A COMPARISON BETWEEN PRESENATATION TIME AND DELAY IN SURGERY IN SIMPLE AND ADVANCED APPENDICITIS

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Background: Acute appendicitis is the most common cause of acute abdomen. Serial examinations and investigations increase diagnostic accuracy. But this causes delay, which may result in gangrene and perforation. Our aim is to determine the affect of delay by the patient as well as by the physician on the stage of the disease as determined intraoperatively and to determine the percentage of negative appendectomies. **Methods:** 102 consecutive patients presenting to the Mayo Hospital emergency, undergoing appendectomy between February and April, 2002 comprise the study group. Data was tabulated and analyzed. The delay by the patient in presenting to emergency was called the "patient's delay" and the in-hospital delay before the actual operation called the "physician's delay" were calculated. The appendicitis was divided into two groups i.e. "simple appendicitis" which included acutely inflamed appendices and grossly mildly or non inflamed but histopathologically inflamed appendicitis and "advanced appendicitis" which included gangrenous and perforated cases. **Results:** The percentage of negative appendectomy in our center was 5.9%. Patients' delay averaged 2.59 days and 2.43 days in simple and advanced appendicitis. A prolonged average delay period of 6.12 day was seen in misdiagnosed cases. The mean delay was not significantly different. 86.3% of the patients were operated within 12 hours of presentation. The mean physician's delay was 9.24 hours. It was significantly shorter for advanced appendicitis as compared to simple appendicitis. **Conclusions:** Patient's delay was not associated with advanced appendicitis. It is recognizable clinically and gets operated two hours earlier on average. There is a significant lag period of observation leading to a physician delay in simple appendicitis, contributing possibly to, increased morbidity. However there is an increased need to use ultrasonography and CT in the emergency setting to diagnose appendicitis in case of doubt.

Key Words: Appendicitis, negative appendectomies, appendix.

INTRODUCTION

Acute appendicitis develops in 10% of the general population. Rare in infancy, the maximal reported incidence is in teens and twenties.[1,2] Overall it is the most common cause of acute abdomen.[3]

Surgical teaching has advocated early appendectomy. This is done at the cost of diagnostic accuracy to avoid the morbidity associated with perforation of the acutely inflamed appendix.[3] However the operation may be delayed because the patient is sometimes kept under observation with serial WBC counts and repeated examinations. In some cases the patient may just present late to the hospital due to various reasons. This leads to a delay in definitive treatment for which both patient and hospital factors may be responsible. The question before us was that does this delay by the patient or by the physician have any effect on the stage of disease as it is determined per-operatively. The current literature is divided over this issue. Some studies suggest that these delays may increase the morbidity [4,5,6]. Our study will be a pointer to the effects of these delays on the outcome of the patient and hence will help in the ultimate decision to wait or not to wait.

The objective of this study is to determine the affect of delay by the patient and by the physician on the stage of the disease as determined intra-operatively. We also want to determine the percentage of negative appendectomies in our unit.

MATERIAL AND METHODS

102 consecutive patients presenting to the emergency department, aged 10 to 85 years underwent emergency appendectomy for the clinical diagnosis of acute appendicitis between 16th February 2002 and 15th April, 2002. Data was collected about the age, sex, duration of history, associated disease, presenting signs, laboratory investigations, time period between admission and surgery, operative and pathological findings.

Duration of complaints before presentation to the hospital was regarded as patient delay and reported in days. The time from arrival in the ER to surgery was regarded as physician delay and was reported in hours. A policy of routine prophylactic antibiotic regimen of intravenous Ampicillin 500mg, Gentamycin 80mg and Metronidazole 500mg at induction was instituted except in cases where any of these drugs were contraindicated i.e. first trimester pregnancy, hypersensitivity etc. All appendectomies were done under general anesthesia. The operative findings were classified into five categories as not inflamed, minimally inflamed, acutely inflamed, gangrenous and perforated according to operative and histopathology reports. For the purpose of the study, the last two categories were grouped together as "advanced appendicitis" while the first three as "simple appendicitis". Cases that seemed non-inflamed intraoperatively but turned out to be inflamed on histopathology were classified as appendicitis. Criteria for inflammation on visual examination were edema, hyperemia, dilated blood vessels and/or obvious gangrene with or without perforation. Histological findings of "periappendicitis" or "sub-acute appendicitis" were not considered appendicitis. Duration of postoperative nil per oral was also noted.

Postoperative wound infection occurring within one month was noted and treated with antibiotics and drainage of pus if present.

RESULTS

Of the 102 patients preoperatively diagnosed as having acute appendicitis 96 (94.1%) were found to be correctly diagnosed on histopathology and 6 (5.9%) were misdiagnosed. 2 males and 4 female patients were misdiagnosed hence the male to female ratio among the misdiagnosed cases was 2:1. 10 (9.8%) of patients had perforated appendices.

Of the 96 correctly diagnosed cases, 81 (84.3%) were simple appendicitis and 15 (15.7%) were advanced appendicitis. The means age for simple appendicitis (22.8 years) was lesser than for advanced appendicitis (27.3 years). (Table 1 – Patient Characteristic)

15.2% (n=46 males) from among males had advanced disease as did 16% (n=50 females) from among the females. Hence the advanced disease was almost equally common in both the sexes.

Postoperative oral consumption started earlier (14.2 hrs vs 32.8 hrs) and hospital stay was shorter (1.6 days vs 3.2 days) in simple appendicitis. Post operative wound infection occurred in 11.1% (9 patients) of simple and 26% (4 patients) of advanced appendicitis.

