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## DELAY IN SURGERY FOR ACUTE APPENDICITIS

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### Abstract

Acute appendicitis is the most common abdominal emergency. In 150 patients with acute appendicitis treated by appendectomy in AL-Sader Teaching Hospital in Basrah, a prospective study was made to study the delay prior to admission to the hospital and subsequent delay before induction of anesthesia.

In 67 (44.66 %) patients, the appendix was perforated or gangrenous and in 83 (55.34%) patients it was acutely inflamed. The median duration of abdominal pain to the induction of anesthesia was 18 hours ranged 3-69 hours for the acutely inflamed group and 35 hours ranged 8-70 hours for the perforated /gangrenous group.

The median preadmission delay was 12 hours and 25 hours for acutely inflamed group and gangrenous /perforated group respectively, while the median post admission delay to the theatre was 2 hours ranged 1-15 hours and 1 hour ranged 1-13 hours for acutely inflamed and perforated / gangrenous groups respectively.

Patients arriving at hospital during the hours 08:00 to 14:00 from Sunday to Thursday waited longer than those seen out of routine working hours before going to the theatre.

In conclusion, Increasing age and preadmission delay were both associated with an increasing risk of perforated / gangrenous appendix. Cases of acute appendicitis should be given the same priority as cases of peritonitis if morbidity is to be minimized.

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### Introduction

Acute appendicitis occurs in 10% of the general population, rare in infancy, the maximal incidence is in teens and twenties. Over all it is the most common cause of acute abdomen<sup>1,2</sup>.

The mortality of appendicectomy is low. Attention is now being focused on morbidity in particular wound sepsis. A factor often ignored in this context is the time delay between the onset of symptoms and the eventual removal of the appendix.

The aim of this study is to measure the components of this delay in appendectomy with particular reference to the pathological state of the organ. An attention is made to explain excessive delay.

### Patients and methods

All patients were presented to Al-Sader Teaching Hospital in Basrah as emergencies with acute abdominal pain. They were documented on a special form includes information about: patient's age, sex, duration of pain before hospital admission (pre-admission delay), delay from arriving at hospital to induction of anesthesia (post-admission delay), time and day of admission to the hospital.

Provisional diagnosis (either appendicitis or not) made by senior house officer. The appendix was classified by pathologist as acutely inflamed appendix, perforated or gangrenous appendix.

Elective appendicectomies, histo-pathologically normal appendices and appendicular mass/abscess were excluded. Statistical analysis was performed using SPSS for windows.

One hundred fifty consecutive cases of acute appendicitis treated by emergency appendicectomy were available for the period January 2006 to January 2008.

**Results**

Patients were 59 females and 91 males

with the mean age of 23.4 years (range from 5 to 56 years). The patients were divided into two groups: 83(55.34 %) were patients with acutely inflamed appendix and 67(44.66%) were patients with gangrenous / perforated appendix.

Table I, shows the total duration of

Table I: Total delay from the onset of the abdominal pain to the theater.

Delay (hours)	No.	Acutely inflamed Appendix		Gangrenous/ perforated appendix	
		No.	%	No.	%
1 – 8	43	30	69.77	13	30.23
9 – 16	29	20	68.97	9	31.03
17 – 24	26	16	61.54	10	38.46
25 - 36	21	10	47.62	11	52.38
37 -48	17	4	23.53	13	76.47
49 – 72	14	3	21.43	11	78.57
Total	150	83	55.34	67	44.66
Median delay (hours)		18		35	

abdominal pain from its onset to the induction of anesthesia in the two groups. The median duration of pain was 18 hours { range ( 3 – 69 ) hours} for acutely inflamed and 35 hours { range (8 – 70) hours} for gangrenous / perforated cases.

The components of this delay are shown in table II (pre admission delay) and table III (post admission delay).

Table II: The pre-admission delay and the pathological state of the appendix.

Delay(hours)	No.	Acutely inflamed appendix		Gangrenous/ perforated appendix	
		No.	%	No.	%
8 1 –	41	34	82.92	7	17.08
16 9 –	23	15	65.21	8	34.79
17 – 24	32	19	59.37	13	40.63
36 25 –	25	9	36	16	64
37 – 48	20	5	25	15	75
49 – 72	9	1	11.11	8	88.89
Total	150	83	55.34	67	44.66
Median delay (hours)		12		25	

Table III. The post-admission delay and the pathological state of the appendix.

