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Long-term Outcome of Non-operative Management of Appendiceal Mass

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Abstract

Objective: **The objective of this study was to study long-term outcome of non-operative management in patients with appendiceal mass.**

Material and Methods: **Medical records of patients with appendiceal mass admitted to King Chulalongkorn Memorial Hospital (KCMH) during 1998-2007 were reviewed. Masses were confirmed by ultrasonography or CT scan. Data including complications and time-interval of recurrent appendicitis were obtained.**

Results: **Of 35 patients, 17 underwent non-operative management and 18 underwent interval appendectomy at the mean duration of 3 (1-10) months. Mean follow-up time was 40 (1-112) months. Of 17 patients with non-operative management, 4 (23.5%) had recurrent appendicitis within 6 months and underwent appendectomy. Two of these 4 patients had postoperative complications including gut obstruction and re-appendectomy. Appendicitis could not be demonstrated by pathological examination in 8 out of 18 with interval appendectomy (44%). Five of 18 patients (27%) had postoperative complications including wound infections and intraabdominal collection.**

Conclusions: **Non-operative management of appendiceal mass can be safely performed. Appendectomy should be reserved only when recurrent symptom occurred. Further investigation with larger population should be obtained.**

Introduction

About 2-6% of appendicitis present as a palpable mass over the right lower quadrant of the abdomen.[1] Appendiceal mass is an inflammatory tumor consisting of an inflamed appendix, its adjacent viscera, and the greater omentum. This mass may or may not contain pus (abscess versus phlegmon). If the amount of pus is large, with a thin walling-off process, it is usually called an appendiceal abscess.[2] Natural history is either gradual with complete resolution of the mass or steadily progressing toward appendiceal abscess formation. The primary treatment of an appendiceal mass or abscess may be either non-operative or surgical drainage plus appendectomy if possible. Whatever method is preferred, the question of interval appendectomy becomes pertinent in most cases. Recent reports on operative management suggested high rate of complications.[3] Nowadays the preferred approach appears to have changed to an initially conservative non-operative treatment, consisting of antibiotics, bed rest and fluids only. Oral food intake is restarted and extended when pain

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and size of palpable mass decrease. An elective appendectomy is performed approximately 6 weeks after the acute episode. In recent years, more evidence is presented in the literature that this interval appendectomy can be omitted.[4] We found that there was a significant number of resected appendices at interval appendectomy in which no signs of previous inflammation could be found. The purpose of our study was to determine the long-term outcome of non-operative and operative management of appendiceal mass.

Patients and Methods

We retrospectively reviewed medical records of 42 patients admitted to King Chulalongkorn Memorial Hospital with the diagnosis of appendiceal mass between January 1998 and January 2007. Seventeen patients underwent non-operative management and 18 patients underwent interval appendectomy. We excluded patients without the diagnosis of appendiceal mass at first admission that underwent emergency operation and patients who were not confirmed with ultrasound or CT-scan before the operation. A total of 7 patients were excluded (2 patients with cecal perforation, 2 patients with tubo-ovarian abscess and 3 patients not confirmed by imaging before operation). Patients with the diagnosis of appendicitis with tumor formation treated conservatively at first admission were included. These patients were treated with intravenous fluid hydration, empiric antibiotics, and nothing per os. Oral intake was resumed when their condition improved. Masses were confirmed by ultrasound or computed-tomography (CT) scan. Patients were discharged after abdominal pain resolved, fever subsided, and good oral intake was resumed.

Statistical analysis

All medical records of these patients were reviewed and relevant variables were registered on a precoded form and entered in a computer database (Microsoft Excel). Parameter included sex, age, complications, mean follow-up time, factor for operation, pathological report of resected appendix, etc. Non parametric comparisons between groups were made using Man-Whittney U test. The chi-squared test was used for categorical data. Probability values of <0.05 were considered statistically significant. The analysis was carried out using Graphpad prism version 4.0.

Results

Of 35 patients, 17 underwent non-operative management and 18 underwent interval appendectomy at the mean time-interval of 3 (1-10) months. The age of patients ranged from 16 to 70 years (average 37 years). The median age in operative group was 43.5 years and in non-operative group was 32 years ($P = 0.133$). Only 1 patient (2.86%), over 60 years of age, presented in operative group. In operative group, there were 8 males and 10 females while in non-operative group, there were 4 males and 13 females ($P = 0.19$). The data showed that there were no significant demographic differences between the two groups. Mean follow-up for non-operative group was 40 (1-112) months and hospital stay during conservative treatment ranged from 3 to 14 days.

Of 17 patients in non-operative conservative treatment group, 4 patients (23.5%) developed abdominal pain with recurrent appendicitis within 6 months and underwent appendectomy. Two of these 4 patients (50%) developed complications (1 had small bowel obstruction, 1 had missed appendectomy and re-appendectomy had to be performed). Thirteen out of 17 patients (76.5%) recovered from conservative treatment. No complications were detected in the follow-up period. The longest follow-up time in our study was 112 months.

