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"A Clinical Study of Appendicular Lump"

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Abstract
Introduction: *Appendicular lump is a common surgical entity presenting with acute appendicitis and presents as a palpable mass over the right lower quadrant of the abdomenencountered 2-6% in patients with acute appendicitis. Themanagement of appendicular lump remains controversial with three general approaches. The conventional conservative approach of Ochsner-Sherren regime followed by delayed appendectomy in patients with appendicular lump is well recommended. These, however, depends on the surgeon's experience and preference in dealing in such a case. This study aimed to find out and evaluate possible need of changing our management strategy of appendicular lump.*
Materials and methods:*A cross-sectional study was carried out after obtaining permission from Research EthicsBoard during a period of two calendar years, fromSeptember 2017 to August 2019 in the Department of Surgery, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur on sixty-seven patients diagnosed and admitted withappendicular lump under variables including age, sex, religion, socio-economic status, symptoms, duration, abnormal laboratory findings, ultra-sonographic findings, mode of treatment which includes non-operative & operative management, surgical procedure adopted, intra-op findings, post-op complications, histo-pathological findings and length of hospital stay.Descriptive data was presented using proportion for sex, religion, etc. and mean and standard deviation for continuous data like age, hospital stay, etc.SPSS software version 21 was used for analysis andMicrosoft word and Excel 2010 were used to generate graphs, tables etc.*
Results and Observation: *Out of 614 patients with acute appendicitis 67 patients were diagnosed as appendicular lump, suggestive of incidence of 10.91%. 39 patients were male (58%) and 28 were females (42%) with a mean age group of 37.47±16.32 years. Majority belongs to middle class socio-economic family (53.7%) and Hindu by religion (67.2%). The patient mostly presents with the right lower quadrant pain followed by anorexia and fever.The diagnosis was based on clinical and abdominal ultrasound. Most of the patients (69%) were treated successfully by conservative medical therapy with mean hospital stay 9.36±4.1.*
Conclusion: *The results of this study state that appendicitis associated with a lump could be treated safely and effectively by initially using conservative managements. In addition, it also confirmed that even in cases involving only ambulatory follow-up observation without interval surgery after conservative managements, the recurrence rate was not high, recurrence of appendicitis was detected early, and surgical treatments could be performed safely.*
Keywords: *Acute appendicitis, Appendicular lump, Ochsner-Sherren regime, Emergency appendicectomy, Interval appendicectomy.*

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I. Introduction

Appendicular lump is a well known sequel and early complications of acuteappendicitis. Itis a common surgical entity presenting with acute appendicitis and presents as a palpable mass over the right lower quadrant of the abdomen.

An appendicular lump is encountered 2-6% in patients with acute appendicitis. It forms a spectrum of diseases ranging from an inflamed appendix, walled off by the omentum and oedematous portions of caecal wall and terminal ileum, to a large collection of pus surrounded by adherent and inflamed omentum(an appendiceal abscess).[1]

Themanagement of appendicular lump remains controversial with three general approaches. The conventional conservative approach of Ochsner-Sherren regime followed by delayed appendectomy in patients with appendicular lump is well recommended. These, however, depends on the surgeon's experience and preference in dealing in such a case.[1,2,3]

Some surgeons prefer a conservative method, consisting of bed rest,withholding oral feeds, intravenous fluids with intravenous antibiotics coverage until the inflammatory mass resolves. This strategy is based on the premise that the inflammatory process is already localized and that the inadvertent surgery is difficult and may be dangerous. It may be impossible to find out the appendix and, occasionally, a faecal fistula may forms. For this reason, it is wise to observe a non operative management but to be prepared to operate when clinical deterioration occurs. Majority of the times appendicular lump resolve after conservative management but some 10 – 20% of such patients fail to respond and require urgent and more difficult operation.[2,4,5]

After conservative management some Surgeons offers the patient for interval appendicectomyafter 6-8 weeks following resolution of symptoms. Advocates of interval appendicectomy describe the advantages of avoiding recurrence of symptoms and the misdiagnosis of an appendix mass. They suggest interval appendicectomy is less hazardous and challenging operation, compared with immediate appendicectomy during initial admission. More recently, the need for interval appendicectomy has been questioned, a number of authors suggest an entirely conservative management without interval appendicectomy. The aim of thisapproach was to achieve resolution of the mass and an asymptomatic patient. Complications of interval appendicectomy include sepsis, bowel perforation, small bowel ileus and various wound abscesses. The incidence of recurrence of symptoms following successful conservative management is low. When the causes for the appendicular mass other than appendicitis are excluded, interval appendicectomy seems unnecessary in patient who respond well to initial conservative management.[4,6,7,8]

A third option involves performing early appendicectomy during primary admission prior to resolution of the mass describe the advantages of avoiding the need for readmission for interval appendicectomy, and the exclusion of other pathologies masquerading as an appendix mass.[9-12]

The present study has been conducted to find out and evaluate possible need of changing our management strategy of appendicular lump.