Delay (hours)	No.	Acutely inflamed appendix		Gangrenous/ perforated appendix	
		No.	%	No.	%
1 – 2	104	57	54.81	47	45.19
3 – 4	18	12	66.66	6	33.34
5 – 6	11	7	63.63	4	36.37
7 – 8	5	3	60	2	40
9 – 10	5	2	40	3	60
11– 12	3	1	33.3	2	66.7
> 12	4	1	25	3	75
Total	150	83	55.34	67	44.66
Median delay		2 hours		1 hour	

The difference in the total delay between the two pathological groups is almost wholly reflected in the pre-admission delay. Twenty six patients (17.33 %) underwent appendectomy 24 hours after the onset of the abdominal pain, 16 patients (61.54%) of them had acutely inflamed appendix while 10 patients (38.46%) had gangrenous / perforated appendix. The risk of perforation increases with increase of the time delay for appendectomy (p= 0.001), therefore 78.57% of patients who were delayed between 49–72 hours had perforated appendix.

There was significant correlation between patient gender and time delay to surgery (p=0.009) table IV, with females waiting longer than males because the differential diagnosis in female is wider than that of male patients.

In addition to the total duration of abdominal pain, age and sex were considered to be related factors influencing the incidence of gangrenous/perforated appendix.

Increasing patient age was associated with increased risk of perforation (p=0.001) table V.

One hundred twenty three patients (82%) arrived at hospital on Sunday to Thursday and 27 patients (18 %) arrived on the weekend. The median post-admission delay for those who arrived at the weekend was two hours in contrast to four hours for those arrived on Sunday to Thursday.

Table IV: The relationship between gender and total time delay for appendectomy.

Gender	Mean total delay ( hours )
male	21
female	28

Table V: The mean age of the patients in the two pathological groups of the appendix.

Pathological state of the appendix.	Mean age ( year)
Acutely inflamed.	22.2
Gangrenous / perforated.	28.6

**Discussion**

The mortality from acute appendicitis has fallen to well below 1% in most reported series, this mortality is almost exclusively amongst those with a perforated appendix<sup>3</sup> which also carries a much higher morbidity than an acutely inflamed non perforated appendix, while in our study no death case was reported.

Two ideas in dealing with appendicitis should be considered: first to prevent perforation and second if the appendix has perforated to perform early surgery.

This study confirms the increasing incidence of perforated / gangrenous appendix with increasing duration of symptoms. In addition, the age of the patient is independently significant factor, for example a patient in his twenties with a 24 hours history of pain has less chance of perforation/ gangrenous appendix compared with patient in his fifties. This period or delay has two components: the pre-admission delay and the post-admission delay. The former depends on patient education, his accessibility to medical care and the previously visited doctor. It remains largely out of the surgeon control as does the age of the patient. Post-admission delay is the surgeon and hospital responsibility and is seldom mentioned in the literature.

The expected difficulty in diagnosis greatly increased post-admission delay and the accurate diagnosis of appendicitis remains a challenge in those days of high technology medicine<sup>4</sup>.

A further factor influencing post-admission delay was the time and day of arriving at hospital. Patients arriving between 08:00 and 14:00 hours from Sunday to Thursday waited significantly longer than those arriving outside these hours, there may be several reasons for this: the operating theatres are in use during these routine hours and the impression is that an elective operating list is seldom interrupted for a case of appendicitis. Similarly the waiting senior house officer or the surgical registrars may be

busy elsewhere, for example conducting an outpatient clinic during these hours. Shorter delay at night may reflect a natural desire to retire to bed as soon as possible.

The delay in surgery for appendicitis is largely pre-admission delay. The majority of perforated/gangrenous cases occur during this period. Post-admission delay is satisfactory in most of these cases. Any improvement in post-admission delay must be parallel in increased accuracy in diagnostic acumen and the realization that appendicitis particularly perforated/gangrenous appendicitis should receive the same priority for theatre as peritonitis.

In this study the post-admission delay for 24 hours was associated with increasing risk of perforated/gangrenous appendix and this differ from what was concluded from a study in Michigan which suggested that surgery for acute appendicitis could be delayed for 24 hours after admission to the hospital without increased risk of perforation<sup>5-8</sup>.

In our community, patients were already delayed before admission, i.e. the pre-admission delay in our community is longer than that in western countries.

In conclusion, the diagnosis of acute appendicitis depends mainly on the clinical presentation and the delay for appendectomy is mainly due to the pre-admission delay. Once acute appendicitis is diagnosed, immediate appendectomy should be performed to decrease the risk of perforation.

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