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THE ROLE OF EARLY LAPAROSCOPIC / OPEN APPENDECTOMY IN APPENDICULAR LUMP

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ABSTRACT

Introduction: Acute appendicitis is the most common cause of an 'acute abdomen' in young adult. Advances in modern radiographic imaging have improved diagnostic accuracy. (***Bailey and love 26th edition***). Appendiceal mass was defined as an inflammatory mass consisting of an inflamed appendix and adjacent viscera, ranging from phlegmon to well-defined abscess **(Nitecki S 1993, Meshikhes A-WN 2008, Andersson RE 2007, Simillis C 2010)**. The diagnosis of appendiceal mass is based on clinical examination, computed tomography (CT), trans abdominal ultrasound (US) or peroperative findings. In this modern era where facilities and expertise of laparoscopic surgery is available, laparoscopic appendicectomy for both complicated (appendicular lump) and uncomplicated appendicitis is recommended.**(Ali s etal 2010, Arshad m 2011, Taj MH 2006). Materials and Method:** This was prospective study done at B P Koirala Institute of Health Science for duration of one year in patients of appendicular lump presenting with in 7 days. The inclusion criteria was patients with the right iliac fossa lump consistent with appendicular lump (pre operative or intra operative) presenting within 7 days. The exclusion criteria were patients presenting after 7 days of clinical signs and symptoms consistent with appendicular lump, patients on conservative management who had to be operated due to failure of treatment beyond 7 days and patients refusing to take part. A detailed history taken from the onset of symptoms and presentation. A complete workup for operation and pre anesthetic checkup was done before the operative intervention. Laparoscopic and open appendectomy was performed. **Results:** A total of 35 patients were selected for evaluation over a period of one year. A total of 20 (57%) males had age ranged from 9-74 years and 15 (43%) were females, age ranging from 11–66 years. Maximum 14 (40%) patients were in the age group between 0-20 years, followed 12 cases (34%) between 21-40 years. Majority of 20 (58.8%) cases were diagnosed intra operatively by the operating surgeon and these were reported normal by ultrasonography. There were 8 (23.5%) patients diagnosed by ultrasonography and later on confirmed by the operating surgeon. 7 (17.7%) cases were diagnosed only by ultrasonography, as it was difficult to assess them clinically due to guarding and tenderness. In our study 23(65.71%) cases underwent open appendectomy while 9(25.71%) cases had laparoscopic appendectomy and 3(8.57%) need conversion to open appendectomy, due to operative difficulties. **Conclusion:** From our study data's and comparison to conservative group and other study, it is clearly seems that early intervention in appendicular lump is feasible, safe with good patient compliance and less hospital stay. In our study first seven days of intervention seems safe with minimum complications. No significant difference noted in any particular day. Early surgical interference during the first admission of patients with an appendicular lump is feasible, safe and avoids the consequences of the misdiagnosis and mistreatment of other surgical pathologies.

INTRODUCTION

The vermiform appendix is considered by most to be a vestigial organ; its importance in surgery results only from its propensity for inflammation, which results in the clinical syndrome known as '**acute appendicitis'**.

Acute appendicitis is the most common cause of an 'acute abdomen' in young adults. Appendicitis is sufficiently common in that appendicectomy is the most frequently performed urgent abdominal operation. Advances in modern radiographic imaging have improved diagnostic accuracy. (***Bailey and love 26th edition***).

Appendicular lump

One of the outcomes of acute appendicitis within the 72 hrs of its commencement and is composed of appendix, omentum, edematous caecum and edematous loop of

ileum. **(Arshad Malik etal 2008)**. In patients suffering from acute appendicitis, up to 7% present with an appendicular mass **(Andersson RE 2008, Kaminski A 2005)**. The pathological spectrum may range from discrete phlegmon to abscess formation **(Nitecki S 1993, MeshikhesA-WN 2008)**.

Appendiceal mass was defined as an inflammatory mass consisting of an inflamed appendix and adjacent viscera, ranging from phlegmon to well-defined abscess **(Nitecki S 1993, Meshikhes A-WN 2008, Andersson RE 2007, Simillis C 2010)**. The diagnosis of appendiceal mass is based on clinical examination, computed tomography (CT), trans abdominal ultrasound (US) or peroperative findings.

With the availability of modern operative and anesthesia facilities and to avoid the uncertain natural course and misdiagnosis, an early exploration of the appendicular mass is recommended. This shortens the hospital stay, cures, diagnoses the disease and obviates the need of a second hospital admission with no added morbidity andmortality. In this modern era where facilities and expertise of laparoscopic surgery is available, laparoscopic appendicectomy for both complicated (appendicular lump) and uncomplicated appendicitis is recommended.**(Ali s etal 2010, Arshad m 2011, Taj MH 2006).**

A large retrospective population-based cohort study of 1012 patients treated initially with conservative therapy showed that only 39 (5%) patients developed recurrent symptoms after a median follow-up of 4 years with male sex having a slight influence on recurrence. They concluded that Interval appendectomy after initial successful conservative treatment is not justified.**(Chen C etal, 2003).**

The non-operative management of patients presenting with an appendicular mass is not always successful. Authors estimate that approximately 10-20% of such patients fail to respond and require a delayed and potentially more difficult appendicectomy with possible laparotomy and bowel resection. Moreover, approximately 50% of patients may suffer a recurrence of their appendicitis/appendicular mass following discharge from hospital.***(Sanapathi PSP et al 2002).*** A large number of patients refuse readmission for operation once their acute problem is solved and this is a major disadvantage of the initial conservative approach. Another disadvantage of the conservative management is the chance of misdiagnosis (15%) in conditions such as intussusception and carcinoma of the caecum may be treated conservatively by mistake adding considerable morbidity.***(Sanapathi PSP et al 2002, Garg p et al 1997).***

