APPENDICULAR MASS- A PROSPECTIVE AND COMPARATIVE STUDY

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ABSTRACT

BACKGROUND

Acute appendicitis remains the commonest cause of acute abdomen in teenagers requiring surgical intervention. Patients presenting late in the course of acute appendicitis are complicated by the development of an inflammatory mass in right iliac fossa. The treatment of appendicular mass is controversial; however, there are several management options for appendicular mass. Traditionally, these patients are managed conservatively followed by interval appendicectomy 4 - 6 weeks later. Advocates of initial conservative approach claim lower rate of complications compared to early operative approach. The studies favouring immediate appendicectomy claim an early recovery and complete cure during the same admission.

The present study is designed to evaluate the feasibility and safety of immediate appendicectomy in appendicular mass in our hospital by comparing the results of an equal number of patients treated conservatively.

Aims & Objectives-

1. To study the safety and feasibility of emergency appendicectomy in appendicular mass.
2. To compare the complications, morbidity and mortality in emergency appendicectomy and conservatively treated appendicular mass.

MATERIALS AND METHODS

This is a non-randomised controlled trial of 60 patients with appendicular mass, which were taken for convenience for the study. The data regarding patient particulars, diagnosis, investigations and surgical procedures is collected in a specially designed case recording form and transferred to a master chart.

RESULTS

Total 40 patients diagnosed with appendicular mass were included in this study. The mean age of patients was 25.85 years ranging from 13 to 48 and majority of patients (72.5%) belonged to age group of 12 - 30 years. There was male preponderance (65%) with male-to-female ratio of 1.8: 1. Majority of the patients, 27 (67.5%) had the onset of pain in periumbilical region. 5 patients had epigastric pain, 6 had pain in right iliac fossa and in 2 cases the onset was generalised. Pain shifted to right iliac fossa in 32 (80%) cases. GI symptoms (nausea, vomiting, anorexia) were present in 35 (87.5%) cases and absent in 5 cases. 28 (70%) patients had fever. During surgery 28 (70%) cases had simple mass, 4 had perforated appendix, 5 cases had an abscess and in 3 cases there were adhesions. In 5 cases there was difficulty in localisation of appendix, minor trauma (serosa tear) to bowel and bleeding (minimal ooze) were encountered in 2 cases each and there was difficulty in adhesiolysis in 1 case. There were no complications seen in 32 (80%) patients. The complications seen were minor wound infection in 6, haematoma in 1, 1 patient had faecal fistula which subsided spontaneously on conservative treatment. Post-operative hospital stay was 2 - 5 days in 27 (67.5%) cases, 6 - 8 days in 10 cases and more than 8 days in 3 cases. Pathologic evidence of appendicitis was present in all patients.

CONCLUSION

Most common cause of right iliac fossa mass is appendicular mass (48%) followed by appendicular abscess (28%) and ileocaecal tuberculosis (16%). Carcinoma caecum and retroperitoneal sarcoma accounts for 4% of cases.

KEYWORDS

Age, Sex, Symptom, Management.

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BACKGROUND

An appendicular mass is a common surgical clinical entity encountered in 2% - 6% of patients presenting with acute appendicitis. Appendicular mass is the localisation of infection occurring 3 to 5 days after an attack of acute

appendicitis. This inflammatory mass is composed of the inflamed appendix, omentum and bowel loops. The treatment of appendicular mass is controversial; however, there are several management options for appendicular mass.¹⁻² Traditionally, these patients are managed conservatively followed by interval appendicectomy 4 - 6 weeks later, believing that an early appendicectomy in these cases is hazardous, time consuming and may lead to life-threatening complications such as faecal fistula. The need of interval appendicectomy has also been questioned.³ Advocates of initial conservative approach claim lower rate of complications compared to early operative approach.⁴ However, in 10% - 20% of the cases, it proves unsuccessful

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and the patients need emergency operation due to spreading infection, which is comparatively more difficult.