Patients' delay ranged from 0.04 days (1 hour) to 30 days (Table 2). 60 patients (62.5%) of the patients presented within one day of the onset of symptoms. A prolonged average delay period of 6.1 days was seen in misdiagnosed cases. The mean delay period was not significantly different among either of the groups.

Patients > 30 year old had marginally longer delay in presentation (2.99 days), than those less than or equal to 30 years (2.48 days). Gender did not affect preadmission delay, but patients presenting with fever at presentation had a mean patient delay of 1.96 days while those without fever averaged 3.17 days.

Physician delay ranged from 1 to 36 hours (Table 3) with an average of 8.96 hours over all. It was shorter (7.36 hours) in advanced appendicitis, than simple appendicitis (9.24 hours). Female patients were operated about an hour earlier on average. Patient delay did not differ significantly between the two groups. 88 patients (86.3%) were operated within 12 hours of presentation.

Table-1: Patient Characteristics, Operative and Post Operative Course of Patients at the Two Stages of Diseases

	Acute Appendicitis N=81	**Advanced Appendicitis N=15**
Characteristics		
Gender		
Male	39	7
Femal	42	8
Mean Age (Yrs)	22.80	27.3
Operative & Post-op Course		
Mean Duration of NPO (Hrs)	1413	32.76
Mean Hospital Stay (Days)	1.63	3.2
Wound Infection (%)	11.1	26.00

*Male : Female = 0.93 : 1

Table-2: Patient's Delay In The Study Group

Patient Delay (Days)	**Simple App N-81**	**Advance App N=15**	**Mis-diagnosed N=6**	**Total Group N=102**
0.5	32	2	2	36
0.51-1.0	24	7	1	32
1.1-2.0	9	3	1	13
2.1-3.0	5	1	1	7
>3.0	11	2	1	14

Mean Delay	**1.59**	**2.43**	**6.1**	**2.56**

Table-3: Physician's Delay in the Study Group

Physician Delay (Hrs)	**Simple App N-81**	**Advance App N=15**	**Mis-diagnosed N=6**	**Total Group N=102**
3	5	1	1	7
3-6	24	4	1	29
6-9	16	6	2	24
9-12	23	4	1	28
>12	14	0	1	14
Mean Delay	**9.24**	**7.3**	**7.9**	**8.96**

DISCUSSION

The percentage of negative appendectomies in our center i.e. 5.9 % (6) is lower than the comparable studies. Rao et al give a figure of 7%[7], but higher figures of 9%[8] and even up to 19%[5] have also been quoted[9]. The well-known fact that the misdiagnosis rate is higher in female[10] is corroborated by our data. This is perhaps because of the gynecological pelvic disease and female functional abnormalities. Apart from the traditional wait and see approach, we also use USG, CT Scan and diagnostic laparoscopy to reach a diagnosis[11]. This has reduced the rate of negative appendectomy[7]. However the rate of negative appendectomy was similar in open and laparoscopic appendectomies[12].

The approach to acute appendicitis is influenced by the desire to reduce the misdiagnosis rate to avoid unnecessary surgery on the one hand. And by the attempt to operate at an early stage of the disease in order to reduce the associated morbidity on the other hand[5]. In doubtful diagnosis, surgery is delayed and close observation of the patient is usually done to allow the clinical picture to become clearer and hence to reach a more precise diagnosis. This approach may or may not affect the stage of the disease. The problem of delay is compounded by the fact that the patients and the surgeons both share the responsibility for it. In-hospital logistics like heavy workload and non-availability of the theatres may cause a further unavoidable delay.

The lag period between onset of symptoms and surgery was divided into a pre-hospital delay (the responsibility of the patient or the referring physician) and hospital delay (due to the observation period or hospital logistics). Conflicting evidence exists as to the role of delay as a whole and its two components on the course and outcome of acute appendicitis. There is evidence that patient delay affects perforation rates while in hospital delay does not [5,8]. But some authors suggest that both the components are associated with advanced disease and increased morbidity[6]. The wait and see approach may be associated with significant morbidity.

62.5% of the patient presented within a day of onset of symptoms. However patient delay did not correlate with advanced disease in our study, even though patients with fever presented earlier on average.

86.3% were operated within 12 hours of presentation. We seem to have operated patient with advanced disease with a significantly lesser physician delay. This is due to the recognition of a more toxic state in these patients on the basis of clinical examination and hence the conscious decision to give them priority for operation.

The male to female ratio is 1 : 1 in most cases except in the age group of teens and twenties when the ratio is recognized as 3:2[2]. Our figure of 0.94:1 for the whole sample corresponds with the accepted figure suggesting that our sample was valid cross section of the general population.

There was a high rate of postoperative wound infection, more so in the perforated cases[13,14]. One of the factors responsible could be the bacterial contamination, but inadequate asepsis and sterilization because of the extremely heavy workload may be the major determinant[15].

CONCLUSION

While in our series, contrary to our initial expectation, patient delay did not turn out to be associated with advanced appendicitis, we did find that this condition is recognizable clinically and gets to the operating table two hours earlier on average. There is however a significant lag period of observation leading to a physician delay in simple appendicitis, which can possibly contribute to, increased morbidity.

In this context, we would like to stress that the mainstay of diagnosis of acute appendicitis are its clinical symptoms and signs. However there is also an increased need to use USG and CT Scan in the emergency setting to diagnose appendicitis when the clinical picture is ambiguous.

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