With the availability of modern operative and anesthesia facilities and to avoid the uncertain natural course and misdiagnosis, an early exploration of the appendicular mass is recommended. This shortens the hospital stay, cures and diagnoses the disease and obviates the need of a second hospital admission with no added morbidity and mortality. In this modern era where facilities and expertise of laparoscopic surgery is available, laparoscopic appendectomy for both complicated (appendicular lump) and uncomplicated appendicitis is recommended.**(Ali s etal 2010, Arshad m 2011, Taj MH 2006)**. The need of interval appendectomy has been questioned. ***(Ein SH et al 1996, Eriksson S et al 1998),*** advocates of initial conservative approach claim lower rate of complications compared to early operative approach***. (Tingstedt B et al 2002).*** The studies favouring immediate appendicectomy claim an early recovery and complete cure during the same admission. ***(Choudhary ZA et al 1996, Vakili C et al 1976, Al-Sammarai AY et al 1995)***.

We undertook this study to evaluate the feasibility and safety of immediate appendectomy in appendicular mass in our population. We wanted to determine patients outcome following appendectomy for an appendicular lump.The aim of study was to study the feasibility and safety of early lapararoscopic / open appendectomy in patients with an appendicular lump presenting within 7 days**.** The objectives of study were to assess the success rate of Emergency Appendectomy in an appendicular lump and to assess the proper timing for Emergency Appendectomy in an appendicular lump**.**

MATERIALS AND METHODOLOGY

This was prospective study done at B P Koirala Institute of Health Science for duration of one year in patients of appendicular lump presenting with in 7 days. The inclusion criteria was patients with the right iliac fossa lump consistent with appendicular lump (pre operative or intra operative) presenting within 7 days. The exclusion criteria were patients presenting after 7 days of clinical signs and symptoms consistent with appendicular lump, patients on conservative management who had to be operated due to failure of treatment beyond 7 days and patients refusing to take part**.** All data were entered into Microsoft EXCEL and Statistical analysis done in SPSS statistical software. Following measures were done like frequency, percentage, mean, median, standard deviation, different graphical methods and tabular presentation. Ethical clearance was taken from the Institutional ethical review board before the start of the study.

METHODOLOGY

All patients with appendicular lump presenting within 7 days to outpatient or Emergency at B.P. Koirala Institute of Health sciences, Dharan were enrolled in the study. Patients who met the exclusion criteria were excluded from the study group. The patients were examined by surgeon before inclusion in the study group. They were asked to sign an informed consent after explaining the intervention group, their possible outcome and complications. A detailed history taken from the onset of symptoms and presentation. Then Clinical examination

was done looking for sign and symptoms like tenderness in right iliac fossa, vomiting, palpable mass in right iliac fossa, anorexia, tachycardia and low grade pyrexia, leucocytosis, neutrophilia. Later on ultrasonographic evaluations was done to know about characteristics of lump, size and to exclude any other lump in right iliac fossa other than the appendicular origin.

After proper history and examinations including ultrasonographic findings, pre operative resuscitation of patients were done with adequate IV fluids**.** Management of symptoms were done for pain, fever, vomiting. Antibiotic coverage was started (ceftriaxone + ornidazole). Patients were kept nil per oral for at least 6 hours prior to intervention. A complete workup for operation and pre anesthetic checkup was done before the operative intervention

METHODS

Open Appendicectomy (procedure)

The patient was given either a general or spinal anaesthesia and operated in a supine position. Prophylactic antibiotics were given to reduce the incidence of wound infection. The abdomen was painted and draped to expose the right lower quadrant and to allow identification of the umbilicus and right anterior superior iliac spine. Classically the incision overlied McBurney's point. An incision was made perpendicular to this line. In case of difficulty incision was extended
After the skin incision the subcutaneous fat was divided, Camper's and Scarpa's fascia down to the external oblique aponeurosis. An incision was made in line of the fibres into the external oblique aponeurosis with a scalpel and extended with tissue scissors. Beneath this the internal oblique muscle was split with a pair of curved artery forceps. The split was enlarged with either fingers or a pair of retractors. Peritoneum was visible, picked by and tented by two small artery forceps. The peritoneum was then opened after ensuring there is nothing adherent to the underlying peritoneum.

In case of appendicular lump adheseolysis was performed to deliver the appendix by separating adjacent surrounding structures carefully. Once the appendix was delivered, mesoappendix was then clipped and divided and the pedicles tied. Appendix base was crushed and ligated ensuring hemostasis and appendectomy done. The ceacum was gently placed back into the peritoneal cavity and any fluid sucked out. A normal saline washout was performed. Tube drain 28 f was placed in the pelvic cavity in every case.

The internal oblique and the transverse abdominis muscle fibres were loosely approximated with some interrupted stitches with vicryl. The external oblique defect was securely repaired with a continuous 1/0 absorbable suture. A local anaesthetic agent infiltrated to provide postoperative pain relief. Skin closed with an interrupted nylon suture or skin clips.

Laparoscopic Appendicectomy: 3 port method

All cases were operated under general anaesthesia in trendlenberg position with lateral tilt.

