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Acute Appendicitis, Comparison Study of Post Operative Complications And Onset of Pain

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Abstract:
Background*: Post operative complications following acutely inflamed appendicitis make a threaten to the patient which may depend on the state of the appendix & need early diagnosis & management .*
Objective*: to compare risk & pain onset of acutely non perforated appendicitis to that of perforated one & to see the importance of making diagnosis early.*
Patients & methods*: our study is a prospective study have been done in Al kadhimiya teaching hospital, include 135 patients in the surgical department for the period from November 2015 to March 2017.*
The cases classified into two groups:
Group I: Acutely inflamed non perforated appendicitis.
Group II: Acutely inflamed perforated appendicitis.
History taken for all the patients concentrated on onset of pain &presence of nausea & vomiting & whether pain came before or after nausea &vomiting, as in acute appendicitis pain come before nausea &vomiting Emergency operation done & findings reported ,follow up done for all the patients & complications recorded .
Results*: In this study 135 patients were included, out of those patients 101 patients (74.8%) underwent emergent operation for acute appendicitis.*
34 patients (25.2%) underwent emergent operation for acute perforated appendicitis. Acute non perforated appendicitis stay less in the hospital than acute perforated appendicitis. Overall complications of acutely inflamed appendicitis were less than acutely perforated appendicitis.
Conclusion*: post operative complications & staying in the hospital occur more in acute perforated appendicitis & delay in diagnosis & operation increase morbidity.*
Keywords*: perforated appendix, non perforated appendix.*

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I. Introduction

Acute appendicitis first described by fitz in 1886 , it is one of the most common cause of acute abdomen.**(1)** Appendicitis is caused by obstruction of the appendiceal lumen. The most common causes of luminal obstruction include lymphoid hyperplasia secondary to inflammatory bowel disease (IBD) or infections (more common during childhood and in young adults), fecal stasis and fecaliths (more common in elderly patients), parasites (especially in Eastern countries), or, more rarely, foreign bodies and neoplasms.[(2)]
Because the early signs and symptoms of appendicitis are often subtle, patients and physicians may downplay their importance, in addition the symptoms can vary depending upon the location of the appendix.**(3)**
Initially the patient have non specific complain as indigestion , flatulence , bowel irregularity & may be the patient feeling unwell only. Then the pain start in the paraumblical area it is visceral in nature i.e constant ,not very sever &poorly localized, then pain shift to the right iliac quadrant as it involve parietal peritoneum , nausea & vomiting may follow the pain. low grade fever (38.2c) later on occur but if it exceed(39.4c) one should suspect perforation .

Laboratory finding: leukocytosis which is mild up to15 X 10(3)/mm 3, but it is very high in perforation. **(4)** Shimizu et al. **(5)** confirmed the relationship between severity of fever and appendicitis and proposed that the neutrophil to lymphocyte ratio (NLR) was useful for predicting the severity of inflammation because pooled neutrophils in bone marrow are able to respond more rapidly to infectious disease compared to acute inflammation-related proteins that are produced by the liver such as C-reactive protein. If we have obstruction of the appendix, the lumen will be filled with mucus & distended, this lead to increase intra luminal pressure & this will lead to thrombosis & ischemia & stasis of lymph flow. Early there is aerobic organism

growth while later on mixed organism found.[6] Common organisms involved in gangrenous and perforated appendicitis include Escherichia coli, Peptostreptococcus, Bacteroides fragilis, and Pseudomonas species [7]
A ruptured appendix can lead to peritonitis and abscess, in a few patients, complications of appendicitis can lead to organ failure and death. [8]

Antibiotic use early to decrease incidence of wound infection & intra-abdominal sepsis.[9]
Acute appendicitis can be acute catarrhal (non-obstructive), or acute obstructive appendicitis which require more urgent operation as it progress more rapidly to perforation [10]
In small child & elderly patient accuracy of the diagnosis is low & perforation rate is high. Perforation incidence increase in pregnancy especially during 3rd trimester & this possibly because of the delay in diagnosis & operation.