In addition, patient may suffer a recurrence of appendicitis after being discharged from the hospital. A large number of patients refuse re-admission for operation once their acute problem is solved and this seems to be a major disadvantage of the initial conservative approach. Another disadvantage of the conservative management is the chance of misdiagnosis as reported by Garg P et al,⁵ claiming that conditions like intussusception and carcinoma caecum may be treated conservatively by mistake adding considerable morbidity. The early operation on the other hand has an edge of being curative in the index admission and ensures early return to work and higher compliance.

The treatment of appendicular mass is taking a turn from the traditional approach of initial conservative treatment followed by interval appendectomy to immediate appendectomy.⁵ However, this change is not widely accepted and a large number of surgeons still continue to adopt the same traditional conservative approach.⁶

The early surgical intervention is known to be an effective alternate to conservative therapy for a long time, as it considerably reduces the total hospital stay and obviates the need for a second admission.⁷⁻¹⁰

It is obvious that a true controversy exists as to the best approach towards this problem and the opinion is divided about the management of appendicular mass.

The present study is designed to evaluate the feasibility and safety of immediate appendicectomy in appendicular mass in our hospital by comparing the results of an equal number of patients treated conservatively.

Aims and Objectives

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MATERIALS AND METHODS

Inclusion Criteria

1. Patients admitted with signs and symptoms of appendicular mass during the study period.
2. Patients diagnosed with appendicular mass during surgery for acute appendicitis.

Exclusion Criteria

1. Pregnant patients.
2. Patients not fit for surgery.
3. Patients with signs of diffuse peritonitis.

Mode of Study

This is a non-randomised controlled trial of sixty patients, which was taken for study for convenience. Thorough history and clinical examination was made. Complete blood count; urinalysis; urea and electrolytes; plain x-ray abdomen; and ultrasonography of abdomen and other investigations as per need of the patient were done. The patients were non-randomly taken, each containing thirty. In Group, early surgical exploration was done within 24 hrs. of admission. Pre-operative preparation was done by keeping the patients nil orally, giving adequate parenteral fluids to maintain fluid

and electrolyte balance, antibiotics and analgesics. Drains were kept in a few cases, which were removed after 48 hrs. and sutures were removed on the 7th post-operative day. Most of the operated patients had uneventful recovery. Post-operative period was monitored; intake output charts and vital charts were maintained. In Group II, conservative approach with Ochsner-Sherren regimen was adopted followed by interval appendectomy 6 - 8 weeks later. Patients in both study groups were discharged as soon as possible and duration of stay and duration of antibiotics and analgesics used in number of days was noted. There was no mortality noted in either groups. The patients were followed up for a variable period of time. A full record of all the patients was maintained on the proforma designed for this purpose.

Statistical Analysis

A comparison of outcome between two groups was done statistically by applying Fisher's exact test and 't' test. Those patients to whom conservative management does not reduce pain, early appendicectomy has been done. Statistical analysis was conducted by using a SPSS version 14.0 software. $P < 0.05$ was considered statistically significant.

RESULTS

In our study, 60 cases of appendicular mass who attended surgical emergency were selected over a period of one and a half year.

Age in Years	Sex		Total (%)
	Male n (%)	Female n (%)	
<20	10	2	12 (20%)
21-30	19	11	30 (50%)
31-40	11	4	15 (25%)
Above 40	2	1	3 (5%)
Total	42 (70%)	18 (30%)	60

Table 1. Age and Sex Wise Distribution of Study Subjects

In our study of 60 cases, the mean age of patients was 27.58 (SD) years ranging from 13 to 48 and majority of patients (50%) belonged to age group of 21 - 30 years. There was male preponderance (70%) with male-to-female ratio of 2.66: 1.