STEP 1: Exposing the Appendix
A pneumo-peritoneum was created after making umbilical port (Hassan's method). The trocars were inserted. A atraumatic grasper [Endo Babcock or Dolphin Nose Grasper] was inserted via the right upper quadrant trocar . The cecum was retracted upwards towards the liver. Blunt dissection was done in cases of appendicular lump for visualization of appendix. After dissection appendix was grasped with a 5 mm claw grasper inserted via the supra-pubic trocar . It was held towards the abdominal wall.

STEP 2: Creating the Mesenteric Window
A dolphin nose grasper was used to create a mesenteric window under the base of the appendix. The window was made as close as possible to the base of the appendix and approximately 1cm in size. Possible surrounding adhenolysis was performed in case of appendicular lump with irrigation and blunt dissection performed to visualize the appendix.

STEP 3: Transecting the Meso-appendix and Appendix
The mesoappendix separated via dissector and appendicular artery clipped and mesoappendix divided. Appendicular base identified and tied with monofilament no1 suture (loop method) and divided. The appendicular artery and base of the appendix was inspected for haemostasis.

STEP 4: Retrieving the Appendix
The appendix was removed through 10mm umblical port by grasper. The intra-abdominal cavity was irrigated thoroughly with normal saline. In every cases of perforated appendicitis or lump with or without an intra-abdominal abscess, suction drain 16 F was placed in the right paracolic gutter or pelvis. Rectus closed with vicryl no1 suture and skin was closed with skin stapler.

Postoperative Care: Patients were than transferred to ward for postoperative care. Routine observation of pulse, heart rate, blood pressure, temperature, respiratory rate, input / output charting were done. Further doses of the antibiotics, pain killers and iv fluids were given postoperatively accordingly to the patient conditions and symptoms. The drain was removed after inspecting the quantity and content of drain fluid. Patients were then discharged with proper medical advice including date of suture removal and was followed up at the end of 1 week, 2 weeks and 4th week, 6wks at the outdoor.

TERMINOLOGIES AND DEFINITIONS

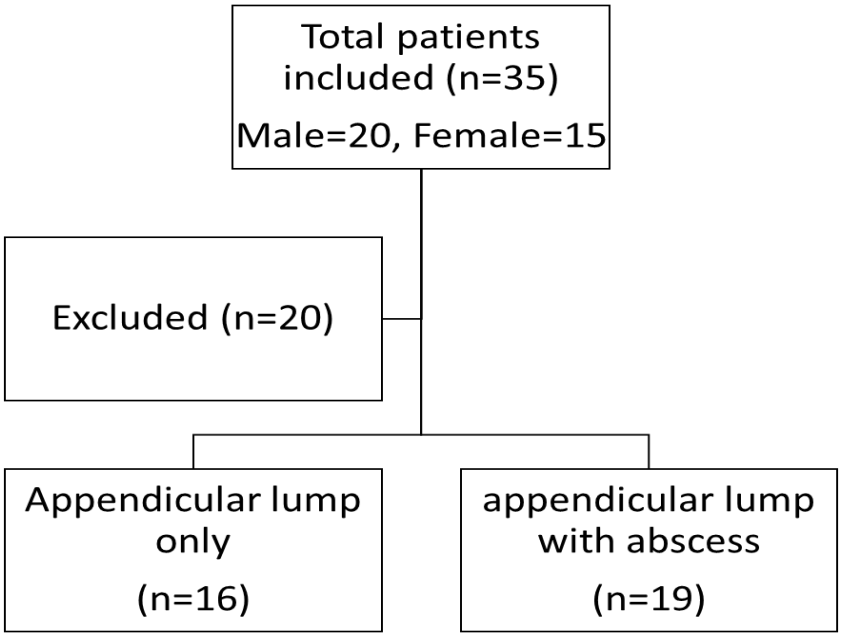
1. Appendicular lump – Phlegmon formed of appendix, bowel loops and omentum without pus.
3. Superficial wound infection - wound infection up to skin and subcutaneous tissue.

4. Deep wound infection - Infection extending deep up to the muscle layer.
5. Residual abscess – Remaining abscess, post operatively in intra abdominal cavity diagnosed by ultrasound scan.

RESULTS

A total of 35 patients were selected for evaluation over a period of one year. We also compared the mean hospital stay of 20 patients were who were conservatively managed excluded or underwent extra peritoneal drainage either due not fulfilling our inclusion criteria or other reason from the study.

This flowchart depicts our study of patients who presented with appendicular lump over one year period:



Gender distribution

We had a total of 35 cases of appendicular lump in a one year study period. Male predominance was seen as shown in table 1 and Fig 1. A total of 20 (57%) males had age ranged from 9-74 years and 15 (43%) were females, age ranging from 11–66 years. The distribution of age of patients is given in Table. 2.

Table 1: Gender distribution of study population.

Gender	Total no of patients
Male	20 (57%)
Female	15 (43%)

Age distribution

Maximum 14 (40%) patients were in the age group between 0-20 years, followed 12 cases (34%) between 21-40 years as shown in Table 2 and fig 2.

Table 2: Age distribution (Range).

Age Range (years)	No of patients(n)
0-20	14 (40 %)
21-40	12 (34%)
41-60	5 (14 %)
61-80	4 (11%)

Geographical distribution

We had a total of 35 patients in our study. A majority of 16 cases (46%) cases belonged to Sunsari, followed by Morang, 5(14%), Saptari, 4(11%) and 3(9%) case from Dhankuta district.

