

Factors affecting the effectiveness of conservative management of appendicular mass

Czynniki wpływające na skuteczność zachowawczego leczenia nacieku okołowyrstkowego

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ABSTRACT:

Introduction: Acute appendicitis is the most common surgical emergency in children. Appendicular mass is a relatively common complication in improperly treated patients. The management of appendicular mass remains controversial.

Aim: This study aims at determining factors affecting the effectiveness of conservative management of appendicular mass.

Material and methods: This was a retrospective study of 71 children younger than 15 years with appendicular mass managed at Basra Children's Specialty Hospital during the period between 2015 and 2019. Factors like age of the patient, duration of symptoms prior to hospital admission, size of the mass, complications, hospital stay and outcome are reviewed.

Results: Appendicular mass complicates 3.9% of all cases of acute appendicitis. Conservative management of appendicular mass was effective in 84.5%. Appendicular mass occurred most frequently in children aged 5–10 years (48%). Male is more frequently affected than female with a ratio of 1.4. Regarding age effect on the efficacy of conservative management of appendicular mass, there is a significant association with P -value = 0.017. Duration of symptoms or size of the mass has no significant association with the success of conservative management. No mortality or major surgical complications are encountered. Although effective, conservative management prolongs the length of hospital stay.

Conclusion: Conservative management of appendicular mass in children should be revised particularly in children younger than 5 years old, wherein operative treatment may be the first option. The reasons for that are high rate of failure of conservative management with early progress to appendicular abscess. These could be explained by the underdevelopment of the greater omentum lacking its protective effect in limiting the spread of inflammation. In addition, early appendectomy has the following advantages: decreased risk of adhesive intestinal obstruction, shortening of hospital stay (i.e., less economic burden), and avoidance of second readmission for interval appendectomy.

KEYWORDS:

appendicitis, complications, conservative, mass, pediatric

STRESZCZENIE:

Wstęp: Ostre zapalenie wyrostka robaczkowego jest najczęstszym stanem nagłym jamy brzusznej wymagającym pilnej interwencji chirurgicznej. Naciek okołowyrstkowy to stosunkowo częste powikłanie obserwowane u niewłaściwie leczonych pacjentów. Odpowiednie postępowanie w przypadku jego rozpoznania nadal budzi kontrowersje.

Cel: Celem niniejszego badania jest identyfikacja czynników wpływających na skuteczność zachowawczego leczenia nacieku okołowyrstkowego.

Materiał i metody: Niniejsza praca jest badaniem retrospektywnym, przeprowadzonym na grupie 71 dzieci poniżej 15. roku życia, które były leczone z powodu nacieku okołowyrstkowego w Basra Children's Specialty Hospital w latach 2015–2019. Wśród analizowanych czynników uwzględniono: wiek pacjentów, czas trwania objawów przed przyjęciem do szpitala, rozmiar nacieku okołowyrstkowego, powikłania, pobyt w szpitalu oraz efekty leczenia.

Wyniki: W 3,9% przypadków ostrego zapalenia wyrostka robaczkowego dochodzi do powikłania w postaci nacieku okołowyrstkowego. Jego leczenie zachowawcze okazało się skuteczne w 84,5%. Występowanie nacieku okołowyrstkowego obserwowano najczęściej w grupie wiekowej 5–10 lat (48%). Ponadto stosunek częstości pojawiania się tego powikłania w grupie chłopców w porównaniu do grupy dziewczynk wynosił 1,4. Związek pomiędzy skutecznością leczenia zachowawczego nacieku okołowyrstkowego a wiekiem pacjenta jest istotny statystycznie na poziomie $p = 0,017$. Nie odnotowano istotnego związku między czasem trwania objawów czy rozmiarem nacieku a skutecznością zachowawczego postępowania terapeutycznego. Nie napotkano żadnych poważnych powikłań pooperacyjnych lub zgonów. Mimo swojej skuteczności, leczenie zachowawcze wydłużało pobyt w szpitalu.

