

## APPENDICULAR MASS: EARLY OR INTERVAL APPENDICECTOMY

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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.<sup>[1-2]</sup> Traditionally, these patients are managed conservatively followed by interval appendicectomy 4-6 weeks later (Ochsner Sherren Regime). Advocates of initial conservative approach claim lower rate of complications compared to early operative approach.<sup>4</sup> 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. **Objectives:** This study is a clinical, prospective and comparative study conducted at TRR institute of medical sciences, Inole from Jan 2021 to Jan 2023. Total of 60 patients with appendicular mass were included in the study and they were allotted to two groups randomly having 30 patients each. 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 subjected to statistical methods like mean, standard deviation, percentage calculation and Fisher exact and t test. **Materials and Methods:** The study is done in 60 patients with appendicular mass who presented to surgery OPD at TRR Institute of Medical Sciences, Inole from Jan 2021 to Jan 2023 **Result:** The mean age of patients was 27.58 years ranging from 13 to 48 and majority of patients (50%) belonged to age group of 21-30 years. In group I, 13.33% patients had complications of which wound infection was commonest. In group II, 46.66% patients had complications of which failure of treatment and lost follow up were commonest. In group I, the mean duration of parenteral medication was 3.3 days. While in group II, it was 6.2 days. In group I, the mean duration of hospital stay was 5.3 days. While in group II, it was 8.5 days. **Conclusion:** Emergency appendectomy is a safe and feasible method of management in patients with appendicular mass.

## INTRODUCTION

An appendicular mass is a common surgical clinical entity, encountered in 2- 6% of patients presenting with acute appendicitis.<sup>[1]</sup> Appendicular mass is the localization 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.<sup>[2]</sup> 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.<sup>[3]</sup> Advocates of initial conservative approach claim lower rate of complications compared to early operative approach. <sup>4</sup>However in 10–20% of the cases, it proves un-successful 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.<sup>[4]</sup> 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.<sup>[5]</sup> 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. However this change is not widely accepted and a large number of surgeons still continue to adopt the same traditional conservative approach.<sup>[6]</sup> 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.<sup>[7-10]</sup> 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 appendectomy in appendicular mass in our hospital by comparing the results of an equal number of patients treated conservatively.

#### Aims and Objectives

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

## MATERIALS AND METHODS

The study is done in 60 patients with appendicular mass who presented to SURGERY OPD, at TRR Institute of Medical Sciences, Inole, from 1<sup>st</sup> Jan 2021 to 01<sup>st</sup> Jan 2023. Our study is a clinical, prospective and comparative study conducted during the period of 1<sup>st</sup> Jan 2021 to 01<sup>st</sup> Jan 2023.

**Method of Collection of Data** The study is done after obtaining a detailed history, complete general physical examination and systemic examination. The patients are subjected to relevant investigations like Hb, TC, urea, creatinine, serum electrolytes, urine routine, USG abdomen and HPE of the operative specimen. All investigations and surgical procedures were carried out with proper informed written consent as appropriately. 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 subjected to statistical methods like mean, standard deviation, proportion, percentage calculation and Fisher exact and t test are used.

#### Inclusion Criteria

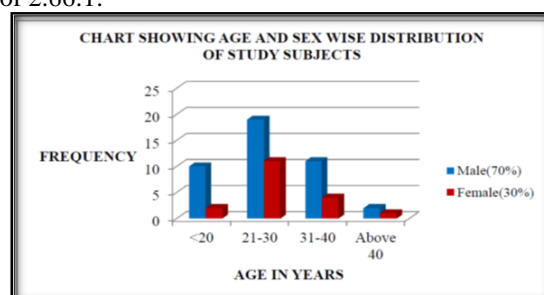
Patients admitted with signs and symptoms of appendicular mass during the study period. 2. Patients diagnosed with appendicular mass during surgery for acute appendicitis.