Assessment of lump

Majority of 20 (58.8%) cases were diagnosed intra operatively by the operating surgeon and these were reported normal by ultrasonography. There were 8 (23.5%) patients diagnosed by ultrasonography and later on confirmed by the operating surgeon. 7 (17.7%) cases were diagnosed only by ultrasonography, as it was difficult to assess them clinically due to guarding and tenderness. The methods of diagnosing an appendicular lump has been mentioned in Table 3.

Table 3: Diagnosis of an appendicular lump.

Method of assessment	No of cases	%
Ultrasonography	7	17.7
Intra operative	20	58.8
Both	8	23.5
Clinically palpable	14	40

DAY OF OPERATION

Majority of appendicular lump were operated on 4th day (14/40% cases) followed by 3rd day (9/26% cases) and 5th day (6/17% cases). Day of operation in relation to numbers of patients are shown in Table 4 and fig 5.

Table 4: Number of patients operated with day of presentation.

Day of operation	No of patients	%
1st	0	0
2nd	1	2.85
3rd	9	25.71
4th	14	40
5th	6	17.14
6th	0	0
7th	5	14.28

Types of surgery

In our study 23(65.71%) cases underwent open appendectomy while 9(25.71%) cases had laparoscopic appendectomy and 3(8.57%) need conversion to open appendectomy, due to operative difficulties.(Table 6 and fig 6)

Table 6: Methods of surgery.

Type of surgery	No of patients (n)	%
Open	23	65.71%
Laparoscopic	9	25.715
Converted	3	8.57%

We had in our results that mean duration of surgery was maximum in laparoscopic appendectomy viz.100 minutes and ranged from 1 hr 10 minutes up to 3 hrs while cases which converted to open appendectomy required 93 minutes and ranged from 1hr 25 minutes up to 1 hr 45 minutes and in open appendectomy time taken was 60 minutes ranged from 45 minutes up to 1 hr 30 minutes as shown in table 7 and figure 7.

Table 7: Types of surgery and duration of operation (mean).

Type of surgery	Mean operative time (minutes)	Range
Open	60	45 mins – 1hr 30 mins
Laparoscopic	100	1 hr 10 mins – 3 hrs
Converted	93	1hr 25 mins – 1hr 45 mins

Operative findings

In our study majority of 19 (54.28%) cases were found to have an appendicular lump with abscess and 16 (45.72%) cases had an appendicular lump as shown in Table 7 and fig. 8.

Table 7: Operative findings.

Operative findings	No of cases	%
Lump	16	45.7
Lump with pus/abscess	19	54.2

Operative difficulties

The most frequent intra-operative difficulty 26(76.5%) cases had in our study was difficulty in adhesiolysis, 18(52.9%) cases need extension of an incision and we found difficulty in localization of appendix was in 8(23.5%) cases, as shown in Table 8.

Table 8: Operative difficulties.

Operative difficulties	No of cases (%)
Difficulty In adhesiolysis	26 (76.5%)
Incision extended	18 (52.9%)
Difficulty in localization of appendix	8 (23.5%)

Post operative complications

In our study the most frequent post operative complication was superficial wound infection in 3 (8.57%) cases while deep wound infection and residual abscess was seen only in 1 case (Table 9 and Fig 9). None of our patients developed other complications like faecal fistula or an intra abdominal abscesses or wound dehiscence, during hospitalization, after discharge or during follow up period.

Table 9: Post operative complications.

Post operative complications	No of cases (%)
Superficial wound infection	3 (8.57%)
Deep wound infection	1 (2.85%)
Residual abscess	1 (2.85%)

Post operative hospital stay

In our study the mean post operative hospital stay of 3.3 days was seen in converted cases. It was followed by laparoscopic appendectomy, 2.8 days and 2.7 days in open appendectomies as shown in table 10. The overall mean post operative hospital stay of 2.93 days was noted which ranged from 2 to 6 days.

Table 10: Type of surgery and mean hospital stay.

Type of surgery	mean hospital stay (days)
Converted	3.3
Laparoscopic	2.8
Open	2.7

Day of surgery in comparison to age,gender, operative findings, mean operative time and hospital stay

In our study we also made a comparison of the various parameters with the day of surgery to assess the safe window for operating an appendicular lump. In relation to gender distribution maximum numbers of males and females were operated on the 4th day (9 males and 7 females), age group ranged from 9 - 61 years. (Table 11).

A simple appendicular lump without any difficulty or intra-operative complication was seen on day 3 (8/9 cases) and on day 4 (8/14 cases) too while tendency to abscess formation seemed to increase with passage of

time viz. in day 4 (6/14 cases, 43%), day 5 (3/ 6, 50% cases) and day 7 (5/ 5, 100% cases). (Table 11)

Table 11: Operative day in relation to age, gender, and operative findings.

Operation Days	Total no of cases	Gender		Age (range)	Appendicular lump (No of cases)	Appendicular lump + abscess (No of cases)
		Male	Female			
2nd	*1*	*0*	*1*	*16 yrs*	*1*	*0*
3rd	*9*	*5*	*4*	*17-66 yrs*	*8*	*1*
4th	*14*	*9*	*7*	*9-61 yrs*	*8*	*6*
5th	*6*	*4*	*2*	*11-74 yrs*	*3*	*3*
7th	*5*	*3*	*2*	*5-55 yrs*	*0*	*5*

Mean duration of surgery was seen to be minimum on the 2nd day (55 min, 1 case) while maximum time was taken on 4th day (mean 81.64 min) out of 14 cases where 9 Open, 4 Laparoscopic and 1 converted case were included. In our study cases presented on the day 3rd, 4th and 5th has been operated by laparoscopic method along with open appendectomy. There were 4 females and 1 male patient and 2 males and 1 female case operated on 4th and 5th day of presentation in which male patient (1/5) on day 4 and 2 patients 1 male and 1 female patient has seen converted to open appendectomy due to operative difficulties as shown in Table 12.

