

To determine the factors that affect the delay in diagnosis of acute appendicitis, affecting the morbidity and mortality of patients, at a tertiary care center in Karachi, Pakistan

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Abstract

Object: The aim of our study is to determine the factors that affect the delay in diagnosis of acute appendicitis, in order to decrease the morbidity and mortality of this condition.

Method: The type of study is a cross sectional study, conducted for a period of one year from May 2014 to May 2015 at a tertiary care center in Karachi, Pakistan. The total study population consisted of 150 patients, the inclusion criteria was all the patients who were above 16 years of age, and presented to the emergency department with delayed presentation (two or more than two days after initial attack) of acute appendicitis, and gave consent to take part in the study, the exclusion criteria was all the patients who were under 16 years of age, presented earlier than two days of signs and symptoms of acute appendicitis and those who refused to give consent. Characteristics of patients were noted in a pre designed proforma. Various characteristics of the patients were noted including age, gender, address, reason for delay, diagnosis made by the physician etc. Data was analyzed using SPSS version 23.

Results: The study population consisted of 150 patients, having a mean age of 35 ± 12 years, of which 92 (61.33%) were males and 58 (38.66%) were females. 42 (28%) of the patients were misdiagnosed by the physicians in the emergency department on initial presentation and were referred as an outpatient case, while 50 (33.33%) of the patients were managed by non physicians on the initial attack of appendicitis, which included homeopaths, hakeems, spiritual healers, chiropractors, nurses, and patients who self medicate, and 32 (21.33%) of the patients stayed at home, and did not seek any medical attention in the initial two days of appendicitis. The most common reason for the delay was a lack of financial resources from the patient or the family which accounted for 43.33% of the cases.

Conclusion: For the proper management of acute appendicitis it is imperative that an early diagnosis and surgical intervention be done, which significantly decreases the complications, morbidity and mortality of these patients. There is an emergent need to educate the public to seek adequate care in due time so as to avoid unnecessary complications.

Keywords: acute abdomen, appendicitis, delay in management, delayed appendicitis, appendicectomy.

Abbreviations: UTI= urinary tract infection, PID= Pelvic inflammatory disease

Introduction:

One of the most common surgeries performed as an emergency procedure is appendectomy, which is done to eradicate the acute surgical emergency that is appendicitis, which is a common cause of acute abdomen across all age groups.^{1,2} One of the major causes for increased morbidity and mortality for appendicitis is late

diagnosis and surgery, which leads to complications such as perforation of the vermiform appendix, but the rate of development of complications depend on various other factors such as the immune state of the patient and cause of appendicitis, the mortality rate for this condition is between 0 and 2.4%, while the mortality rate for appendicectomy for un-complicated appen-

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dicitis is 0.8 per 1000, and for complicated cases (perforated) is 5.1 per 1,000. There is controversy over the facts of what causes delay in surgery, either it is pre-admission or post-admission delay, but it is universally accepted that delay in the diagnosis and intervention leads to increased morbidity and mortality.³ Among the patients who belong to the old age group, mortality and morbidity is high, due to co morbidities, and delay in intervention due to an increased number of possible diagnoses.⁴ Appendicular mass, gangrene, perforation, abscess and generalized peritonitis are the complications which can occur if appendicitis is not treated in a timely manner. The life time risk for development of acute appendicitis in males and females is 8.6% and 6.7% respectively.^{5,6} The late presentation can lead to gangrene and perforation, among the pediatric age group these complications can develop in 8 to 24 hours, while in adults the complications develop in 36 hours.⁷ In our region of the globe, there are various different causes of delay to diagnosis and treatment such as, illiteracy about the disease, home remedies, alternative medicine like homeopathy, ayurvedic medicine, hakeem, Chinese medicine, spiritual healing practices, quacks and other factors like, financial issues, lack of proper ambulance and emergency services in district hospitals.⁸ Various other diseases like acute gastro enteritis, UTI, and PID mimic the signs and symptoms of acute appendicitis and it is difficult to distinguish among these illnesses, which results in delay in diagnosis and intervention. A test's sensitivity and specificity determines its significance along with the positive and negative predictive values. Appendicitis is frequently misdiagnosed and is among the major reasons for malpractice by the emergency room physicians. The aim of our study is to determine the factors that affect the delay in diagnosis of acute appendicitis, in order to decrease the morbidity and mortality of this condition.