#### Exclusion Criteria

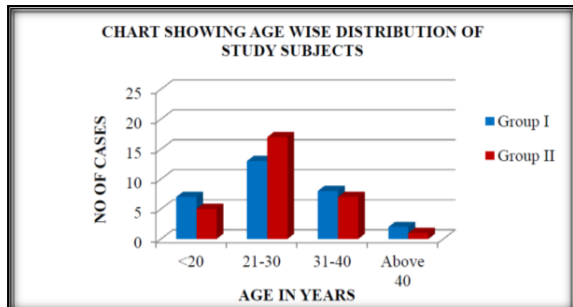
Pregnant patients. 2. Patients not fit for surgery. 3. Patients with signs of diffuse peritonitis. **MODE OF STUDY:** This prospective study was conducted at TRR Institute of Medical Sciences, Inole. A total of sixty patients were included. Thorough history and clinical examination was made. Complete 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 divided randomly in two groups, each containing thirty. In Group I, early surgical exploration was done within 24hrs of admission. Preoperative 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 48hrs and sutures were removed on the 7<sup>th</sup> 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 Regime 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 group. 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. A comparison of outcome between two groups was done statistically by applying Fisher's exact test and t test.

## RESULTS

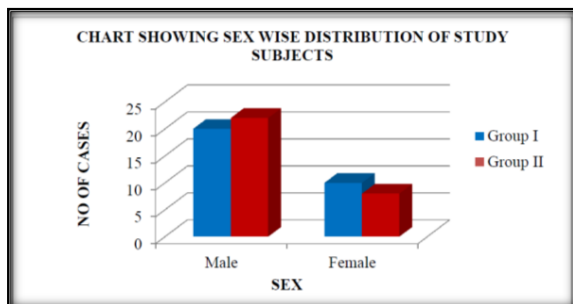
In our study, 60 cases of appendicular mass who attended surgical emergency were selected over a period of one and half year from 1<sup>st</sup> Jan 2021 to Jan 2023 and they were divided in two groups, each containing thirty. In our study of 60 cases, the mean age of patients was 27.58 (SD8.11) years 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.



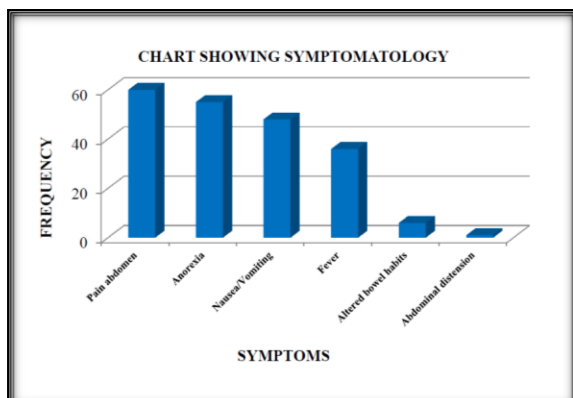
Our study of 60 cases, the patients were divided in two groups, each containing thirty. In group I the mean age of study subjects was 27.83 (SD 8.65) years ranging from 13 to 48 and majority of patients (43.33%) belonged to age group of 21-30 years. In group II the mean age of study subjects was 27.33 (SD 7.68) years ranging from 17 to 45 and majority of patients (56.66%) belonged to age group of 21-30 years.



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.



Study all the patients had pain abdomen and 55(91%) cases had associated anorexia with nausea/vomiting in 48(80%) cases. 60% patients had fever.

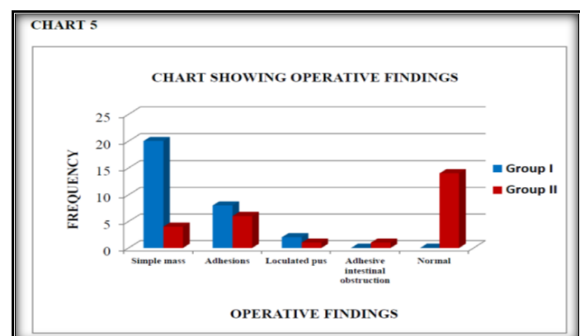


**Figure 8: Intra-Op Photo of Appendicular Mass with Adhesions**

In group I, the operative finding in majority (66.66%) of the patients was simple mass, 8 had adhesions and loculated pus in 2.



In group II the operative finding in majority (53.84%) of the patients was a normal finding, 4 had simple mass, 6 had adhesions, 1 had loculated pus and adhesive intestinal obstruction in 1

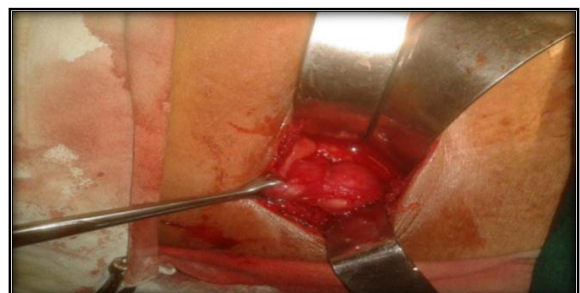


**Figure 9: Intra-Op Photo of Appendicular Mass with Loculated Pus**



**Figure 10: Intra-Op Photos of Appendicular Mass**

In our study, the major (13.33%) operative problem in group I patients was difficulty in localization of appendix. The major (19.23%) operative problem in group II patients also was difficulty in localization of appendix.