Patients operated on the 5th day had to be in the hospital for 3.66 days, those operated on the 2nd day had a stay of 2 days and those operated on the 4th day were kept in the hospital for 2.64 days as shown in Table 12.

Table 12: Operative time, post operative hospital stay and type of surgery with relation to day of surgery.

Day	Type of appendectomy (no of cases)			Mean operative time (minutes)	Mean post operative hospital stay (days)
	open	Laparoscopic	Conversion		
2nd	1	0	0	55	2
3rd	4	4	0	63.11	2.66
4th	9	4	1	81.64	2.64
5th	3	1	2	76.66	3.66
7th	5	0	0	68	2.8

Day of surgery in comparison to operative difficulties and post operative complications

In terms of operative difficulties encountered by the surgeon, compared with the day of surgery, there was a need to extend incision which was maximum on day 4 and day 7 (6 cases each) while 4 cases had difficulty in localization of appendix and 12 cases had difficulty in adhesiolysis seen on 4th day.

Post operative complications 3/35, developed superficial wound infection which was on day 3, 4th and 5th day while one case developed deep wound infection and residual abscess formation on the 5th day which was managed by antibiotics and ultrasound guided aspiration. (Table 12 and 13).

Table 13: Operative difficulties in relation to day of surgery.

Operative difficulties (no of cases)	2nd day	3rd day	4th day	5th day	7th day
Need of extension of incision	0	2	6	4	6
Difficulty in localization of appendix	0	1	4	3	0
Difficulty in adhesiolysis	0	7	12	4	5

Table 14: Post operative complications with day of surgery.

Post operative complications (no of patients)	3rd day	4th day	5th day
Superficial wound infection	1	0	0
Deep wound infection	0	0	1
Residual abscess	0	0	1

Day of operations		2nd	3rd	4th	5th	7th
Total no of cases		1	9	14	6	5
Sex distribution		1F/4M	5M/4F	9M/5F	4M/2F	3M/2F
Pt's with lump only		1	8	8	3	0
Pt's with lump + abscess		0	1	6	3	5
mean operative time (mins)		55	63.11	81.64	76.66	68
Operative difficulties	NEI	0	2	6	4	6
	DIL	0	1	4	3	0
	DIA	0	7	12	4	5
Post-operative complications	SWI	0	1	1	1	0
	DWI	0	0	0	1	0
	RA	0	0	0	1	0
Mean post op. hospital stay		2	2.66	2.64	3.66	2.8

HISTOPATHOLOGICAL FINDINGS

In our study histopathological evaluation of specimen, 13(37.1%) cases had "Acute appendicitis with periappendicitis with perforation" and gangrenous appendicitis seen in 11(31.4%) of patients as shown in table 15**.**

Table 14: Histopathological findings.

Histopathological findings	No of patients (%)
Acute appendicitis	2(5.7)
Acute appendicitis with periappendicitis	9(25.7)
Gangrenous appendicitis	11(31.4)
Acute appendicitis with periappendicitis with perforation	13(37.1)
Total	35

Hospital stays in Conservative method / Drainage procedure and early interventional methods

In our study we also compared the mean hospital stay of 20 patients who were conservatively managed by "Ochsner sherren regimen" or underwent extraperitoneal drainage either to the fact that they were not fulfilling our inclusion criterias. Surprisingly there was a significant difference in relation to hospital stay compared to patients in our study group. The mean hospital stay was 4.45 days in conservative group and it ranged between 3 to 16 days while in our study subject the mean hospital stay was 2.93 days (range 2- 6 days).

Table 15: Mean hospital stay in early appendectomies and patients under" Ochsner sherren regimen "or drainage procedure.

Method	Mean (Days)	Range (Days)
Conservative (n=20)	4.45	3-16
Interventional (n=35)	2.93	2-6

Follow up

A total of 35 cases were included in our study which were followed up at the end of 1 week, 2 weeks, 4th week and 6th week . 27 (77%) cases were followed up in outdoor or via contact phone numbers and the rest 8 patients were lost to follow up. Followed up cases had no post operative complications. One case was readmitted after 1 week of discharge with complains of pain in epigastrium, which was managed symptomatically with proton pump inhibitors and was discharged after 2 days.

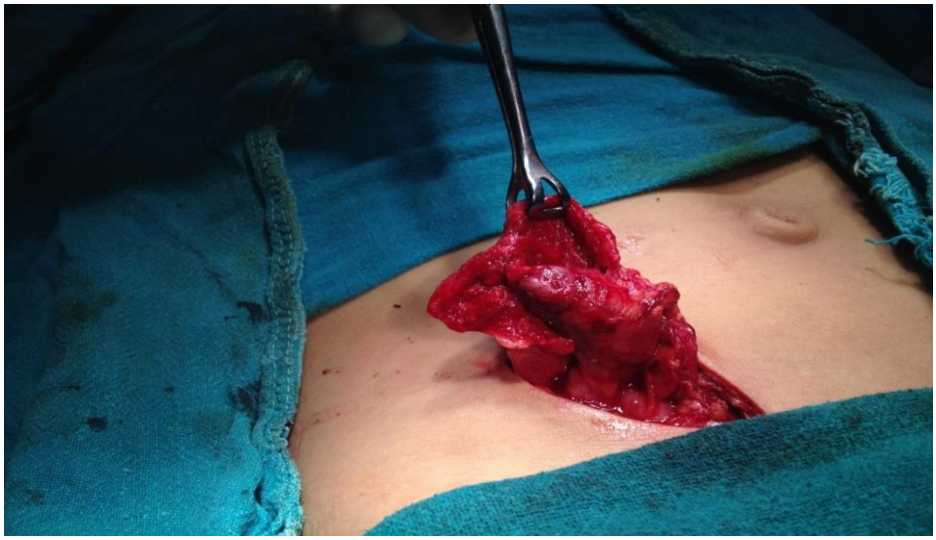


Fig 1: Early lump formation after appendicitis.

