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Original Research Article

Delayed appendicectomy in patients with non-perforated acute appendicitis

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ABSTRACT

Background: Appendicitis remains one of the most common diseases encountered by the surgeon in practice. Appendicectomy is the most common urgent or emergency general surgical operation performed. Emergency appendicectomy is believed to be the standard treatment protocol for patients with acute appendicitis. This study was conducted to verify whether acute non-perforated appendicitis requires immediate surgery or can be delayed to be taken up on elective basis.
Methods: This is a retrospective study of all the cases undergoing appendicectomy for acute appendicitis over the period of January 2016 to December 2016 in K. R. hospital, Mysuru, Karnataka, India. The cases were divided into two comparison groups: emergency group (operated within 12 hours of admission) and delayed group (operated between 12-72 hours). Parameters like age, sex, duration of symptoms, total leucocytes count, temperature, haemoglobin, radiological investigations, operative procedure, operative time, length of hospital stay, length of post-operative stay were collected and the end points for comparison were: Operative time, perforation rate, post-operative complication, length of hospital stay, readmission rate. Cases of perforated appendicitis in preoperative diagnosis, interval appendicectomy and appendicectomy done in association with other abdominal conditions were excluded from the study.
Results: During this one-year period 283 patients have undergone appendicectomy. Out of this 189 (66.8%) patients have undergone surgery within 12 hours of admission and 94 (33.2%) have undergone surgery between 12 to 72 hours of admission. There was no significant difference between the two groups in operative time, per operative perforation rate, post-operative complication rate, readmission rate. Length of the hospital stay was greater in delayed group as compared to emergency group. But there was no significant difference between the post-operative length of hospital stay.
Conclusions: Acute appendicitis can be treated surgically in a delayed elective basis without increasing morbidity.

Keywords: Delayed appendicectomy, Emergency appendicectomy, Non-perforated acute appendicitis

INTRODUCTION

Appendicitis remains one of the most common diseases encountered by the surgeon in practice. Appendicectomy is the most common urgent or emergency general surgical operation performed. Emergency appendicectomy is believed to be the standard treatment protocol for patients with acute appendicitis. It is widely believed that delay in diagnosis and treatment significantly contributes to increased incidences of perforated appendicitis, which result in increased patient morbidity.[1] But sometimes, emergency surgery may not be possible because of various reasons like patients not willing for surgery at the

time of diagnosis, non-availability of operating room due to overcrowding of other emergency cases, lack of fasting time for anaesthesia and others.

Few studies have challenged impact of these delays and standard of care given for appendicitis there by suggesting acute appendicitis can be treated conservatively or can be operated at an elective basis without increasing morbidity.[2,3,4-6]

This is review of 283 cases of acute appendicitis undergoing appendicectomy from January 2016 to December 2016 to verify whether acute non-perforated appendicitis requires immediate surgery or can be delayed being taken up on elective basis.

METHODS

This is a retrospective study of all the cases undergoing appendicectomy for acute appendicitis over the period of January 2016 to December 2016 in K. R. hospital, Mysuru, Karnataka, India

414 people have got admitted and underwent appendicectomy during this one-year period but 131 cases were excluded from the study because of perforated appendicitis in preoperative diagnosis, interval appendicectomy and appendicectomy done in association with other abdominal conditions

The cases were divided into two comparison groups: emergency group (operated within 12 hours of admission) and delayed group (operated between 12-72 hours). Data is collected from medical records department, K.R. Hospital, Mysore and following data collected: age, sex, duration of symptoms, total leucocytes count, temperature, haemoglobin, radiological investigations, operative procedure, operative time, length of hospital stay, length of post-operative stay. The end points for comparison were: Operative time, perforation rate, post-operative complication, length of hospital stay, readmission rate.

In all cases diagnosis was made on the basis of clinical presentation and examination, radiological investigations and blood investigations. Soon after admission, parenteral antibiotics like ceftriaxone and metronidazole was started and continued into post-operative period.

RESULTS

During this one-year period 283 patients have been diagnosed pre-operatively with acute non-perforated appendicitis and have undergone appendicectomy. Out of this 189 (66.8%) patients have undergone surgery within 12 hours of admission and 94 (33.2%) have undergone surgery between 12 to 72 hours of admission. Most of the patients were of age between 21-30 years (45.6%) followed by 10-20 years (33.5%) together constituting 79.1% of patients (Table 1).

Table 1: Age distribution of patients.

Age	Number of patients	Percentage (%)
10-20	95	33.5
21-30	129	45.6
31-40	31	11
41-50	17	6
>50	11	3.9

Patients predominately belonged to male sex (194 out of 283, 68.6%) (Figure 1).