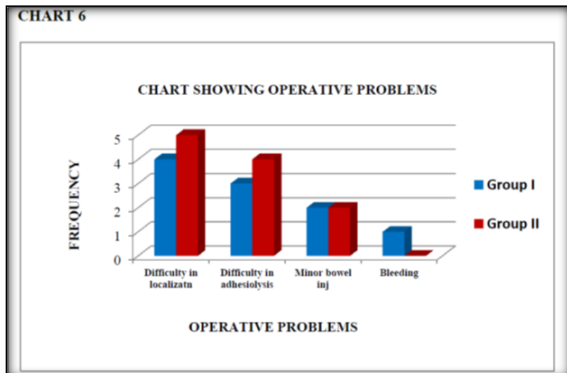


**Figure 11: Intra-Op Photo of Dissection of Appendicular Mass**





Fisher's exact test was applied and the p value was found to be  $>0.05$  which is insignificant.



**Figure 12: Intra-Op Photo of Dissection of Appendicular Mass**

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 follow up and the overall rate of complication was 46.66%.



**Figure 13: Post-Op Photo of Wound Infection**



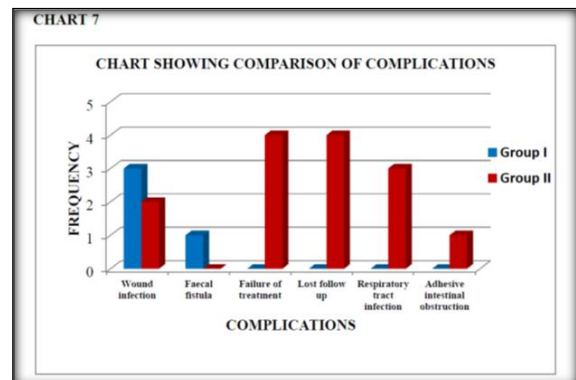
**Figure 14: Post-Op Photo of Fecal Fistula**

Faecal fistula developed in one patient in group I which was managed successfully, conservatively.

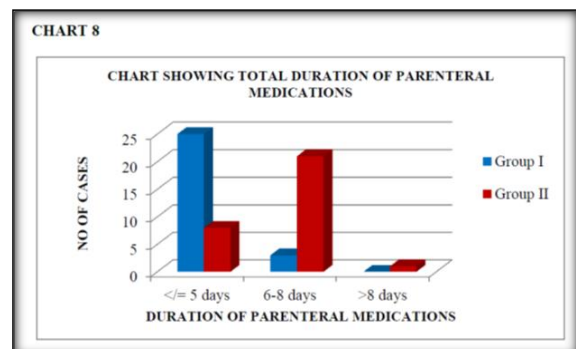
Four patients in group II had failure of conservative management and had to undergo emergency surgery in a difficult situation. Of the four, one had adhesive intestinal obstruction and had to undergo laparotomy, adhesiolysis and appendectomy with an uneventful post op recovery. Another four patients managed successfully by Oschner Sherren regime did not return for interval appendectomy and their fate is unknown.



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.

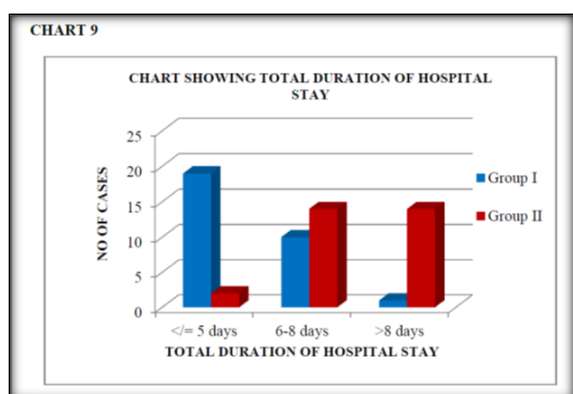


There was no mortality noted in either of the groups.



Histopathology of all the appendix specimens of group I patients showed features of acute appendicitis and that of group II patients showed features of chronic appendicitis in all except the four patients who underwent emergency appendectomy due to failure of conservative management, in whom it showed features of acute appendicitis. The fate of the four cases that were managed successfully by

conservative management but lost follow up and did not return for interval appendectomy is unknown. \*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  $\leq 5$  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.