The patient with perforation has longer duration of complaining of sign & symptom & longer period of staying in the hospital than non perforated one.[11]Appendiceal perforation lead to many complications as abscess , peritonitis ,Wound infection, urine retention , small bowel obstruction , pelvic abscess ,also other rare complication as pyelphlebitis of the portal vein which associate with high fever , rigor , jaundice & abnormal liver function test.[12]Children with perforated appendicitis often have a prolong hospital course complicated by surgical site or intra-abdominal infection ,treatment with multiple antibiotics after appendectomy has been the standard of care for this patient.[13]Intra –abdominal &pelvic abscess occur in about 5% of patient with appendicitis.[14] Most of the serious early complications are septic and include abscess and wound infection. Wound infection is common, but is nearly always confined to the subcutaneous tissues and promptly responds to wound drainage, which is accomplished by reopening the skin incision. Wound infection predisposes the patient to wound dehiscence. The type of incision is relevant; complete dehiscence rarely occurs in a Gridiron incision. The incidence of intra-abdominal abscesses secondary to peritoneal contamination from gangrenous or perforated appendicitis has decreased markedly since the introduction of potent antibiotics.
The sites of predilection for abscesses are the appendiceal fossa, pouch of Douglas, subhepatic space, and between loops of intestine. The latter are usually multiple. Transrectal drainage is preferred for an abscess that bulges into the rectum.

Fecal fistula is an annoying, but not particularly dangerous, complication of appendectomy that may be caused by sloughing of that portion of the cecum inside a constricting purse-string suture , by the ligature 's slipping off a tied but not inverted appendiceal stump, or by necrosis from an abscess encroaching on the cecum. Intestinal obstruction ,initially paralytic but may progressing to mechanical obstruction occur with slowly resolving peritonitis with loculated abscesses and exuberant adhesion formation. [15] There is a slightly higher rate of appendicitis in the second trimester than in the first and third trimesters or postpartum. [16]An infected appendix appears to be more likely to rupture during pregnancy, especially in the third trimester, possibly because of delay in diagnosis and intervention. [17,18] Delay in diagnosis and treatment results in increased risk of developing perforation which can lead to poor management outcome [19]

Perforated appendicitis is associated with high morbidity and mortality rates especially in children, elders, pregnant woman, diabetics, steroid dependent and immunocompromised patients. We should be aggressive in the treatment of appendicitis in the high risk patients. So once acute appendicitis diagnosed, the expedient surgery and appropriate use of perioperative can help to minimize the morbidity [20]

Patient & methods:

A prospective study comparing between acutely inflamed non-perforated and perforated appendicitis concerning the duration of pain from onset to theatre and morbidity (early post operative complications) was undertaken on 135 patients for a period from November 2015 to March 2017 in the surgical department of Al-kadhimiya teaching hospital.

The patients were divided into two groups according to the operative finding:
1.**Group I:** included 101 patients (74.8 %) underwent emergency appendicectomy, for acutely inflamed non-perforating appendicitis . 2.GROUP II: included 34 patients (25.2 %) underwent emergency appendicectomy for acutely inflamed perforating appendicitis. Patients with age ranging from 8 – 56 years (mean = 33) . Duration of pain before surgery to theatre, signs & symptom of patients with relevant laboratory data (WBC, GUE) were recorded in special formula. On which operative finding & early postoperative treatment & complications were also recorded.Our diagnoses were made clinically. Sometimes, clinical diagnosis was assisted by ultrasound finding. Data were collected from follow up of the patients during hospitalization & early postoperative period as an outpatient follow up work. The early postoperative complications were reported including wound infection, intraperitoneal abscess, paralytic ileus, fecal fistula and pulmonary complication.
Both groups were treated with triple antibiotics (ampicillin + gentamycin + metronidazole) or with 3rd generation cephalosporine + flagyl.

Wound infection assessed clinically for signs of infection.

II. Result

Based on operative finding normal appendices and those associated with other pathology like appendicular mass, ovarian lesion were excluded from study.135 patients were included, divided into two groups.

1-**Group I:** included 101 patients (74.8 %) underwent emergency appendicectomy, for acute inflamed non-perforating appendicitis. Number of patients with early post operative complications is (20), (19.8 %) as shown in Table (1), Figure (1).

Table (1): Group I patients with early post operative complications.