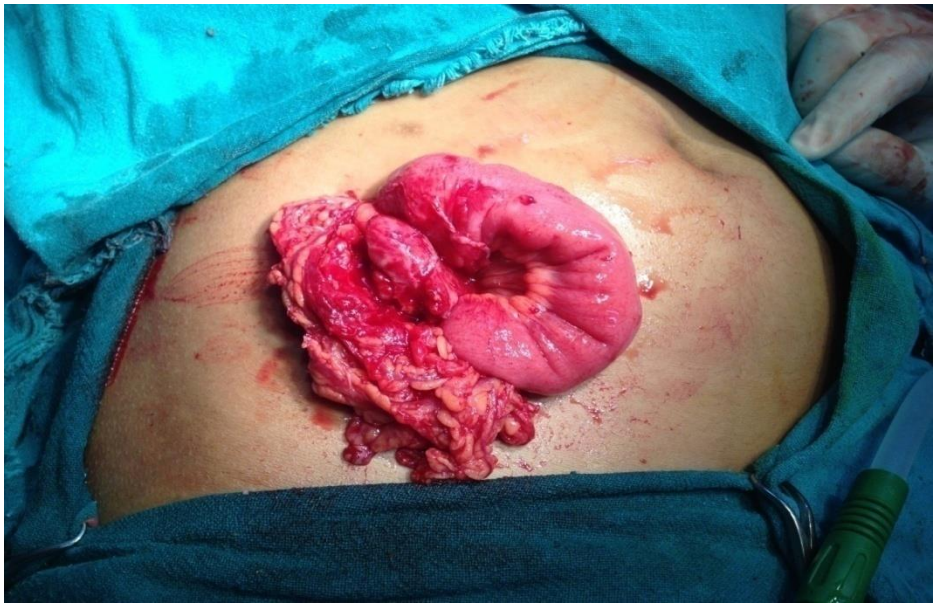


Fig 2: Classical appendicular lump.

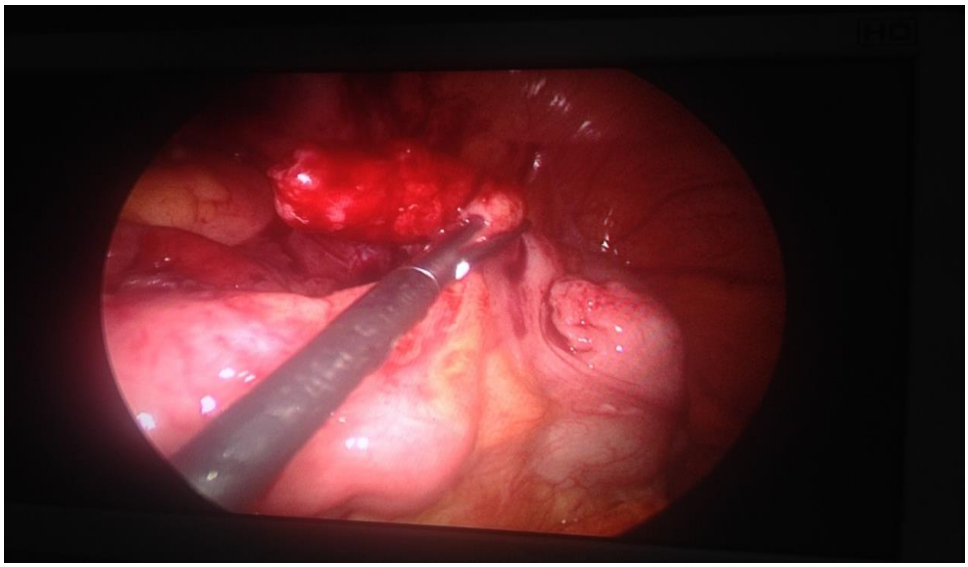


Fig 3: Laparoscopic appendectomy in an early lump.

DISCUSSION

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 **(Endorgan et al, 2005)**. They argue that many of these patients responding well to conservative treatment don't require interval appendicectomy at all as recurrence rate is reported to be as low as 5-20% **(Tekin A 2008, Adala SA 1996)** and importantly the recurrent disease is milder than the primary acute appendicitis.