In this study, the majority (63.33%) of group I patients had total duration of hospital stay for  $\leq 5$  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  $\leq 5$  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 is significant

## DISCUSSION

An appendicular mass is a common surgical clinical entity, encountered in 2-6% of patients presenting with acute appendicitis.<sup>[11]</sup> The treatment of appendicular mass is taking a turn from the traditional approach of initial conservative treatment followed by interval appendectomy to immediate appendectomy.<sup>5</sup> However this change is not widely accepted and a large number of surgeons still continue to adopt the same traditional conservative approach. 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. In the present study sixty cases of appendicular mass those attended TRR Institute of Medical Sciences, Inole emergency from January 2021 to Jan 2023 were included. The patients were divided randomly in two groups, each containing thirty. In Group I, early surgical exploration was done within 24 hrs. of admission. In Group II, conservative approach with Ochsner Sherren Regime was adopted followed by interval appendectomy 6-8 weeks later. The mean age of patients was 27.58 years ranging from 13 to 48 and

majority of patients (50%) belonged to age group of 21-30 years. There are many other studies in literature where surgery in appendicular mass has been studied. Some of those which closely resemble the present study are: De U, Ghosh S. in their study involving 87 patients evaluated the feasibility of acute appendectomy in patients with an appendicular mass included 48 patients presented with a classical appendix mass, 25 patients (28.7%) had classical features of appendix abscess, and in 14 (16.1%) a loculated collection of pus (10 to 50 ml) was found. Operative time ranged from 45 to 90 min (mean 65). Pathologic evidence of appendicitis was present in all patients. 71 patients were discharged on the seventh postoperative day. 15 patients developed minor wound infection. One patient developed band obstruction, which subsided spontaneously on conservative treatment. Rest of the patients did well. Meade RH et al concluded that low morbidity, reduced hospital stay, low cost and patient compliance favour operative management of appendicular mass by experienced surgeons thus obviating the old practice of conservative treatment followed by interval appendectomy.<sup>[12]</sup> Bahram MA. conducted a prospective, nonrandomized study over 46 consecutive patients (mean age:  $24 \pm 8.76$  years) presenting with an appendicular mass over a 4-year period. They were subjected for immediate appendectomy within 24 h of admission. The appendix was identified and removed in all 46 patients at operation. Peri-appendiceal abscesses were present in 25% (11 of 46). There was difficulty with adhesiolysis and localization of the appendix in 10% (4) of patients. Superficial wound infection had occurred in 8 (17%) while deep wound infection had occurred in 9 (4) patients. The mean hospital stay was  $3 \pm 0.25$  day. No major complications had occurred. Conclusion was made that early surgical intervention in patients with an appendicular mass is feasible, safe and avoids the consequences of the misdiagnosis and mistreatment of other surgical pathologies.<sup>[13]</sup> Cunnigaiper ND, Raj P, Ganeshram P, Venkatesan V analyzed retrospectively 506 patients (240 males, 266 female) who underwent emergency appendectomy for suspected appendicitis and appendicular mass. The postoperative outcomes were compared between the two groups of patients classified as with or without the mass. A total of 506 patients were included in the study, of which 114 had appendicular mass. A comparison of the two groups demonstrated no major complications in either group. There was significantly increased incidence of minor complications in the group of patients with mass, although the incidence of wound infection showed no significant difference between the two groups. There was a significantly increased usage of drain / duration of stay in patients with mass. It was concluded that low morbidity, reduced hospital stay, low cost, and patient compliance favor early operative management for appendicular mass, and it also avoids the possibility of missing entities like