Pathological state Of appendix	No. of cases	No. of cases With post op complication	Percentage %
Acute appendicitis (Nonperforated)	101	20	19.8 %

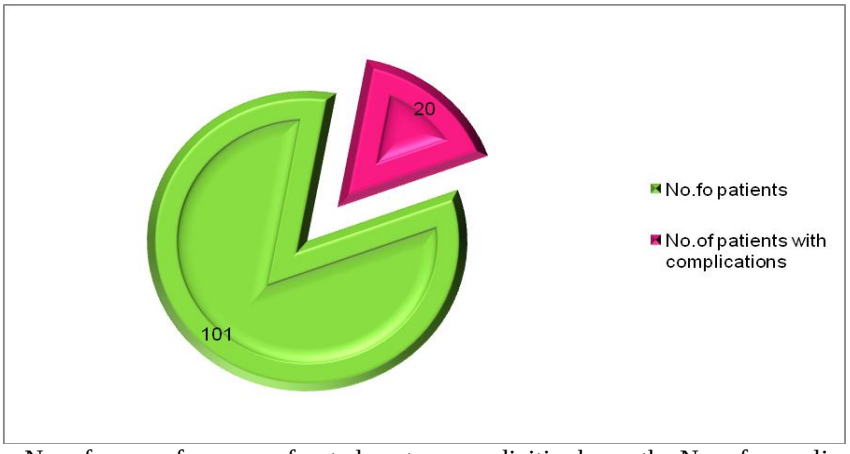


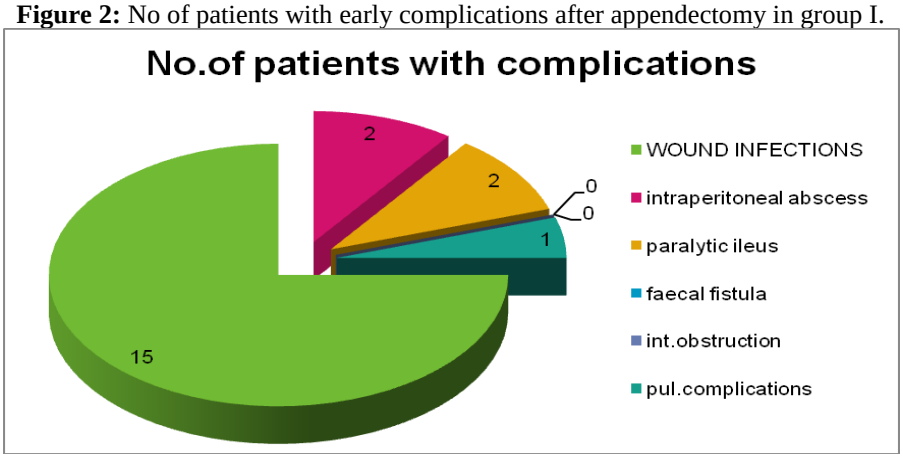
Figure 1:. No. of cases of non - perforated acute appendicitis shows the No. of complicated cases.

The early post operative complications after appendicectomy in group I most commonly was wound infection, then Intraperitoneal abscess, paralytic ileus and pulmonary complication were noticed ,no other complications recorded , as shown in table(2) and figure(2).

Table (2): Earl post operative complications after appendicectomy in group I.

Early post op. complication	No. of patients With complication	Percentage %
Wound infection	15	14.7 %
Intraperitoneal Abscess	2	1.9 %
Paralytic ileus	2	1.9 %
Pul. complication	1	0.9 %
total	20	19,8%

Figure 2: No of patients with early complications after appendectomy in group I.



2-**Group Ii :** included 34 patients (25.2 %) underwent emergency appendicectomy, for perforated appendicitis (purulent or gangrenous) with localized or generalise peritonitis or abscess .

Number of patients with post operative complications are (17), (50 %) as shown in table (3) and figure (3).

Table (3): Group II patients with post operative complications.

Early post op. complication	No. of patients With complication	Percentage %
Wound infection	15	14.7 %
Intraperitoneal Abscess	2	1.9 %
Paralytic ileus	2	1.9 %
Pul. complication	1	0.9 %
total	20	19,8%