Age in yrs.	Group I n (%)	Group II n (%)	Total
<20	7 (23.33%)	5 (16.66%)	12
21-30	13 (43.33%)	17 (56.66%)	30
31-40	8 (26.66%)	7 (23.33%)	15
>40	2 (6.66%)	1 (3.33%)	3
Total	30	30	60

Table 2. Age Wise Distribution of Study Subjects

In our study of 60 cases the patients were divided in two groups, each containing thirty. In Group I the mean age of study subjects was 27.83 (SD) years, ranging from 13 to 48 and majority of patients (43.33%) belonged to age group of 21 - 30 years. In Group II the mean age of study subjects was 27.33 (SD) years ranging from 17 to 45 and majority of patients (56.66%) belonged to age group of 21 - 30 years.

Sex	Group I n (%)	Group II n (%)	Total
Male	20 (66.66%)	22 (73.33%)	42
Female	10 (33.33%)	8 (26.66%)	18
Total	30	30	60

Table 3. Sex Wise Distribution of Study Subjects

In our study, there was male preponderance (66.66%) with male-to-female ratio of 2: 1 in Group I. There was male preponderance (73.33%) with male-to-female ratio of 2.75: 1 in Group II also.

Operative Findings	Type of Treatment	
	Group I n (%)	Group II n (%)
Simple mass	20 (66.66%)	4 (15.38%)
Adhesions	8 (26.66%)	6 (23%)
Loculated pus	2 (6.66%)	1 (3.84%)
Adhesive intestinal obstruction	0	1 (3.84%)
Normal	0	14 (53.84%)
Total	30	24

Table 4. Operative Findings in Both Groups

In our study, the operative finding in majority (66.66%) of the patients in Group I was simple mass. In Group II, the operative finding in majority (53.84%) of patients was a normal finding.

Operative Problems	Type of Treatment	
	Group I n (%)	Group II n (%)
Difficulty in localisation of appendix	4 (13.33%)	5 (19.23%)
Difficulty in adhesiolysis	3 (10%)	4 (15.38%)
Minor trauma to bowel	2 (6.66%)	2 (7.69%)
Minor bleeding	1 (3.33%)	0
Total	10	11

Table 5. Operative Problems in Both Groups

In our study, the major (13.33%) operative problem in Group I patients was difficulty in localisation of appendix. The major (19.23%) operative problem in Group II patients also was difficulty in localisation of appendix. Fisher's exact test was applied and the 'p' value was found to be > 0.05, which was insignificant.

Complications	Group I n (%)	Group II n (%)	P value
Wound infection	3 (10%)	2 (6.66%)	>0.05
Faecal fistula	1 (3.33%)	0	>0.05
Failure of treatment	0	4 (13.33%)	>0.05
Lost for follow-up	0	4 (13.33%)	>0.05
Respiratory tract infection	0	3 (10%)	>0.05
Adhesive intestinal obstruction	0	1 (3.33%)	>0.05
Total	4 (13.33%)	14 (46.66%)	0.01

Table 6. Comparison of Complications

In our study, the major (10%) complication in Group I patients was wound infection and the overall rate of complication was 13.33%. The major (13.33%) complication in Group II patients was failure of treatment and lost for follow-up and the overall rate of complication was 46.66%. Fisher's exact test was applied and the 'p' value was found to be > 0.05 (insignificant) while comparing individual

complications, but the 'p' value was < 0.05 (significant) when the overall complication rates between the two groups was compared.

Total Duration of Medications	Group I n (%)	Group II n (%)*
<= 5 days	27 (90%)	8 (26.66%)
6-8 days	3 (10%)	21 (70%)
>8 days	0	1 (3.33%)
Mean	3.3 days	6.2 days
SD	1.534657	1.284747
SE	.2801888	.2345616
95% CI	2.72695-3.87305	5.786934-6.746399

Table 7. Total Duration of Parenteral Medications#

- #Includes antibiotics and analgesics, SD- Standard deviation.
- *Includes both 1st and 2nd admission, SE- Standard error, CI- Confidence interval.

In this study the majority (90%) of Group I patients had parenteral medications for <= 5 days and the mean duration of parenteral medication was 3.3 days in this group. Whereas in Group II, the majority (70%) of patients had parenteral medications for 6 - 8 days and the mean duration of parenteral medication was 6.2 days in them. T test was applied and the 'p' value was calculated to be < 0.05, which is significant.