Wnioski: Na podstawie przeprowadzonej analizy, można stwierdzić, że leczenie zachowawcze nacieku okołowyrstkowego powinno zostać skorygowane, szczególnie w przypadku pacjentów poniżej 5. roku życia, u których należy rozważyć traktowanie interwencji chirurgicznej jako postępowania z wyboru. Jest to spowodowane wysokim odsetkiem niepowodzeń leczenia zachowawczego u tych pacjentów i związaną z tym wczesną progresją nacieku do ropnia okołowyrstkowego. Przyczyną takich zmian może być z kolei niepełny rozwój sieci większej i wynikający z tego brak funkcji ochronnej, która ograniczałaby rozprzestrzenianie się zapalenia. Ponadto wczesne zalety wykonania appendektomii to: zmniejszone ryzyko niedrożności jelit spowodowanej zrostami, skrócenie pobytu w szpitalu (i związane z tym mniejsze obciążenie finansowe placówki) oraz rzadsza konieczność ponownego przyjęcia do szpitala w celu wykonania odroczonej appendektomii.

SŁOWA KLUCZOWE: naciek, pediatria, powikłania, leczenie zachowawcze, zapalenie wyrostka robaczkowego

INTRODUCTION

Acute appendicitis is the most common surgical emergency in children [1]. It is a common surgical emergency worldwide (7–8%) [2]. In patients who presented with acute appendicitis, about 2–7% will present with an appendiceal mass [3, 4].

The pathology may range from phlegmon to abscess [5, 6]. The human body may control the acute situation by forming an inflammatory mass, often presenting as a palpable, tender mass, usually 5 to 7 days after the onset of symptoms [7].

The management of appendicular mass remains controversial with three general regimes. The conservative approach (Ochsner-Sherren) followed by delayed appendectomy [8, 9]. Conservative management without interval appendectomy is the second option [10]. The third option is early appendectomy prior to resolution of the mass. This will avoid the need for readmission for interval appendectomy and help to exclude the presence of other pathologies masking as an appendix mass [11–13].

AIM

1. Was conservative management of appendicular mass successful in children, particularly those younger than 5 years old?
2. What are other factors affecting the effectiveness of conservative management of appendicular mass – particularly the size of the mass and duration of symptoms?
3. What is the impact of conservative management of appendicular mass?

MATERIAL AND METHODS

This study was approved by the Ethical Committee. The medical records of all pediatric patients, younger than 15 years, with appendicular mass who underwent initial conservative management at Basra Children Specialty Hospital in Iraq from 2015 to 2019 were reviewed. A total of 71 patients were studied. Patients that presented with peritonitis or intestinal obstruction were excluded. Children with appendicular mass were reviewed for age, duration of symptoms prior to hospital admission, size of the mass, complications, hospital stay and outcome.

Appendicular mass was diagnosed by clinical examination, examination under anaesthesia, abdominal ultrasonography or CT scan in certain cases.

Children with appendicular mass were initially treated conservatively with intravenous fluid, broad-spectrum antibiotics, and frequent observations. Sixty patients were successfully treated by conservative management. Eleven patients failed to respond and required operations, of them 9 patients at the time of same admission while 2 patients after discharge (after 2 and 4 days readmitted and operated on).

Complications following operative treatment were divided into major and minor. Major complications were potentially fatal e.g. ileocecal resection, right hemicolectomy, or appendiceal stump complications with peritonitis or sepsis. All other complications were defined as minor complications.

Appendiceal mass is defined as aggregation of an inflamed appendix and adjacent viscera [3, 14]. Failure of conservative treatment is defined as unsuccessful when operation is done during the same hospital admission or shortly after discharge (less than one week).

Analysis was done by using SPSS v. 20.

RESULTS

Seventy-one patients with appendicular mass were admitted to Basra Children Specialty Hospital and conservatively treated with broad-spectrum antibiotics and intravenous fluid. A total of 1807 cases of acute appendicitis were treated during the study time making an incidence of 3.9% of appendicular mass.

Conservative management of appendicular mass was effective in 60 patients (84.5%). Eleven patients failed to respond and required operations (15.5%). Fig. 1. shows the effectiveness of conservative management of appendicular mass.

Appendicular mass occurred most frequently in children aged 5–10 years (47.9%), followed by those aged 10–15 years (29.6%), and then children younger than 5 years (22.5%). Fig. 2. shows age distribution of pediatric appendicular mass.