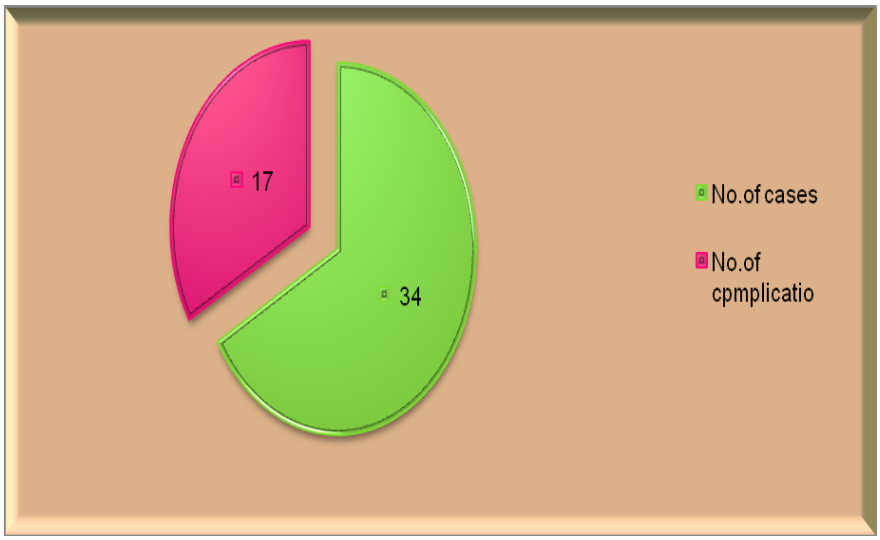


Figure3: Group II Patients With Post Operative Complications.

The early post operative complications after appendicectomy in group II was wound infection, intraperitoneal abscess, intestinal obstruction and pulmonary complication, no other complications was recorded , as shown in table(4) and figure(4).

Early post op. complication	No. of patients with complication	Percentage %
Wound infection	11	32.3 %
Intraperitoneal abscess	3	8.8 %
Intestinal obstruction	1	2.9 %
Pulmonary complication	2	5.8 %
Total	17	50%

Table(4) : Early Post Operative Complications After Appendicectomy In Group II

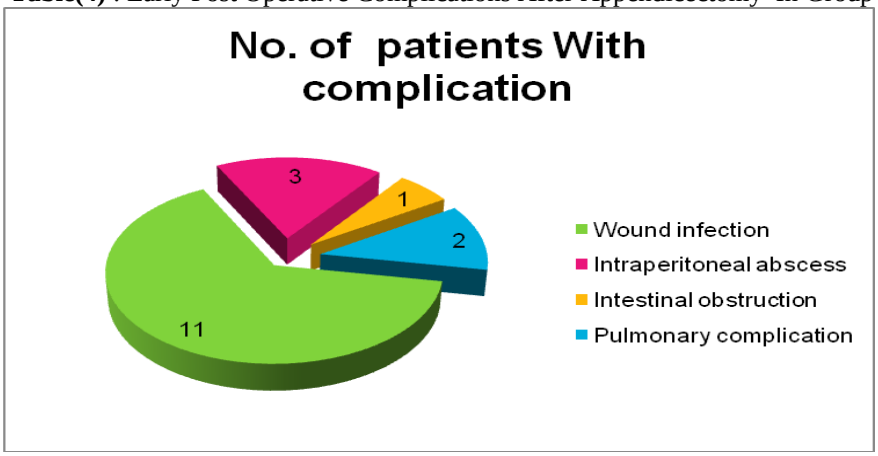


Figure (4): Group II patients with early post operative complications.

In our study the percentage of patients with acute non perforated appendicitis with history of 1 day (24 hours) duration was 70%(70 patients) in contrast with 23.5 % (8 patients) of perforated appendicitis group where as the percentage of patients with acute non- perforated appendicitis with history of 2 days (25--48 hours) duration was 14.8%(15 patients) compared with 23.5 %(8 patients) of perforated appendicitis group.

Eleven patients (10.8%) of acute non- perforated group had a history of 3 days (49-72 hours) duration, in contrast to fourteen patients (41.1%) of perforated group as shown in table (5) and figure(5) .

Table (5): Total duration of the symptoms from the onset of abdominal pain to theater.