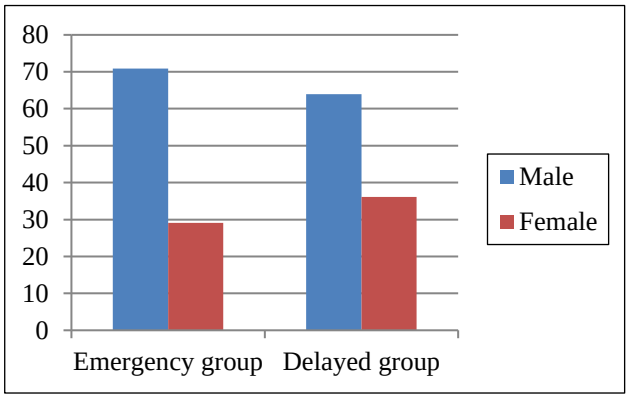

Figure 1: Sex distribution of patients.

Table 2: Patient factors.

	Emergency group (Mean±SD)	Delayed group (Mean±SD)	P value
Patient interval (days)	2.13±1.7	2.5±1.8	0.092
WBC (10^3/dL)	11.6±3.3	11.2±3.3	0.283
Temperature (ºC)	36.5±0.6	36.6±0.5	0.070

Patient interval: Time from onset of symptoms to hospital presentation, dL: decilitre, SD: Standard deviation, WBC: White blood cell

Table 3: Post-operative statistics.

	Emergency group	Delayed group	P value
Operative time (minutes±SD)	50.2±21.6	48.0±20.3	0.411
LHS (days±SD)	5.4±1.6	5.9±1.7	0.015
Post-operative LHS (days±SD)	5.3±1.7	5.1±1.6	0.342
Readmission	1 (0.5)	0 (0)	
Complications			
Wound infection	10 (5.2)	5 (5.3)	
Intra-abdominal infection	2 (1.1)	1 (1.1)	
Others*	1 (0.5)	0 (0)	
Total	13 (6.8)	6 (6.3)	

Values in the bracket are percentages (%), SD: Standard deviation, LHS: Length of hospital stay, *Other complications include ileus, obstruction

No significant differences seen between the two groups in relation to age, sex, patient interval (duration between the start of symptoms to presentation to hospital), white blood cell count and temperature (Table 2).

There was no significant difference between the two groups in operative time (50.2±21.6 minutes in emergency group and 48.0±20.3 minutes in delayed group), post-operative complication rate (6.8% in emergency group and 6.3% in delayed group), readmission rate (0.5% in emergency group and none in delayed group). Length of the hospital stay was significantly greater in delayed group (5.9±1.7 days) as compared to emergency group (5.4±1.6 days). But there was no significant difference between the post-operative length of hospital stay (5.3±1.7 days in emergency group and 5.1±1.6 days in delayed group (Table 3). There was no difference between the two groups in per operative perforation rate (3.2% in emergency group and 3.2% in delayed group) (Table 4).

Table 4: Per operative findings.

	Emergency group	Percentage (%)	Delayed group	Percentage (%)
Simple appendicitis	183	96.8	91	96.8
Perforated appendicitis	6	3.2	3	3.2

DISCUSSION

This study demonstrated that surgery for acute non-perforated appendicitis can be delayed and can be taken for surgery in elective basis without increasing morbidity, perforation rate, post-operative complications. This study found only the overall length of hospital stay was increased in the delayed group, but the post-operative length of stay was same in both groups.

Yardeni D et al, found that delayed managements in acute appendicitis allow greater efficiency and effective use of hospital resources without significantly affecting the operating time, perforation rate or complications.[4]

Kim SH et al, studied 1805 patients over a period of 5 years and found that delayed appendicectomy is safe in acute non-perforated appendicitis.[5]

Omundsen and Dennett found that surgery for acute appendicitis up to 24 hours does not lead to an increase in morbidity but when exceeds 24 hours, the morbidity and complications increases.[6]

Appendicectomy in acute appendicitis can be delayed in contrast to the earlier beliefs that complications and perforation rate increases when delayed. Delayed appendicectomy have become safe due to the parenteral antibiotics which halts the inflammation and disease progression.

Even there has been study by Weiner DJ et al and Bufo AJ et al, supporting antibiotics and interval appendicectomy in cases of perforated appendicitis.[7,8]

Accurate preoperative diagnosis of acute non-perforated appendicitis using clinical examination and various radiological and biochemical tests is the main prerequisite for safe delayed appendicectomy.

CONCLUSION

Acute appendicitis can be treated surgically in a delayed elective basis without increasing morbidity. Effective use of hospital resources and quality of care from surgeons can be improved there by providing emergency operating room for other major life-threatening emergency surgeries.

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