Male (41 cases) was affected more than female (30 cases) with a ratio of (1.4).

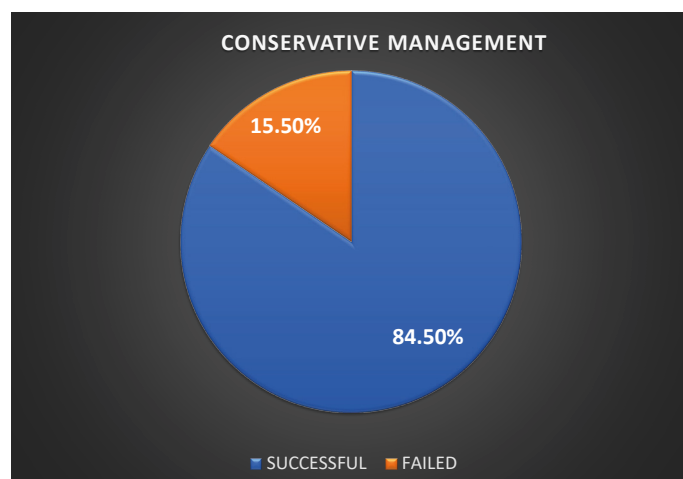
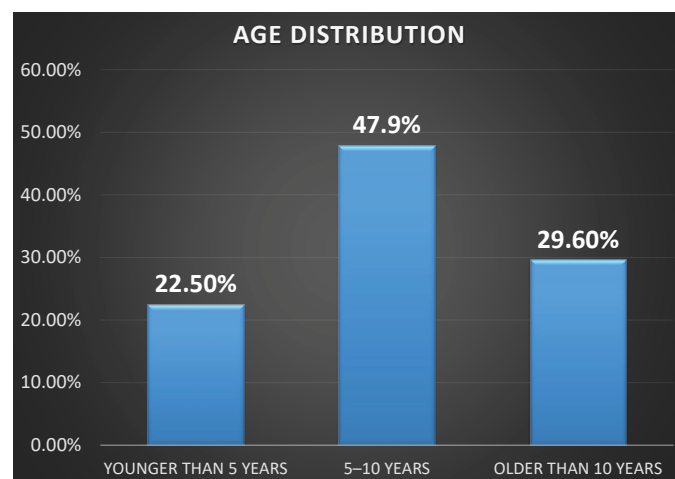
Of the 16 patients younger than 5 years, six patients required operation (37.5%). Four out of 34 patients aged 5–10 years (11.8%) and one of 21 patients older than 10 years (5%) required operations. Chi-square = 8.127 and P-value = 0.017. Tab. I. shows age effect on the effectiveness of conservative management of appendicular mass.

All appendicular masses smaller than 2*2*2 resolved with conservative management. Five out of 36 masses sized 2*2*2–4*4*4 cm (13.9%) and 6 out of 21 masses larger than 4*4*4 cm (28.6%) did not resolve with conservative management. Tab. II. shows the effect of size of the mass on the success of conservative management of appendicular mass. Chi-square = 5.381 and P-value = 0.068.

All patients who presented within 3 days of appearance of symptoms showed effective conservative management. Seven out of 43 patients who presented between day 3 and 5 (16.3%) and 4 out of 17 patients who presented after 5 days (23.5%) required operations. Tab. III. shows the effect of duration of symptoms on the effectiveness of conservative management of appendicular mass.

Tab. I. Age Effect on the Effectiveness of Conservative Management.

CONSERVATIVE MANAGEMENT	AGE			TOTAL
	LESS THAN 5 YEARS	5–10 YEARS	10–15 YEARS	
SUCCESSFUL	10 (62.5%)	30 (88.2%)	20 (95%)	60
FAILED	6 (37.5%)	4 (11.8%)	1 (5%)	11
TOTAL	16	34	21	71

**Fig. 1.** Effectiveness of Conservative Management of Appendicular Mass.**Fig. 2.** Age Distribution in Pediatric Appendicular Mass.

No mortality or major complications (ileocecal resection, right hemicolectomy, sepsis following appendiceal stump leak or major bleeding) were reported on in this study. One patient developed pelvic abscess 5 days after discharge following operative interference. It was less than 5 cm large and it was effectively treated conservatively. Two patients complained of wound infections, one with skin dehiscence, and were both treated conservatively.

