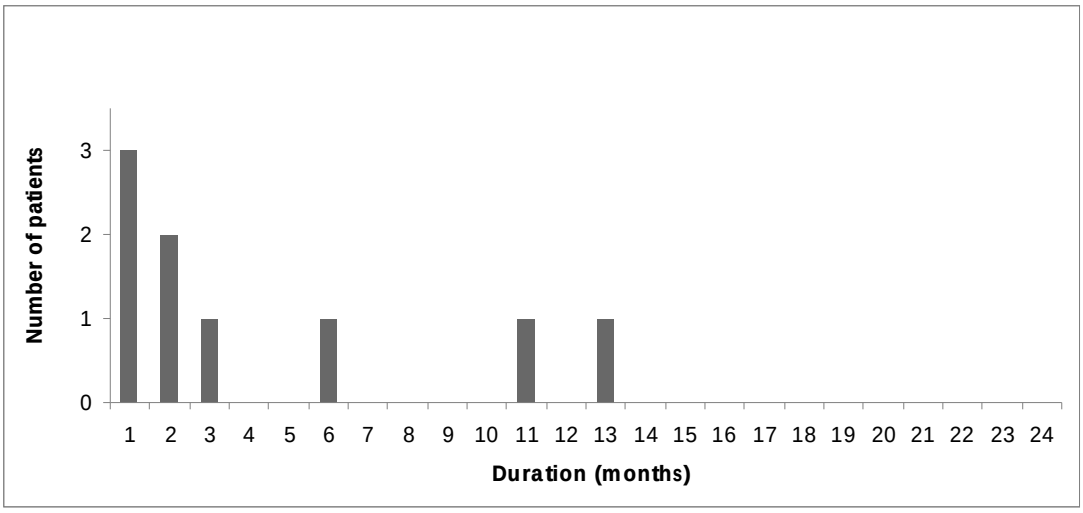

Fig 2. Recurrent appendicitis after resolution of appendiceal mass (phlegmon or abscess).

DISCUSSION

Appendicitis is one of the most common surgical problems in the population as a whole. It is estimated that an individual has an approximately 7% lifetime risk of developing appendicitis.[14] About 2-6% of appendicitis presents as a palpable mass (either a phlegmon or an abscess) over the right lower quadrant of the abdomen.[15-17] The success rate of conservative treatment for an appendiceal mass ranges from 76% to 97%.[4,6,8,10] Abscesses can also be treated conservatively with only 58% needing US-guided drainage and 6% needing surgical drainage.[18] The present study supports conservative treatment for appendiceal mass (phlegmon or abscess) as conservative treatment with or without abscess drainage was successful in 66 (66/69, 96.7%) patients.

The question of whether routine IA is indicated after initial nonoperative management of appendiceal mass has been a subject of debate in the medical literature.[4,9,11,17,19] The recurrence rate of acute appendicitis after conservative treatment of an appendiceal mass has been reported to be between 5% and 25.5%.[4,10-12] with most of the recurrences occur within the first 3 to 6 months.[6,10] In the present study recurrence rate was 17.6%, of which 44.4% occurred before 6 weeks, 22.2% occurred between 6 and 12 weeks, and the remaining 33.3% occurred after 12 weeks. Thus an IA performed 6 weeks after discharge would have prevented only 10.6% (5/47) of recurrences and less than 6.7% (3/45) of recurrences if performed after 12 weeks leaving 89.4% and 93.3% of patients respectively that would have had an unnecessary appendectomy. The risk of recurrent acute appendicitis was very low (1.9%) one year after the initial episode. This figure was very disappointing at our institution where IA is recommended to all patients after successful nonoperative treatment of appendiceal mass. However, given the results of the present study, it is difficult to defend IA. The prospective results of the present study are supported by other retrospective studied suggesting that routine IA could be safely omitted in 80% to 93.3% of patients.[4,5,10] Although studies reporting histopathological data show evidence of inflammation in about half of IA specimens, this does not correlate with the low risk of recurrent appendicitis detected clinically.[8,9] Even though, some of the patients may suffer from recurrent appendicitis, they usually exhibited a milder clinical course at recurrence.[6,12,13,15]

Arguments for performing routine IA include avoiding delay of diagnosis if the initial diagnosis is incorrect (e.g. cecal carcinoma, inflammatory bowel disease). The incidence of other diseases labelled initially as an appendiceal mass is reported to be up to 12%.[10,20] In the present study, three (4.3%) out of the 69 patients diagnosed initially as having appendiceal mass had incorrect diagnosis either after surgery or survey. One patient was diagnosed after surgical exploration for failed conservative treatment as having Crohn's disease. In a previous study, it was reported that patients failing initial nonoperative treatment of presumed appendiceal mass were more likely to have an etiology of their symptoms other than appendicitis.[21] The other 2 patients revealed cancer colon; one patient had persistent mass in the right iliac fossa after the acute clinical state returned to normal limits, colonoscopy and biopsy was done which revealed cecal carcinoma and the other patient was diagnosed during colonic evaluation performed for patients with risk for cancer. Colonic evaluation (colonoscopy, barium enema, or small bowel series) was not routinely performed for all patients during the present study. It was used in selected patients with a history suspicious for another diagnosis or those with risk for cancer. So if patients at high risk for malignancy are routinely subjected to colonic evaluation to assess presence of carcinoma and inflammatory bowel disease, the benefit obtained from IA would be the elimination of the risk of recurrent appendicitis.

Nitecki et al.[2] reported that complicated appendicitis is more likely to involve a fecolith and that appendectomy is recommended on finding a fecolith incidentally. Patients with a fecolith in the appendix are more likely to benefit from IA as this becomes a nidus for future infection.[22] In our study a fecolith was identified in 4 (44.4%) of the 9 patients who suffered recurrent appendicitis and only in 2 (4.8%) of the 42 patients who were recurrence-free ($P < 0.001$). Similarly 5 patients (55.6% vs 11.9%, $P < 0.05$) in both groups respectively reported recurrent intermittent lower quadrant abdominal pain. Recurrent intermittent lower quadrant abdominal pain may be a stigma that appendicitis will recur.

The morbidity for IA ranges from 3.4% to 19%.[6,7,15,16,19] In the present study, complications occurred in one (10%) patient after IA and in one (12.5%) patient after appendectomy performed for recurrent appendicitis (P =NS). Based on complication rate, there was no benefit of appendectomy performed before the recurrence of appendicitis (IA) compared with appendectomy performed after recurrence.

Up to date, there is no consensus about the necessity of IA following resolution of appendiceal phlegmon or abscess. Based on the findings of the present study and the literature, IA may be considered in selected patients after resolution of appendiceal mass; patients with a fecolith in the appendix on imaging, patients exhibiting recurrent intermittent lower quadrant abdominal pain, and according to patients' wishes and desire. Asymptomatic patients can be followed up without IA until appendicitis recurs since the recurrence rate is low, most of the recurrences occur with the first 3 to 6 months; therefore, many of the early recurrences may not be prevented by IA and patients usually exhibit milder clinical course at recurrence. Additional diagnostic testing (e.g. colonoscopy, contrast enema, or small bowel series) in patients with risk for cancer being observed should be considered.

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