intestinal/peritoneal tuberculosis, which have similar presentations and are especially common in a country like India.<sup>[14]</sup> Bülent KAYA, IBarış SANA et al suggested a simple appendectomy was performed in 38 (80.9%) patients. Twenty-nine (61.8%) patients were discharged and followed up without any complication after surgery. Wound infection was detected in 13 (27.7%) patients. Immediate appendectomy in appendicular mass is a safe and effective alternative to conservative management.<sup>[15]</sup> Vishwanath V Shindholimath et al.: A total of 120 patients were treated for appendicitis. A retrospective review of the patients' records demonstrated that 19 patients (15.8%) had appendicular mass at the time of admission. The average operative time was 95 minutes (range 45-140 minutes). Pathological evidence of appendicitis was present in all the patients. The average length of hospital stay was six days (range 6-9 days). Three patients (15.7%) had post-operative complications. Two patients developed wound infections and one patient was re-admitted with pain and a lump below the umbilical port. They concluded that laparoscopic appendectomy is feasible in patients with appendicular mass. The authors propose a prospective, randomized trial to verify this finding.<sup>[16]</sup> Goh BK, Chui CH, Yap TL, Low Y, Lama TK, Alkouder G, Prasad S, Jacobsen AS. This is a prospective study of 88 consecutive pediatric patients who underwent attempted LA for suspected acute appendicitis. A total of 88 patients with a mean age of 10 +/- 3 years (range, 3-16 years) underwent LA for an appendiceal mass (n = 22), simple appendicitis (n = 36), other complicated (gangrenous or perforated) appendicitis (n = 23), and a normal appendix (n = 7). There were 7 conversions to open appendectomy, 3 of which occurred in patients with an appendiceal mass. There were no perioperative or postoperative mortalities. Morbidity occurred in only one patient who underwent LA for perforated appendicitis. He had prolonged sepsis that resolved after 2 weeks of intravenous antibiotics. None of the patients with an appendiceal mass developed complications. Patients who underwent early LA for an appendiceal mass had a statistically significant (P < .05) longer operating time (median, 103 minutes; interquartile range, 90-151 minutes, vs median, 87 minutes; interquartile range, 71-112 minutes), prolonged time to ambulation (median, 2.0 days; interquartile range, 2-2.5 days, vs median, 1.0 days; interquartile, 1-2 days), increased time to resumption of diet (median, 4 days; interquartile, 3-5 days, vs median, 2 days; interquartile, 2-3 days), and longer postoperative stay (median, 6.0 days; interquartile, 5.5-6.5 days, vs median, 4.0 days; interquartile, 3-5.5 days) compared with patients presenting with appendicitis without mass formation. However, there was no statistical difference in these parameters when LA for an appendiceal mass was compared with LA for other complicated appendicitis (perforated and gangrenous). Concluding that although early LA for

an appendiceal mass is a technically demanding procedure, it can be performed safely in children with minimal morbidity and mortality. In an era where patients' demand for "key-hole" surgery is rising, early LA is a safe and viable option in the management of children with an appendiceal mass. It also offers the advantage of avoiding misdiagnoses and the need for a second hospitalization.<sup>[17]</sup> Ball CG, Kortbeek JB, Kirkpatrick AW, Mitchell P: Consecutive patients (n = 304) who underwent laparoscopic appendectomy were studied. Patients undergoing open appendectomies also were compared ad hoc. Analgesia use, length of hospital stay, return to activity, and complication rates for the complicated and uncomplicated appendicitis subgroups were analyzed. Complete data were available for 243 patients (80%). There were no statistical differences in characteristics between the two groups. The operating times, lengths of hospital stay, return to activity times, complication rates, and analgesia requirements, both in the hospital and after discharge, were equivalent. A greater number of complicated cases required open conversion. Considering those with complicated appendicitis, the open group had a significantly longer mean hospital stay and a higher complication rate than those treated with laparoscopic appendectomy. They concluded that minimally invasive laparoscopic technique is safe and efficacious. It should be the initial procedure of choice for most cases of complicated appendicitis.<sup>[18]</sup>

## CONCLUSION

Appendicular mass is common in males. Mean age of presentation of appendicular mass is 27.58 yrs. ranging from 13 to 48 years. Ultrasound is the investigation of choice in pts. with appendicular mass. There is no significant difference in the operative problems faced between the two lines of management studied here. There was a significant difference in the complications between the two groups with more complications occurring in the group of patients treated by Ochsner-Sherren regimen followed by interval appendectomy and hence these patients had more morbidity. The duration of parenteral medications was more in group II than in group I and was statistically significant. The total duration of hospital stay was more in group II patients than in group I hence increasing the economic burden on the patient. Early appendectomy obviates the need for a second admission and provides curative treatment during the index admission whereby minimizing total expenses. Early appendectomy may also avoid the consequences of the misdiagnosis and mistreatment of other surgical pathologies. Early appendectomy in appendicular mass is safe owing to the improvements in surgical skills and better post-operative care. Low morbidity,

reduced hospital stay, low cost and patient compliance favour operative management of appendicular mass by experienced surgeons thus obviating the old practice of conservative treatment followed by interval appendectomy.

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