Materials and Methods:

The type of study is a cross sectional study, conducted for a period of one year from May 2014 to May 2015 at a tertiary care center in Karachi,

Pakistan. The total study population consisted of n=150 patients, the inclusion criteria was all the patients who were above 16 years of age, and presented to the emergency department with delayed presentation (two or more than two days after initial attack of acute appendicitis) of acute appendicitis, and gave consent to be partake in the study, the exclusion criteria was all the patients who were under 16 years of age, presented earlier than two days of signs and symptoms of acute appendicitis and those who refused to give consent. Characteristics of patients were noted in a pre designed proforma, which included various variables such as patients age, gender, address, time of onset of signs and symptoms of appendicitis, mode of transportation to the hospital, complete history and physical examination of the patients, complications of acute appendicitis, such as perforation, appendicular mass, auto amputation, gangrene or abscess, laboratory investigations such as complete blood picture, Urine analysis, serum urea, creatinine and electrolytes, ultrasound abdomen, chest X-ray and CT scan of the abdomen was also done for the patients. Data was analyzed using SPSS version 23, Quantitative variables were noted as frequency and percentages, while qualitative variables were noted as mean and standard deviation.

Results:

The study population consisted of 150 patients, having a mean age of 35 ± 12 years, having an age range of 16 to 70 years, of which 92 (61.33%) were males and 58 (38.66%) were females. The various demographic characteristics of the patients are given in Table 1. In our study the majority of the patients were between 20 and 40 years of age that is 54% of the study population, the length of hospital stay varied according to the pre existing co morbidities in the patient population, the majority of the patients had a hospital stay of less than 10 days. 42 (28%) of the patients were misdiagnosed by the physicians in the emergency department on initial presentation and were referred as an outpatient case, while 50 (33.33%) of the patients were managed by non physicians on the initial

Table 1: Characteristics of patients with delayed appendicitis

Characteristic	No of patients	Percentage
Gender		
Male	92	61.33%
Female	58	38.66%
Age group		
<20 years	45	30%
20 to 40 years	81	54%
>40 years	24	16%
Length of hospital stay		
<10 days	69	46%
11 to 20 days	24	16%
>20 days	57	38%
Diagnosis & Management		
Managed by Non Doctors	50	33.33%
Managed by District Surgeon	26	17.33%
Misdiagnosed by Physicians	42	28%
Delays at home	32	21.33%
Mode of transport to the hospital		
Via Ambulance	76	50.66%
Via Private transport	44	29.33%
Via Public transport	30	20%
Reasons for delay		
Lack of financial resources	65	43.33%
Misperception of the gravity of illness, thinking it will go away with rest	33	22%
Lack of transportation availability	19	12.66%
No support from family or friends	33	22%

attack of appendicitis, which included homeopaths, hakeems, spiritual healers, chiropractors, nurses, and patients who self medicate, and 32 (21.33%) of the patients stayed at home, and did not seek any medical attention in the initial two days of appendicitis. The most common reason for the delay was a lack of financial resources from the patient or the family which accounted for 43.33% of the cases, refer to table 1.