II. Aims And Objects

1. To study the clinical presentation of appendicular lump.
2. To study the different modalities of treatment and their outcome of appendicular lump.

III. Materials And Methods

A cross-sectional study was carried out after obtaining permission from Research EthicsBoard between September 2017 to August 2019 in the Department of Surgery, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur. A total of 67 patients diagnosed as appendicular lump were included in this study.

Inclusion criteria

1.All age groups and both sexes
2. Willingness to comply with the treatment and follow-up assessment.

Exclusion criteria

1 Any patients whose diagnosis is changed after initial diagnosis of appendicular lump were excluded.
2. Pregnant patients.

Methods:

- Diagnosis of appendicular lump has been made from history, clinical findings, relevant laboratory data and supported by ultrasound findings of abdomen.
- Complete routine investigations has been performed like complete hemogram, liver function test, kidney function test, serum electrolytes, urine routine examination, blood sugar level and radio imaging like plain X-ray abdomen and ultrasonography of abdomen.
- The initial resuscitative measures included intravenous fluid, correction of electrolyte imbalance, antibiotics and analgesics.
- Details of technical aspects of surgical management of appendicular mass has been recorded, including difficulties in dissection, intra operative complications, blood loss, state of appendix such as oedema, inflammation, perforation, peri-appendiceal collection, state of surroundings structure and time taken for operation.
- Duration of hospital stay in both types has been recorded. This includes number of days spent in the hospital before and after operation and overall length of hospitalization.
- A pre-designed proforma was used to gather information of the subject of study. All the relevant findings were entered into it.

IV. Data analysis

At the end of the study, data collected from the study are tabulated and analyzed accordingly. All the data were entered in a proforma specially designed for the study and data analysis was performed using SPSS software version 21 for Windows (IBM Corp., Armonk, NY, United States).Descriptive data was presented using proportion for sex, religion, duration of symptoms, etc. and mean and standard deviation for continuous data like age, hospital stay etc.Microsoft word and Excel 2010 were used to generate graphs, tables etc.

V. Results And Observation

Total 614 patients were admitted in hospital with the diagnosis of acute appendicitis, out of which 67 patients were having appendicular lump, suggestive of incidence of 10.91%.

Table 1: Age distribution of the patients

Age in years	**No. of patients**	**Percentage (%)**
≤10	2	3.0
11-20	9	13.4
21-30	14	20.9
31-40	16	23.9
41-50	11	16.4
51-60	8	11.9
>60	7	10.4
Total	**67**	**100.0**
Mean ± SD	**37.47 ± 16.32**	

Majority of the patients were from the age group 21- 40 years which consisted of combine 44.8% of cases. The mean age group was 37.47±16.32 as shown in table 1.
Incidence was more in male, male to female ratio is 1.4:1
Hindu constituted majority of the patients in 67.2% cases followed by Christian 25.3% and Muslims 7.5% Most of the patients were from middle class family (53.7%) of cases

Table 2: Showing presenting complaints /symptoms& sign

Sign &Symptoms	**No. of patients**	**Percentage**
Pain in right lower quadrant	67	100
Anorexia	56	84
Nausea & vomiting	38	57
Fever	36	54
Lump in right iliac fossa	67	100
Tenderness in right iliac fossa	67	100
Rebound tenderness	53	79
Generalised guarding & rigidity	24	36

Right lower quadrant pain was the most common symptom in all patients (100%), followed by anorexia (84%), nausea & vomiting (57%) and fever (54%).
With regard to signs, lump and tenderness in right iliac fossa were found in all patients (100%), followed by rebound tenderness (79%) and generalised guarding & rigidity (36%).

Table 3: Duration of symptoms

Duration	**No. of patients**	Percentage
Within 72 hours	24	35.8
More than 72 hours	43	64.2
Total	**67**	**100.0**

Majority of the patients presented with symptoms of more than 72 hours is seen in 43 patients (64.2%), followed by within 72 hours in 24 patients (35.8%) as shown in table 3.