Total Duration Of Symptoms	PATHOLOGICAL STATE OF APPENDIX			
	Non Perforated		Perforated	
	No.	%	No.	%
1 Day (24 Hrs.)	70	69.3	8	23.5
2 Day (25 – 48 Hrs.)	15	14.8	8	23.5
3 Day (49 – 72 Hrs.)	11	10.8	14	41.1
4 Day (73 – 96 Hrs.)	4	3.9	3	8.8
5 Day & More > 96 Hrs	1	0.9	1	2.9

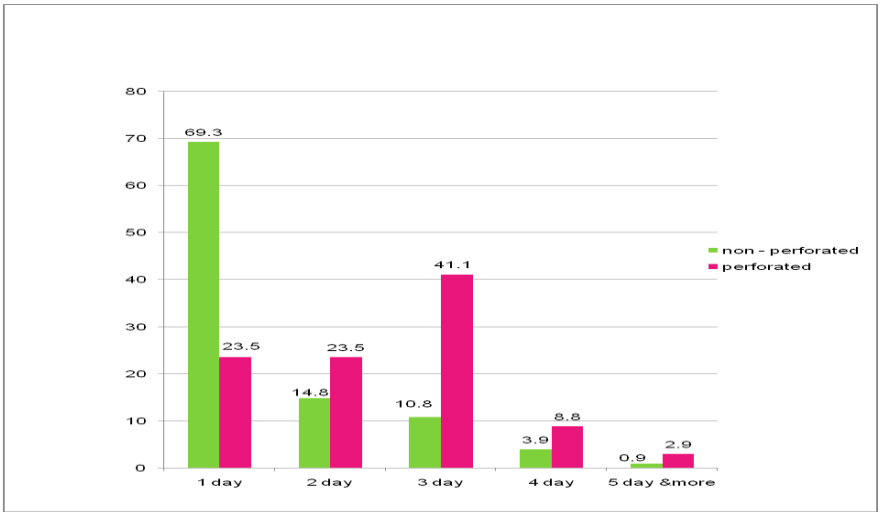


Figure. (5). Total Duration From Onset Of Abdominal Pain To Theater .

Overall early post operative complications rate was 19.8 % (20 patients) in non-perforated group and 50 % (17 patients) in those with perforation, mean of hospital stay was 3 days in those with-non perforated group as compared to 7 days in patient with perforated appendicitis as shown in figure (6).

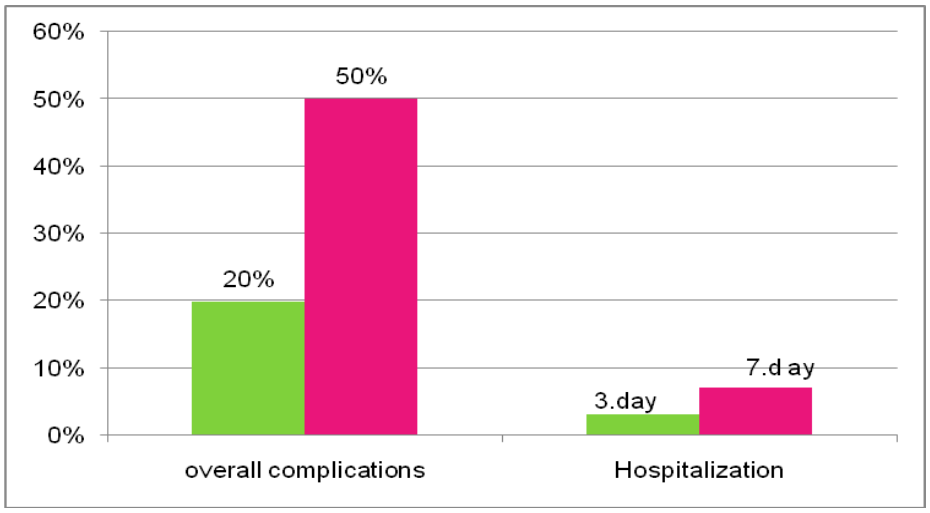
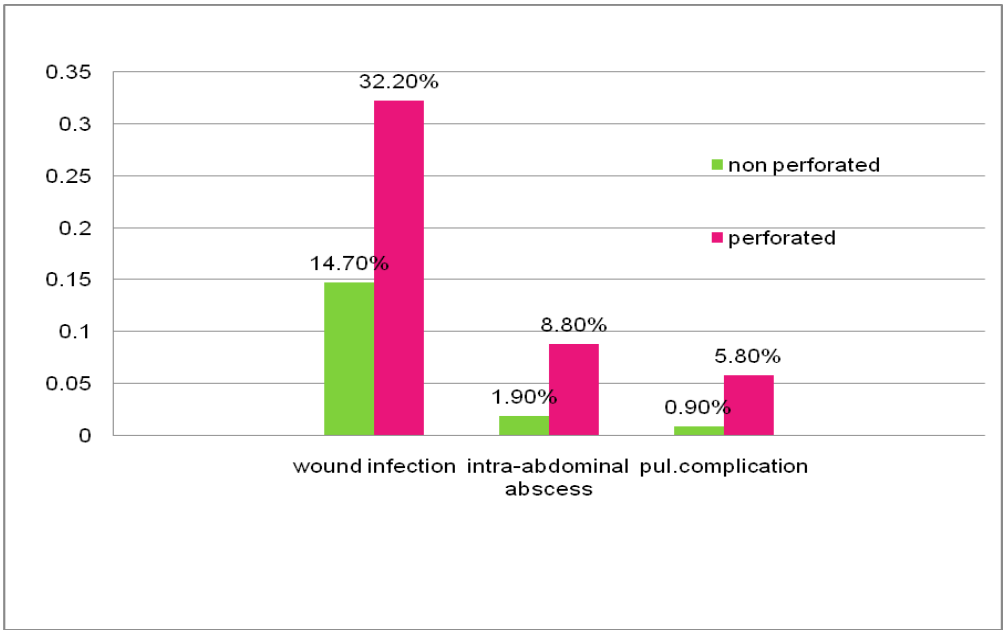