In 18 patients who underwent interval appendectomy, there were no evidences of recurrent abdominal pain. Five of 18 patients (27.8%) developed complications after surgery which included wound infection in 4 patients, and intra-abdominal collection in 1 patient. Complication rate in operative group was 27.8% compared with 11.8% in non-operative group ($P = 0.18$). The duration of hospital stay in surgical group, which ranged from 3 to 18 days, included the duration for initial conservative treatment and for interval appendectomy. The longest stay was due to postoperative wound infection and daily wound care. No deaths were recorded among 35 patients. Median duration of hospital stay in conser-vative group was 6 days while in operative group was 10.5 days ($P = 0.0009$).

In microscopic pathological examination, appendicitis could not be demonstrated by pathological examination in 8 out of 18 (44%). They were classified as "lymphoid hyperplasia". Others were classified as

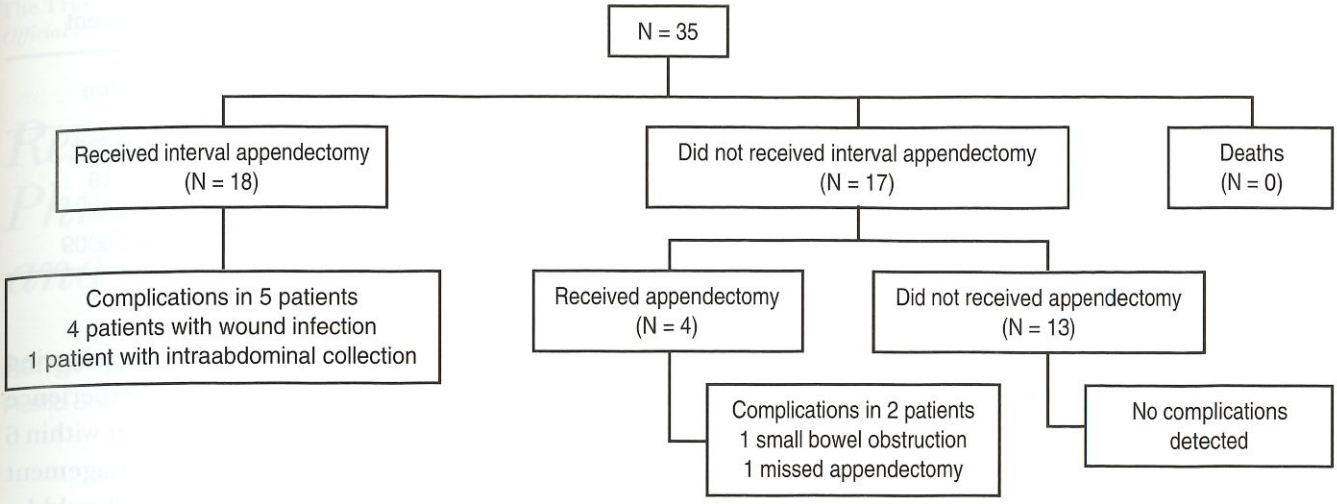

Figure 1 Patient distribution

"chronic appendicitis". Of 4 patients who underwent conservative treatment and developed recurrent appendicitis, pathological examination of the removed appendices in 2 patients were classified as lymphoid hyperplasia and both of them developed complications after surgery.

Discussion

Tumor formation after appendicitis (appendiceal mass) is the end results of a walled-off appendiceal perforation. Pathologically, it may represent a spectrum ranging from phlegmon to abscess. The former is an inflammatory tumor consisting of the inflamed appendix, its adjacent viscera, and the greater omentum. The latter is a pus-containing appendiceal mass.

Ultrasound or CT scan is useful in diagnosing a space-occupying mass or an abscess in right lower quadrant of the abdomen.[5] In 1987 Bagi et al.[6] were the first to verify the diagnosis and nature of an appendiceal mass by ultrasound.

During the last century, the treatment of an appendiceal mass has changed several times. Early in the 20th century, it was considered good practice to hospitalize and keep the patient in bed until the mass had resolved spontaneously. In the 1990s, the treatment of an appendiceal mass is described as follows: "Initial treatment of an appendiceal mass is non-operative with antibiotics, bowel rest, IV hydration and early ultrasound or CT scan to visualize the mass. With this treatment, symptoms resolve in 7-14 days and interval appendectomy is only done in symptomatic patients, if there is a peculiar anatomy predisposing to appendicitis or if there is a persisting mass effect".