Table 4: **Abnormal laboratory investigations**

Laboratory investigation	**No. of patients**	**Percentage**
Anaemia	14	21
Leucocytosis	46	68
Elevated liver enzymes	11	16
Abnormal KFT	9	13
Abnormal urine R/E	13	19

Leucocytosis was noticed predominantly in 46 patients (68%). Anaemia was noted in 14 (21%), elevated liver enzymes in 11 (16%), abnormal urine R/E in 13 (19%) and abnormal kidney functions (KFT) were found in 9 (13%) patients as shown in table 4.
All patients (100%) were confirmed as appendicular lump by USG

Table 5: Mode of treatment

Treatment	No. of patients	Percentage
Conservative	46	69
Surgical	21	31
Total	**67**	**100.0**

Most of the patients (68.7%) underwent conservative management i.e. medical, whereas 21 patients (31.3%) were managed by surgically as shown in table 5.

Table 6: Showing types of surgical procedure adopted

Surgical procedure	No. of patients	Percentage
Emergency appendicectomy	7	33
Interval appendicectomy	14	67
Total	**21**	**100.0**

14 (67%) patients underwent interval appendicectomy after 6-8 weeks following initial medical therapy, followed byemergency appendicectomy done in 7 (33%) patients on first day of admission.

Table 7: Intra-operative findings

Condition of appendix	Emergency appendicectomy		Interval appendicectomy	
	N=7	Percentage	N=14	Percentage
Peri-appendiceal collection	6	86	1	7
Inflamed appendix	7	100	3	21
Fecolith	2	28.5	Nil	0
Perforation	2	28.5	Nil	0
Gangrene	1	14	Nil	0
Lump	**7**	100	1	7
Adhesion	**7**	100	4	28.5

During emergency appendicectomy, inflamed appendix with lump and adhesion were noticed in 100% patients, followed by peri-appendiceal collection predominantly found in 86% patients. Fecolith and perforation of appendix found in 28.5% of each patient and gangrene in 1 (14%) patient.

In interval appendicectomy patients, most of the conditions of appendix were unremarkable. 28.5% patients had adhesion, 21% inflamed appendix and only 7% patients had lump &peri-appendiceal collection.

Figure 1: Open interval appendicectomy showing adhesion

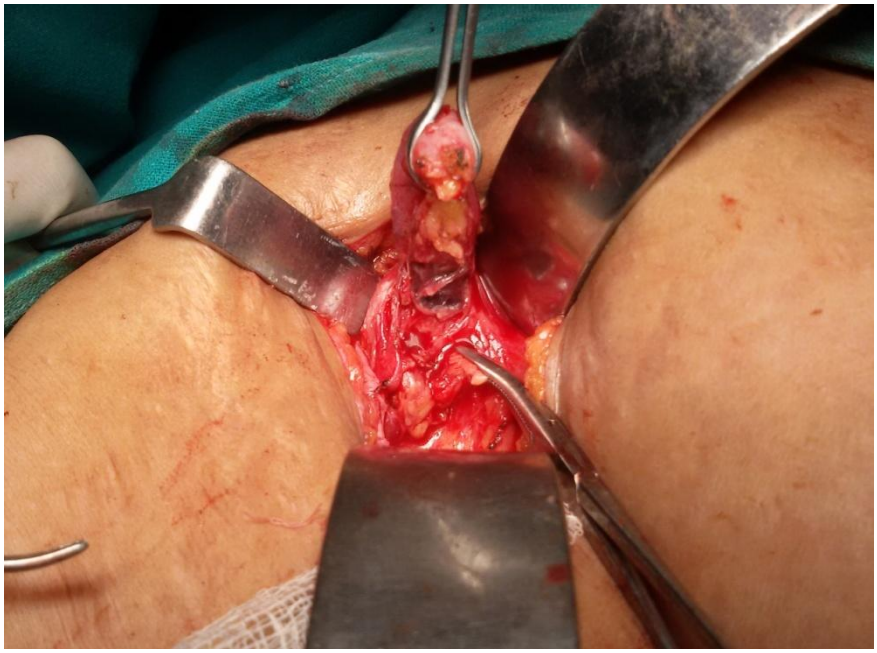

Figure 2: Emergency appendicectomy showing gangrenous & perforated base

Table 8: Complications associated with surgery

Complications	Emergency Appendectomy		Interval Appendectomy	
	N=7	Percentage	N=14	Percentage
Wound infection	3	43	2	14
Paralytic ileus	1	14	Nil	0
Intestinal obstruction	1	14	Nil	0
Faecal fistula	Nil	0	Nil	0
Generalised/localised peritonitis	Nil	0	Nil	0

Out of 21 patients who underwent surgery, post operative complications were higher with emergency patientgroups as shown in table 8.