Discussion:

Appendicitis is one of the most discussed disease in the medical literature,⁹ it is a well established fact that for successful outcome with as little complications as possible, is made possible only through early diagnosis and treatment of the condition,^{10,11} surgery remains the gold standard but few authors are proponents

of conservative techniques even for a complicated appendicitis with perforation,¹²⁻¹⁶ there are two methods to perform appendectomy, either by the open method or the laparoscopic method which yields and early mobilization and less number of days spent in the hospital.¹⁷⁻¹⁹ The health care system of Pakistan is designed in such a way that majority of cases of acute appendicitis are first seen by general physicians and practitioners of alternative medicine. The decision made by the afore mentioned entities then relies on making the diagnosis of as such that it leads to a regimen of observation, or treatment with medicine (such as antibiotics etc), or referral for appropriate surgical care and intervention. But this unnecessary delay in referral for appropriate surgical care leads to development of complications such as perforation etc and increase in morbidity and mortality.^{8-11,20-22} Various studies^{7,8,23,24} have sought to seek the causes of this delay in seeking surgical care, in our study the male participants accounted for 61.33% of the population which is also similar to the results of other studies,^{6,8} and according to Salati et al in their study males constituted twice the affected population.⁹ According to a study by Aly Saber et al the maximum length of hospital stay was found to be 7 days while in our study it was more than 20 days.²⁶ And according to Ch Chung et al the number of patients misdiagnosed by the physicians constituted of 22.1% of the patient population, while in our study the number of patients misdiagnosed were 28%, and a similar study in Kashmir yielded 23% of the patients misdiagnosed.^{12,21} According to Salati et al, the number of patients who presented with delayed appendicitis due to mismanagement by non doctors and due to unnecessary delays at home were 12.5% and 53% respectively, while our study shows similar results of 21.33% and 33.33% respectively. Also considering the fact that Pakistan is a developing country, and the transportation system in Pakistan is not fully developed, therefore it takes a longer amount of time for patients to reach proper facilities which provide surgical care, especially for patients who live in the sub-urban or rural areas. Most of the patients belonging to the rural areas, are man-

ual workers by occupation and their sources of living is based on them working on a daily basis, hence for these patients missing time from work is a nuisance which causes unnecessary financial burden, therefore majority of patients who belong to his category ignore the signs and symptoms and the gravity of their illness, and seek help only when the pain becomes unbearable. Also the quack industry in Pakistan is very well established, and with no regulatory body governing these quacks and homeopaths, open up their clinics in rural areas and take advantage of the illiteracy of the population in those areas,^{20,21} patients take medications offered by these quacks in hopes of getting better which further delays surgical treatment and leads to more complications.¹⁰ Mis-management by physicians specially in the earlier timeline of disease is also a hurdle, especially in the pediatric population in which acute appendicitis is difficult to diagnose and manage,⁸ this combined with the fact that their first encounter is likely to be with a general physicians, quack, hakeem, homeopath etc, further aggravates the issue.^{4,24} Patients who are prescribed antibiotics and pain medications by these primary contact care providers often mask the symptoms and cause a hindrance in surgical assessment. And delay is caused by treating an alternative diagnosis, which causes a rise in morbidity and mortality.^{9-11,20} Therefore we recommend, that a regulatory body be formed which works to eradicate or at least regulate these quacks and practitioners of alternative medicine, also we suggest that primary care clinics be developed and upgraded in the rural health sector so that delays in diagnosis and referral are avoided for the patients.

Conclusion: For the proper management of acute appendicitis it is imperative that an early diagnosis and surgical intervention be done, which significantly decreases the complications, morbidity and mortality of these patients. There is an emergent need to educate the public to seek adequate care in due time so as to avoid unnecessary complications.

Conflict of Interest: None

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Role and contribution of authors:

Dr Ayaz Ghulam Rasool, Resident emergency medicine, have collected the data and references

Dr Maaz Obaid, Resident emergency medicine, also helped in collecting data and discussion writing.

Dr Muhammad Azam Akhter, Resident emergency medicine, collected the references and helped in introduction and methodology writing.

Dr Lal Shehbaz, Registrar Emergency Medicine, has been collecting data and helped in introduction, methodology and results writing

Dr Shua Nasir, Registrar Emergency Medicine, collected the data and helped in writing introduction, result and discussion and gave the final touchup to the article.

Dr Zain Ali, House officer, did collected the data and wrote the initial writeup.

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