The non-operative management of patients presenting with an appendicular mass is not always successful. Authors estimate that approximately 10 to 20% of such patients fail to respond and require a delayed and potentially more difficult appendectomy with a possible laparotomy and bowel resection. Moreover, approximately 50% of patients may suffer a recurrence of their appendicitis/appendicular mass following discharge from hospital (**Sanapathi et al 2002).**

A large number of patients refuse readmission for operation once their acute problem is solved and this is a major disadvantage of the initial conservative approach. Another disadvantage of the conservative management is the chance of misdiagnosis (15%) as conditions such as intussusception and carcinoma of the caecum may be treated conservatively by mistake adding considerable morbidity (**Sanapathi etal 2002) (Garg p et al 1997).**

The conservative treatment comprises hospitalization, intravenous fluids, antibiotics, analgesics and a strict watch on the vitals and general state of the patient.8 Also in about 50% of patients managed conservatively, the appendix is totally destroyed or atrophied (fibrosis) with obliterated lumen of the appendix so no risk of recurrent acute attack and nothing else needed to have been done in those patients.(**Okune G et al 2007).**

Early appendicectomy clearly avoids these difficulties and enables a one-admission treatment. Also early surgical intervention is known to be an effective alternative to conservative therapy as it considerably reduces the total hospital stay and obviates the need for a second admission. This substantially reduces the total expenses.**(Arshad M et al 2008, Sanapathi et al 2002, Garg p et al 1997**).

The maximum patients 14 (48.38%) in our study were between the age group of 0-21 years followed by 12 cases in age group 21-40 years.. However the age varied from 9 years to 66 years suggesting any age group prone to develop lump, but common in younger age groups. The male to female ratio of 1.33:1 is also comparable with another study. Majority of the patients who presented with lump had symptoms between 3 to 5 days.

In our study total 9 cases were assessed initially by USG. Maximum 20 Cases were diagnosed by intra operatively which were not detected by USG initially while 8 cases clinical and intra operative findings were matched with USG findings. It suggest that appendicular lump assessment needs expert clinical assessment but because of clinical symptoms like guarding and rigidity it can be missed especially in early forming lumps.

In our study most of the cases 14(40%) where operated on day 4. In our study maximum cases noted were appendicular lump with abscess formation (19 cases) usually seen in 4-6 days in respect to 16 cases which consist of simple appendicular lump only seen in 2-4 days signifies that tendency of appendix to form abscess is significantly increased as duration of symptoms increases.

In our study most frequent intra operative complication noted by operating surgeon was "Difficulty in adesiolysis " in 26 cases (77%) while "Need of extension of incision" was noted in 18 cases (53 %) and "Difficulty in localization of appendix" in 8 cases (24%) as compared to study by **Arshad M et al,2008** where most common intra-operative complication was difficulty in localization (41%) followed by difficulty in adhesiolysis (23%). In study by **M.A. Bahram, 2011** most common intra-op complication was need to extend incision (11%) followed by difficulty in localisation and adhesiolysis (4%).

Most common post-operative complication in our study was superficial infection (3 cases) followed by deep wound infection and residual abscess (1-1 case respectively) which is comparable with other studies, **Arshad M et al 2008, M. A. Bahram 2011, C Pandey 2013Dr Sanjeev kumar Choudhary et al 2014.** None of our patient develop faecal fistula or hernia**.**

In terms of complications in relation to day of surgery no intra/post-operative complication was found in case operated on day 2, difficulty in adhesiolysis was found in all cases operated on day 7 and in most of cases operated on day 3 and 4 (77% & 85%). Post-operative complication was seen in cases operated on day 5.

In our study mean length of hospital stay was 2.93 days which was comparable with other studies and was found to be shorter to that in conservative management as reported by various authors.

In view of different approach of operations to post operative stay, in our study maximum post operative hospital stay (3.3 days) was noted in cases converted (laparoscopic to open) then laparoscopic (2.8 days) and open appendectomy (2.7 days) respectively. It must be noted that in our study maximum cases underwent open method (23 cases) then laparoscopic (9 cases) and 3 cases need conversion (laparoscopic to open) due to operative difficulties.

In our study the mean operative was 84.33 minutes which was even less in open appendectomy that is 60 mins while in laparoscopic 100 mins noted. The finding is comparable to the study by M.A.Bahram where mean operative time for open appendectomy was 50 mins and for laparoscopic approach was 65mins. Mean duration of surgery was minimum in day 2 (55 min) while maximum in day 4 (81.64 min), day 5, day 7 and day 3 respectively.

In the study of **Malik et al 2008** the operative time and the hospital stay were significantly shorter in the group treated by immediate appendicectomy than the group treated conservatively followed by interval appendicectomy. Malik et al reported no significant difference between both groups in relation to wound infection. They stressed the feasibility and effectiveness of early appendicectomy in the presence of appendicular mass and their results were consistent with a number of similar studies as **Ghosh et al 2002 and Samuel et al 2002.**

Samuel et al stated that surgical intervention was beneficial over non-operative management in their cohort of patients. Oedema and friability of the tissues did not affect the outcome in those treated with early surgical intervention, and this is a result of careful and meticulous technique adopted at laparotomy. Also he stated that the persistence of adhesions at interval appendicectomy was significant in the group managed by non-operative treatment of appendiceal mass followed by interval appendectomy.

Okune et al in their study on the group treated by early surgical interference for appendicular mass recorded that the operation time was about 50 min on the average and wound suppuration occurred in 3/11 patients 27.3%. No bowel injury or feacal fistula occurred. **Okune et al** recorded lower rate of wound infection in the group treated by the traditional approach but two cases of misdiagnosis were recorded, namely a mucinous adenocarcinoma of the appendix and an appendiceal carcinoid tumour.

Operative problems such as localization of appendix, adhesiolysis and bleeding are more pronounced and troublesome with interval appendicectomy in the study of **Erdogan et al**, wound infection, however, remains common post-operative complication of early appendectomy in appendicular mass but the rate of wound infection is not so high as to preclude this early operative approach.