Table 9: Histopathological examination (HPE) findings

HPE findings	Emergency appendicectomy (N=7)	Interval appendicetomy(N=14)
Features of acute appendicitis	7	1
Fibrosis and obliteration of lumen	1	3
Chronic active inflammation	3	4
Normal appendix	0	6
Necrotic with gangrenous base	1	0

The HPE of the appendicectomy specimens were reported to be features of acute appendicitis in all patients of emergency appendicectomy, followed by chronic inflammation in 3 patients, fibrosis with obliteration of lumen in 1 patient and gangrenous base in 1 patient of emergency appendicectomy.

Whereas chronic active inflammation, fibrosis withobliteration of lumen and features of acute appendicitis were found in 4, 3 and 1 no of patients respectively and rest 6 patients had normal appendix in interval appendicectomy cases as shown in table 9.

Table 10: Length of hospital stay

Length of hospital stay	No. of patients	Percentage
1-5 days	9	13.4
6-10 days	38	56.7
11-15 days	14	20.9
>15 days	6	9
Total	**67**	**100.0**
Mean ± SD	**9.36 ± 4.1**	

Majority of the patients, 38 stayed 6-10 days (56.7%), 14 patients stayed in between 11-15 days (20.9%), 9 patients stayed 1-5 days (13.4%) and 6 patients stayed more than 15 days (9%) with mean hospital stay was 9.36±4.1 as shown in table 10.

VI. Discussion

Immediate appendectomy is the accepted therapy for earlyacute appendicitis, but the management of patients with more advanced stages of this disease, who present with anabdominal mass, remains controversial. The palpablemass may contain phlegmon, composed of adherentomentum and small bowel loops, or abscesses of varioussizes.Interval appendectomy is usually performed 6 to 8weeks later to prevent the recurrence. Sincenon-operative management for palpable peri-appendicealmass has been proven to be safe and effective, it serves asa useful comparison group for our present study.

Emergency surgery has a certain place in the treatmentof appendiceal mass and abscess. High frequency ofpostoperative complications is the negative side of thismethod.These complications are caused by oedema andthe vulnerability of the adjacent small and large intestine,and difficult approach to the appendix due to deformation ofanatomic structures and location. Conducting colonicresections (ileocecectomy, right hemicolectomy) issometimes necessary instead of appendectomy due to theacute inflammation and adhesion.

In our study, Total 614 patients were admitted in hospital with the diagnosis of acute appendicitis, out of which 67 patients were having appendicular lump, suggestive of incidence of 10.91%.

Patel BJ et al[13] reported in their studies, out of total 598 patients admitted to hospital with diagnosis of acute appendicitis, 50 patients had appendicular lump suggestive of incidence of 10.7%.Bhandari RS et al[14] and Pandey C et al[15] in their study reported 10% and 9.81% of incidence respectively.

AGE AND SEX INCIDENCE

Present prospective series consists of 67 patients having age ranged from below 10 years to above 60 years with maximum incidence in 21-40 years which consisted of combine of 44.8% with mean age 37.47±16.32 and male to female ratio as 1.4:1.

Ali S et al[1] reported the age range in their series to be from 12 to 65 years with maximum incidence in 2nd and 3rd decade with male-female sex ratio as 2:1. Emmanuel BO et al[4] reported the age range in their series to be from 3 to 79 years with mean age of 37.2±3.6 years with male-female sex ratio as 2.4:1.1. Vakili C et al[9] in his study found that the age of the patient ranged from14 to 60 rears with male to female ratio as 2.3:1.3. Findings in this study are comparable to the above studies with almost similar observation regarding the age incidence with male to female ratio of the incidence of appendiceal mass.

RELIGION AND SOCIO-ECONOMIC STATUS

Geographically majority of the patients was from middle class socio-economic status 53.7% and Hindu by religion 67.2%.

The increased incidence among Hindus may be due to majority of population or due to their dietary habits which comprised of increase consumption of animal meats, fats and protein of both animal and vegetable source and also carbohydrate in the form of rice or they may seek prompt medical attention very early or more health conscious compared to other religion, or due to some other factors which is not yet studied.

CLINICAL SIGNS AND SYMPTOMS

Pain in the right lower quadrant in this series was found in all 67 cases (100%), almost similar finding were reported (100%) by Samuel Met al[11]. Anorexia is seen in 84% in this study. Almost similar finding were also claimed by Samuel M et al[11] (87%). Fever is present in 54% in this study. Almost similar finding was reported 53% by Erik SK et al[16]. Irfan K et al[7] reported palpabeappendiceal mass in 100% of cases. This study also gives similar finding of palpable lump in 100% cases.