One case was found to have another diagnosis during exploration (ileal duplication).

The mean length of hospital stay was 8.1 days. The maximum was 14 days and the minimum was 4 days.

DISCUSSION

Although it is a common pathology, there is no universal standard for the management of appendicular mass.

In this study, appendicular mass complicated 3.9% of all cases of acute appendicitis (71 cases out of 1807 cases of acute appendicitis). Appendicular mass was found in 2% to 7% of all cases of appendicitis [14]. Another study, by Ashok Koirala in Dhahran, reported a high incidence of appendicular mass (34.87%) [15].

Conservative management of appendicular mass was effective in most patients (84.5%). The effectiveness of conservative management of appendicular mass ranges from 91.5% [16], through 84.2% [17] to 76.5% [18].

The mean age was 8 years. The youngest patient was 1.3 years old and the oldest one was 14.5 years old. This is comparable with

other studies, with the mean age being 7.3 years [19]. About 47.9% of patients were 5–10 years old, 29.6% were older than 10 years, and the remaining 22.5% were younger than 5 years. Regarding the age effect on the efficacy of conservative management of appendicular mass, there was a significant association with P -value = 0.017. This raises a question “is conservative management still recommended in children, particularly younger than 5 years”. Similar studies reported higher success rates, of 84–96% [20, 21].

Male was more frequently affected than female, with a ratio of (1.4). This is similar to another study [22]. There was no association between the effectiveness of conservative management and gender.

The size of appendicular mass may determine the resolution of appendicular mass but the association is not significant, with P -value of 0.68.

Furthermore, the duration of symptoms prior to hospital admission might have an effect on the success of conservative management of appendicular mass but still the association is not significant, with P -value of 0.237.

For patients who failed to respond to conservative treatment, only few complications were reported on. No mortality or major complications were encountered in this study. One patient developed pelvic abscess 5 days after discharge following the operative interference. It was less than 5 cm large and it was effectively treated conservatively. Two patients complained of wound infections, one with skin dehiscence, and were both treated conservatively. Even when surgery was needed, the morbidity and complications were low and not significant. This is similar to other studies [22–24].

Tab. II. Effect of Size of the Mass on the Success of Conservative Management.

CONSERVATIVE MANAGEMENT	SIZE OF THE MASS			Total
	< 2*2 cm	2*2-4*4 cm	> 4*4 cm	
SUCCESSFUL	14 (100%)	31 (86.1%)	15 (71.4%)	60
FAILED	0 (0%)	5 (13.9%)	6 (28.6%)	11
TOTAL	14	36	21	71

Tab. III. Effect of Duration of Symptoms on the Success of Conservative Management.

CONSERVATIVE MANAGEMENT	DURATION OF SYMPTOMS			Total
	<3 DAYS	3-5 DAYS	>5 DAYS	
SUCCESSFUL	11 (100%)	36 (83.7%)	13 (76.5%)	60
FAILED	0 (0%)	7 (16.3%)	4 (23.5%)	11
TOTAL	11	43	17	71

Many authors state that immediate appendectomy in appendicular mass is a safe and effective alternative to conservative management [22–25].

One patient was reported to have another diagnosis during exploration (ileal duplication). This may favor early surgical interference in order to avoid misdiagnosis as appendicular mass.

The mean hospital stay was 8.1 days following conservative management. This is less than reported by a similar study [25]. Even after operation, the length of hospital stay was shorter than in conservative treatment (5 days vs 8.1 days). The length of hospital admission is about 3.5 days after early operative interference [24].

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CONCLUSION

Conservative management of appendicular mass in children should be revised particularly in children younger than 5 years, wherein operative treatment may be the first option. The reasons for that are a high rate of failure of conservative management with early progress to appendicular abscess. These could be explained by the underdevelopment of the greater omentum, lacking its protective effect in limiting the spread of inflammation. In addition, early appendectomy has the following advantages: decreased risk of adhesive intestinal obstruction, shortening of hospital stay (i.e. less economic burden), and avoidance of second readmission for interval appendectomy.

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