Our results demonstrated that the benefits of early appendectomy overweight the results of interval appendectomy and this view is supported by many other studies. **Malik et al 2008.**

The earlier belief that surgery is difficult in such a state where the inflamed appendix is buried deeply in the mass and the bowel loops are friable is no more a valid argument at present due to a global improvement in anaesthesia, supportive care and antibiotics.

In our study we also tried to demonstrate and compare the operative difficulties and complication rates related to particular day of surgery.

Regarding histopathological evaluation maximum numbers of cases had “acute appendicitis with periappendicitis with perforation” total 13 cases out of 35 cases**,** follwed by gangrenous appendicitis 11 cases and acute appendicitis with periappendicitis in 9 cases.

In our study we also compare the mean hospital stay of patients who were conservatively managed (20 cases) either due to fell in our exclusion criteria or not given consent. Surprisingly there was significant difference in relation to hospital stays compared to patients in our study group. The mean period of hospital stay was noted in conservative group was 4.45 days ranged between 3 to 16 days while in our study group mean period of hospital stay was 2.93 days ranged from 2 to 6 days.

Out of 20 patients significantly 15 patients lost follow up for interval appendectomy. One case of appendicular lump again readmitted for 5 days for the complain of pain. One case of interval appendectomy stayed for 7 days post operatively. One case of appendicular lump with abscess underwent extraperitoneal drainage admitted for 9 days.

From the above datas and comparision, it is clearly seems that early intervention in appendicular lump is feasible, safe with good patient complaince and less hospital stay.

In our study first seven days of intervention seems safe with minimum complications. No significant difference noted in any particular day.

Early surgical interference during the first admission of patients with an appendicular lump is feasible, safe and avoids the consequences of the misdiagnosis and mistreatment of other surgical pathologies, such as carcinoma of the ceacum.

CONCLUSION

From our study data’s and comparison to conservative group and other study, it is clearly seems that early intervention in appendicular lump is feasible, safe with good patient compliance and less hospital stay. In our study first seven days of intervention seems safe with minimum complications. No significant difference noted in any particular day. Early surgical interference during the first admission of patients with an appendicular lump is feasible, safe and avoids the consequences of the misdiagnosis and mistreatment of other surgical pathologies.

REFERENCES

1. Andersson RE, Petzold MG. Nonsurgical treatment of appendiceal abscess or phlegmon: a systematic review and meta-analysis. Ann Surg, 2007; 246: 741-8.
2. Arshad Malik, Aziz Laghari A, Qasim Mallah, Altaf Hussain Talpur K. Early appendicectomy in appendicular mass dA LIAQUAT University hospital experience. J Ayub Med Coll Abbottabad, 2008; 20(1).
3. BAILEY AND LOVE 26th edition.
4. Chen C, Botelho C, Cooper A, Hibberd P, Parsons SK. Current practice patterns in the treatment of perforated appendicitis in children. J Am Coll Surg, 2003; 196: 212-221.
5. Deakin DE, Ahmed I. Interval appendectomy after resolution of adult inflammatory appendix masseis it necessary? Surgeon, 2007; 5(1): 45e50.
6. Erdogan D, Karaman I, Narci A, Karaman A, Cavus¸ o_glu YH, Aslan MK, et al. Comparison of two methods for the management of appendicular mass in children. Pediatr Surg Int, 2005; 21(2): 81e3.
7. Garg P, Dass BK, Bansal AR, Chitkara N. Comparative evaluation of conservative management versus early surgical intervention in appendicular massda clinical study. J Indian Med Assoc, 1997; 95(6): 179e80.
8. Ghosh S, De U. Acute appendicectomy for appendicular mass: a study of 87 patients. Ceylon Med J, 2002; 47(4): 117e8.
9. Kaminski A, Liu I-LA, Applebaum H et al. Routine interval appendectomy is not justified after initial nonoperative treatment of acute appendicitis. Arch Surg, 2005; 140: 897-901.
10. 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 Mar; 30: 352e7.
11. Meshikhes A-WN. Management of appendiceal mass: controversial issues revisited. J Gastrointest Surg, 2008; 12: 767-75.
12. Nitecki S, Assalia A, Schein M. Contemporary management of the appendiceal mass. Br J Surg, 1993; 80: 18-20.
13. Okune G, Marek, Jaros1aw K. Management of appendiceal mass In Children and adults: our experience. Internet J Surg, 2007; 9(2).
14. Oliak D, Yamini D, Udani VM, Lewis RJ, Vargas H, Arnell T, et al. Nonoperative management of perforated appendicitis without periappendiceal mass. J Surg, 2000; 179: 177e81.
15. Russel RCG, William NS. Vermoform appendix. In: Short practice of surgery; 24th edition, 2004; 2: 1203e8.
16. S K Shetty, M Shankar. A Clinical Study Of Right Iliac Fossa Mass. The Internet Journal of Surgery, 2013; 30(4).
17. Samuel M, Hosie G, Holmes K. Prospective evaluation of nonsurgical versus surgical management of appendiceal mass. J Pediatr Surg, 2002 Jun; 37(6): 882e6.
18. Sanapathi PSP, Bhattacharya D, Amori BJ. Early laparoscopic appendectomy for appendicular mass. Surg Endosc, 2002; 16(12): 1783e5.
19. Sanjeew etal Int J Pharm Bio Sci, 2014 Jan; 5(1): (B) 400–404.
20. Simillis C, Symeonides P, Shorthouse AJ et al. A meta-analysis comparing conservative treatment versus acute appendectomy for complicated appendicitis (abscess or phlegmon). Surgery, 2010; 147: 818-29.