Total Duration of Hospital Stay	Group 1 n (%)	Group 2 n (%)*
<= 5 days	19 (63.33%)	2 (6.66%)
6-8 days	10 (33.33%)	14 (46.66%)
>8 days	1 (3.33%)	14 (46.66%)
Mean	5.3 days	8.5 days
SD	2.409035	1.943158
SE	.4398276	.3547704
95% CI	4.400452-6.199548	7.774413-9.225587

Table 8. Total Duration of Hospital Stay

- *Includes both 1st and 2nd admission.
- SD- Standard deviation.
- SE- Standard error.
- CI- Confidence interval.

In this study, the majority (63.33%) of Group I patients had total duration of hospital stay for <= 5 days and the mean duration of hospital stay was 5.3 days in this group. Whereas in Group II, only 6.66% of patients had total duration of hospital stay for <= 5 days and the mean duration of hospital stay was 8.5 days in them. 'T' test was applied and the 'p' value was calculated to be < 0.05, which was significant. The sample size estimation was also done at conveniences.

DISCUSSION

In our study, appendicular mass formed 48% of cases. All the patients came to the hospital for pain abdomen of duration less than one month. This pain was of colicky in nature. They complained of pain, noticed initially around umbilicus which later shifted to right iliac fossa. Some patients had associated fever and vomiting.

86% patients presented with fever and 52% patients presented with vomiting.

In our study, appendicular mass was more common in males (70.8%) than females (29.1%) with the ratio of 2.4: 1 which is comparable with the study by E Okune et al, where appendicular mass was more common in males than females with the ratio of 2.1: 1.

In present study maximum age incidence was between 31 - 50 years, i.e. more common in 4th and 5th decade. While in E. Okune et al series, it was more common in 3rd and 4th decade.

According to D. Erdogan et al, most common symptoms include abdominal pain (87.5%), vomiting (90%) and fever (82.5%). In our study, all patients presented with pain abdomen, 52% patients presented with vomiting and 86% presented with fever.

On examination, all patients had right iliac fossa tenderness (100%). 70.8% patients had guarding and all patients (100%) had mass palpable in right iliac fossa. While in D. Erdogan et al series 80% patients had abdominal tenderness, 47.5% had guarding and 32.5% had right lower abdominal mass.

In present study, abdominal ultrasound was done in all patients. The diagnosis was made in correlation with history and clinical findings and confirmed by ultrasound. All the cases were correctly diagnosed by USG, the results of which were comparable with other study.

In this study, 83.3% patients were treated conservatively with Ochsner-Sherren regimen followed by interval appendicectomy after 6 to 8 weeks. 16.6% patients were treated by immediate (early) appendicectomy.

Nil by mouth, Ryle's tube aspiration, antibiotics and IV fluids. This decision was based on the fact that nature has already localised the lesion and it is unwise to disturb these barriers, inadvertent surgery at this time is dangerous, difficult and bloody.

According to Gahukamble DB "in situ" delayed appendicectomy seems beneficial for all the patients who responded well to the initial management of appendicular mass.

De U and Ghosh S concluded low morbidity, reduced hospital stay, low cost and patient's compliance favour operative management of appendicular mass by experienced surgeons, thus obviating the old practice of conservative treatment followed by interval appendicectomy.

According to D. Erdogan et al, the choice of management in patients with appendicular mass is conservative followed by elective appendicectomy. In deciding for immediate appendicectomy, the criteria most important are unresponsive to medical treatment and suspicion of malignancy.

Safir Ullah et al concluded that conservative management is effective in the majority of the patients.

According to E. Okune et al management of appendicular mass should vary, depending on the clinical and the state of the patients concerned irrespective of age.

Harith Hassani, in his study concluded that conservative management followed by delayed interval appendicectomy is a safe, effective and can be applied in all centres and it carries the least morbidity and mortality rates comparing with other studies and it is the most statistically successful method.