In our study, 76.5% of patients did well on conservative treatment which is in accordance with other studies. Similar success rate has been reported in children.[7] No mortality was detected in our study. We consider reporting to operation after starting conservative treatment to be a complication, which amounted to 23% in our study. Most recurrences occurred within 6 months. Fifty percent of patients developed complications such as small bowel obstruction and missed appendectomy. Complication rate of interval appendectomy in our study was 27.8%. This was not low enough to suggest the use of interval appendectomy routinely but not high enough to overlook the benefit of interval appendectomy. Complication rates between operative and non-operative group was not comparatively different and the duration of hospital stay in the non-operative group is significantly less than in the operative group. From this study, routine interval appendectomy offers no more benefit than conservative group. Dixon et al.[8] in 2003 reviewed the characteristics of 32 patients who had recurrence of symptoms following conservative management. Mean time interval to recurrence was 5 months following initial episode. They demonstrated that when recurrence of appendicitis occurred, this followed a milder clinical course. The recurrences were treated successfully with both operative and non-operative approaches and were not associated with any significant

Table 1 Summarized data of patients with appendiceal mass treated with conservative and surgical management

Parameters	Operative group (N = 18)	Non-operative group (N = 17)	P-value
Age (yrs) (median)	43.5 (IQR = 16-53)	32 (23.5-39)	P = 0.133
Gender (Male/Female)	8/10	4/13	P = 0.19
Complication rates	27.8%	11.8%	P = 0.18
Duration of hospital stay days (median)	10.5	6	P = 0.0009

mortality or morbidity. They concluded that the risk of recurrent acute appendicitis following successful conservative management is low between 5% and 14% which is amenable to our study.

We collected pathological report of resected specimens and found that in patients who underwent interval appendectomy after conservative treatment, appendicites could not be demonstrated by pathological examination in 8 out of 18 (44%) and 5 of 18 patients (27%) developed postoperative complications including wound infections and intraabdominal collection. We suggest that interval appendectomy is not justified in patients with appendiceal mass due to significant morbidity and in half of patients who underwent interval appendectomy, appendicites could not be demonstrated. However, the number of patients in this study was too small, further investigation with larger number of patients should be carried out.

It is difficult to define the role of interval appendectomy after conservative treatment of an appendiceal mass. A recent survey conducted with consultants and specialist registrars in general surgery in England showed that physicians had differences of opinion on the management of an appendiceal mass in different scenarios.[9,10] Less than 25% of them managed an asymptomatic appendiceal mass without interval appendectomy. It seems that specialist registrars were more likely not to offer patients interval appendectomy after conservative treatment. Based on this study and others, interval appendectomy did benefit a substantial group of patients but was not routinely necessary or cost-effective.[11]

Conclusions

Initial conservative management is successful in the vast majority of patients presenting with an appendiceal mass and interval appendectomy is unnecessary in the majority of patients. Patients with appendiceal mass whose symptoms resolve following conservative management, 76.5% will not experience a recurrence. Recurrences are likely to occur within 6 months. We suggest that non-operative management can be safely performed. Appendectomy should be reserved only for patients with recurrent symptoms.

REFERENCES

1. Willemsen PJ, Hoorntje LE, Eddes EH, Ploeg RJ. The need for interval appendectomy after resolution of an appendiceal mass questioned. Dig Surg 2002; 19: 216-20.
2. Nitecki S, Assalia A, Schein M. Contemporary management of the appendiceal mass. Br J Surg 1993 Jan; 80(1): 18-20.
3. Tingstedt B, Bexe-Lindskog E, Ekelund M, Andersson R. Management of appendiceal masses. Eur J Surg 2002; 168: 579-82.
4. Lai HW, Loong CC, Chiu JH, Chau GY, Wu CW, Lui WY. Interval appendectomy after conservative treatment of an appendiceal mass. World J Surg 2006; 30: 352-7.
5. Okafor PI, Orakwe JC, Chianakwana GU. Management of appendiceal masses in a peripheral hospital in Nigeria: review of thirty cases. World J Surg 2003; 27: 800-3.
6. Bagi P, Dueholm S. Nonoperative management of the ultrasonically evaluated appendiceal mass. Surgery 1987; 101: 602-5
7. Karaca I, Altintoprak Z, Karkiner A, Temir G, Mir E. The management of appendiceal mass in children: is interval appendectomy necessary? Surg Today 2001; 31: 675-7.
8. Dixin MR, Haukoos JS, Park IU, et al. An assessment of the severity of recurrent appendicitis. Am J Surg 2003; 186: 718-22
9. Corfield L. Interval appendicectomy after appendiceal mass or abscess in adults: what is "best practice"? Surg Today 2007; 37: 1-4. Epub 2007 Jan 1.
10. Ahmed I, Deakin D, Parson SL. Appendix mass: do we know how to treat it? Ann R Coll Surg Engl 2005; 87: 191-5.
11. Lai HW, Loong CC, Wu CW, Lui WY. Watchful waiting versus interval appendectomy for patients who recovered from acute appendicitis with tumor formation: a cost-effectiveness analysis. J Chin Med Assoc 2005; 68: 431-4.