INVESTIGATIONS

The present study highlighted leucocytosis (>11,000/cu.mm) in 68 %. Jordan JS et al[17] in their study observed leucocytosis 66% which is comparable to our study. Ultrasonography accuracy rate in diagnosis of appendiceal mass was 100% in this study which was almost similar to the report established by Samuel M et al[11] as 98%. Anaemia was found in 21%, UTI in 19%, elevated liver enzymes in 16% and abnormal serum electrolytes, urea and creatinine were found in 13% patients. X-ray chest PA view, ECG and Random blood sugar were found to be normal.

DURATION OF SYMPTOMS PRIOR TO ADMISSSION

Erik SK et al[16]and Khan AW et al[18] in their study reported the duration lapse between the onset of symptoms and reporting to hospital as 3.8 to 4 days.

This study also showed similar duration of symptoms as 64.2% of cases reported after 72 hours and the remaining 35.8% reported within 72 hours.

OPERATIVE FINDINGS

In this study open appendectomy was performed in 21 cases which comprises 7 emergency and 14 interval appendectomy.

Samuel M et al[11] in their study reported that 100% of patients had an identifiable appendix at operation and had adhesion and peri-appendiceal collection operated on first day of admission. In this study, 100% of adhesion and appendiceal lump and 86% of peri-appendiceal collection were noted in emergency appendectomy group. Khan AW et al[18] in their series reported that 100% of cases had an appendiceal lump and 86% had loculated collection.

Present findings are almost similar with the findings of the above mentioned author. In this study, out of 7 patients in emergency group, fecolith were there in 2 patients, perforation of appendix in 1 patient and gangrene in 1 patient.

POST OPERATIVE COMPLICATIONS

Kumar S et al[19] reported no wound infection in interval appendectomy group.Emmanuel BO et al[4] reported that wound infection in early appendectomy group to be 27.3%. Samuel M et al[11] in their study reported the incidence of post operative complication in early and interval appendectomy to be 12.1% and 0% respectively. De U et al[20] reported that 1.1% of patients developed band obstruction in immediate appendectomy group.

This study showed early appendectomy group had wound infection rate of 43% whereas it was 14% in interval appendectomy group. Obstruction was found in 14% with emergency groups.

HISTOPATHOLOGICAL FINDINGS

Samuel M et al[11] in their studies concluded that out of 48 interval appendectomy specimens, 37 (77%) had a patent lumen and 11(33%) showed fibrosis and obliteration of appendicular lumen. Joseph S et al[21] reported that pathological specimens revealed fibrosis in 46%, sub-acute inflammation in 35% and acute inflammation in 19% following interval appendectomy.Surana R et al[22] reported that evidence of inflammation was present on histological examination in 47.2% of the cases following immediate appendectomy following diagnosis of appendiceal mass in children.

In our study, fibrosis and obliteration of lumen were found in 21% and acute inflammation were 7% in interval appendicectomy patients.

HOSPITAL STAY

Brown CV et al[23] reported a mean hospital stay of 10.7±5.4 days. Surana R et al[22] reported a mean hospital stay of 9.7 days. Foran B et al[24] reported a mean hospital stay of 7.2 days. Erdogan D et al[25] reported a mean hospital stay of 8.9±2.6 days.

Present study comprised of mean hospital stay of 9.36±4.1.

VII. Conclusion

This study had concluded that incidence of appendicular lump are increasing in frequency (10.91%) in this part of the country, mean age group was 37.47±16.32, with male patients predominance, with majority from middle class socioeconomic status and Hindu by religion. The patient mostly presents with the right lower quadrant pain followed by anorexia and fever.The diagnosis was based on clinical and abdominal ultrasound. Most of the patients (69%) were treated successfully by conservative medical therapy with mean hospital stay 9.36±4.1.

The results of this study state that appendicitis associated with a lump could be treated safely and effectively by initially using conservative managements. In addition, it also confirmed that even in cases involving only ambulatory follow-up observation without interval surgery after conservative managements, the recurrence rate was not high, recurrence of appendicitis was detected early, and surgical treatments could be performed safely.

Clinical examination still remains the most important tool in the diagnosis of appendicular lump. Radiological investigations arenecessary, when there is doubtful palpable mass. We treated patients according toOchsner-Sherren regime and surgery wasdone when mass did not resolve or went in for complication. Majority of patients responded for conservative measures. So, weconcluded that conservative medical management is still preferred approach in treating appendicular lump.

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