Ali S and Rafique HM concluded that early surgical exploration of appendicular mass is safe and cost effective.

In this study, cases which were managed conservatively were called back for appendicectomy 6 - 8 weeks later. Specimens of appendix after emergency appendicectomy revealed acute appendicitis and those after delayed appendicectomy were reported as chronic appendicitis.

According to Adalla SA,¹⁰ an appendicular mass should no longer be regarded as an indication for interval appendicectomy.

Limitation of the Study

Due to short duration of study, convenience sampling technique was followed. Thus, sampling size was also calculated by convenience. The results of the study cannot be generalised due to the potential bias resulting from the sampling technique and sample size estimation.

CONCLUSION

- Most common cause of right iliac fossa mass is appendicular mass (48%) followed by appendicular abscess (28%) and ileocaecal tuberculosis (16%). Carcinoma caecum and retroperitoneal sarcoma accounts for 4% of cases.
- Right iliac fossa mass is common among patients with low socioeconomic status.
- There is no sex predilection for right iliac fossa mass.
- Appendicular mass and appendicular abscess were common in males. Ileocaecal tuberculosis is common in males. Carcinoma caecum is equal in both sexes and retroperitoneal sarcoma is common in females.
- Mean age of presentation of right iliac fossa mass is 40.6 yrs.

Condition	Mean Age
Appendicular mass	38.2 yrs.
Appendicular abscess	39 yrs.
Ileocaecal tuberculosis	43.7 yrs.
Carcinoma caecum	62 yrs.
Retroperitoneal sarcoma	42 yrs.

- Most common presenting symptom of right iliac fossa mass is pain abdomen. Other symptoms were fever (86%), vomiting (52%), weight loss (22%), altered bowel habits (14%), abdominal distension (12%) and mass per abdomen (8%).
- Commonest presenting symptom of appendicular mass is pain abdomen. Other common symptoms are fever and vomiting.
- Most common symptoms of appendicular abscess are pain abdomen and fever. Other common symptom is vomiting.
- Subacute intestinal obstruction is the commonest presentation of ileocaecal tuberculosis, the commonest symptoms being pain abdomen, abdominal distension, altered bowel habits and history of weight loss.
- Commonest symptoms of carcinoma caecum are pain abdomen. Others are weight loss, altered bowel habits and abdominal distension. The varied presentation in carcinoma is probably due to small sample size.
- Most symptom of retroperitoneal sarcoma is pain abdomen. Other common symptoms are mass per abdomen, weight loss and fever.

- USG abdomen is the first investigation of choice in patients with right iliac fossa mass. Ultrasound is the investigation of choice in patients with appendicular mass and appendicular abscess.
- Barium study is the preferred investigation in patients with ileocaecal tuberculosis. Gold standard investigation for confirmation of ileocaecal tuberculosis is histopathology.
- Colonoscopy is the investigation of choice for carcinoma caecum. CT scan modality of choice for evaluation of local and distant spread.
- CT scan is the investigation of choice for retroperitoneal sarcoma.
- The choice of management for appendicular mass is conservative followed by interval appendicectomy. The criteria most important in deciding for immediate appendicectomy are unresponsive to medical treatment and suspicion of malignancy.
- The preferred management in appendicular abscess is extraperitoneal drainage of abscess with delayed appendicectomy. Neither major morbidity nor mortality was observed.
- The management of choice in patients with ileocaecal tuberculosis with features of intestinal obstruction is surgery under coverage of ATT.
- Strongly suggestive clinical features with positive non-specific investigation findings and radiological findings suggestive of abdominal tuberculosis are indications for starting up of ATT in endemic country like India.
- Surgery is the management of choice in carcinoma caecum. Adjuvant chemotherapy is considered in patients with stage II onwards with acceptable prognosis.
- Mainstay of treatment in retroperitoneal sarcoma is surgery (wide local excision with tumour free margin) followed by radiotherapy. Tumour free margin is an important factor in deciding local recurrence.

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