Fig. (6). Overall complications according to pathological diagnosis. And mean hospital stay.

Wound infection rate alone was 14.7%(15 patients) in non- perforated group as compared with 32.3% (11 patients) in perforated group. Intraperitoneal abscesses rate was 1.9% (2 patients) in non- perforated group as compared with 8.8% (3 patients) in perforated group. So that morbidity of perforated appendicitis exceeded that of non- perforated appendicitis as shown in figure (7).



Fig(7). Early postoperative complications between non- perforated and perforated appendicitis.

III. Discussion

Comparing our study in table {5} with previous study carried out by Marc S. & Sandra M. Jones [(11)] there was increasing incidence of perforated cases with increasing duration of symptoms. Sixty five percent of patients with perforated appendicitis have been symptomatic longer than 48 hours (> 2 days). Perforation is recognized preoperatively in 70% of patients Suggestive clinical features include symptom duration of more than 36 hours (>1.5 days) [(12)]

Our results were also similar to that obtained by Marc S. & Sandra M. Jones which showed that (41.1%) patients with perforated appendicitis have been symptomatic longer than 48 hours (> 2 days) [(12)]

Our results were comparable to that obtained by Temple & Claire which showed that patients with perforated appendicitis had a delay before reporting to the emergency room of 2.5 times longer than that of patients with non - perforated appendicitis, (57 hours vs. 22 hours) **[(21)]** In comparison of this study with Salati study, it was evident that in Salati study about 88% of the patients in the non-perforated appendicitis group reported to the hospital in less than 48 hours of the onset of the symptoms whereas only 14% of the cases of perforated appendicitis reported within 48 hours where as in our study, 84.1% of cases on non – perforated appendicitis & 47% of perforated group reported within 48 hours. This delay in seeking expert medical care has been reported to be a major factor in leading to perforation of appendix. Our results were comparable to a study done by S. Salati, A. Rather & S. Wani in Kashmir which showed a higher complication rate in perforated appendicitis (73%) than that of non-perforated appendicitis group (4%). Our study shows higher incidence of complication in perforated group (50%) as compared (19,8%) for non perforated group .**[(21)]**

Both studies showed an increase in the incidence of complications in perforated appendicitis groups as shown in table (9). Comparing our study with study done by S.Salati regarding hospital stay, the mean hospital stay was (7.7 days) in perforated appendicitis as compared to (3.0 days) in the non-perforated group, which is similar to our study (7 days versus 3.0 day respectively). Hence, perforated appendicitis results in increased morbidity and increased hospital stay **[(22)]**

Table (6). Comparison between Salati study & our study regarding postoperative complication.

State of appendix .	Complication rate in non-perforated appendicitis	Complication rate in \perforated appendicitis
S.Salati.	4%	73%
Our study	19.8%	50%

In conclusion, the delay in operating on patients with acute appendicitis is a factor contributing to perforation. Moreover, postoperative complications occur more in perforated appendicitis than non – perforated appendicitis. Wound infection is the most common cause of morbidity after appendicectomy despite the routine use of prophylactic antibiotics that target both aerobic and anaerobic organism. Complicated forms of acute appendicitis are the basic causes of increased duration of hospitalization.

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