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Original Research Article

Factors influencing perforated appendicitis in a tertiary care hospital

Palachandra A.[1]*, Shashank R.[1], Sreelatha C. Y.[2]

[1]Department of General Surgery, HIMS, Hassan, Karnataka, India
[2]Department of Community Medicine, HIMS, Hassan, Karnataka, India

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***Correspondence:**
Dr. Palachandra A.,
E-mail: drapchandra72@gmail.com

ABSTRACT

Background: Appendicitis is among the most common abdominal conditions requiring admission to emergency surgery departments. It has a life time risk of 6%. Untreated appendicitis may be complicated with development of gangrene or perforation, resulting in high morbidity and mortality rates in almost all age groups. The frequency of appendicitis may show variation by population, age, sex, socioeconomic status, and race. The objective of this study was to know the influence of some demographic factors on perforated appendicitis in a tertiary care hospital.
Methods: A descriptive cross sectional was done in a teaching hospital which is a referral center. All the acute appendicitis cases admitted to the hospital between January 2015 to December 2016 were included in the study. A total of 532 acute appendicitis cases were diagnosed based on pathological features and were allocated to either the perforated or non-perforated appendicitis groups.
Results: In our study total 532 cases were operated for appendicitis. Among that 294 (56%) were males and 238 (44%) were females with a ratio of 1.27:1.00. The mean age was 26.8±13.2 among non -perforated cases and 22.4±12.3 among perforated cases. In present study, maximum cases were in the age group 21-30 years and perforation was more among >50 years age group (23.3%).
Conclusions: Perforation was higher among >50 years age group and in the patients from rural area which was found to be statistically significant. The reasons can be misdiagnosis, delayed diagnosis, financial and transportation problems.

Keywords: Appendicitis, Demographic factors, Perforation

INTRODUCTION

Appendicitis is among the most common abdominal conditions requiring admission to emergency surgery departments. It has a life time risk of 6%.[1] Untreated appendicitis may be complicated with development of gangrene or perforation, resulting in high morbidity and mortality rates in almost all age groups. Claudius Amyand performed the first appendicitis operation at London St. George's Hospital.[2]

Since then, the decreasing and increasing prevalence rates of the disease over time have directed researchers to undertake epidemiological and demographic studies. Similar to many diseases, the frequency of appendicitis may show variation by population, age, sex, socioeconomic status, and race.[2-5]

Although eating habits and hygienic practices have been suggested to also have a role, such a relation is not widely accepted at present.[6] Recently, several researchers have found some relation between the development of appendicitis and different seasons. Few epidemiological data on appendicitis is present in Indian and Asian population as most studies are on western population.[7-10] Therefore, present study was undertaken in a tertiary care

hospital to understand demographic factors related to acute appendicitis in an Indian context.

The objective of this study was to know the influence of some demographic factors on perforated appendicitis in a tertiary care hospital.

METHODS

A descriptive cross sectional was done in a teaching hospital which is a referral center. All the acute appendicitis cases admitted to the hospital between January 2015 to December 2016 were included in the study.

Recurrent appendicitis, elective appendectomies and false-positive appendicitis cases were excluded. Detailed case history of the patient was taken including necessary demographic information.

A total of 532 acute appendicitis cases were diagnosed based on pathological features and were allocated to either the perforated or non-perforated appendicitis groups. For the purpose of analysis, patients were divided into six age groups as: 0-9 years, 10-19 years, 20-29 years, 30-39 years, 40-49 years, and ≥50 years. Data were analyzed for age, sex, length of stay in hospital, place of residence, and perforation status. Data was analyzed using SPPSS and ratio, proportion and chi square test $\chi 2$ were applied.

RESULTS

In present study total 532 cases were operated for appendicitis. Among that 294 (56%) were males and 238 (44%) were females with a ratio of 1.27:1.00. The mean age of incidence was 25.7±12.6, males it was 26±13.6 and in females it was 24.4±10.3. Out of 532, 42 (8%) patients had perforated appendicitis and 490 (92%) patients had non-perforated appendentis. The mean age was 26.8±13.2 among non-perforated cases and 22.4±12.3 among perforated cases. The difference was not significant (p>0.05).

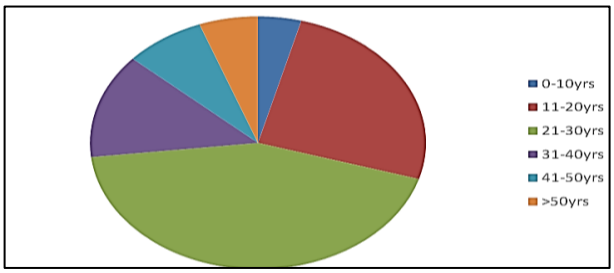

Figure 1: Pie diagram showing age distribution of acute appendicitis cases.

In present study though the males are more prone for perforation than females, the difference was not significant (p>0.05). Among the perforated cases 57% were males and 43% were females with a ratio of 1.33:1.

Table 1: Distribution of gender according to the perforation status.

Gender	Non-perforated appendicitis N=490 (92%)	Perforated appendicitis N=42 (8%)	Total N=532 (100%)
Male	270 (55%)	24 (57%)	294 (56%)
female	220 (45%)	18 (43%)	238 (44%)

$\chi 2$= 0.065; p>0.05.

Table 2: Distribution of age according to the perforation status.

Age (years)	Non-perforated appendicitis (N=490)	Perforated appendicitis (N=42)	Total (N=532)
0-9	19 (86.3%)	3 (13.7%)	22 (100%)
11-20	126 (94.7%)	7 (5.2%)	133 (100%)
21-30	219 (93%)	16 (7%)	235 (100%)
31-40	65 (91.5%)	6 (8.5%)	71 (100%)
41-50	38 (92.6%)	3 (7.4%)	41 (100%)
>50	23 (76.6%)	7 (23.3%)	30 (100%)

$\chi 2$=12.5; p<0.05.

Table 3: Distribution of acute appendicitis by season.

Season	Nonperforated appendicitis (N=490)	Perforated appendicitis(N=42)	Total (N=532)
Rainy	183 (93.8%)	12 (6.1%)	195 (100%)
winter	156 (90%)	17 (10%)	173 (100%)
summer	151 (92%)	13 (8%)	164 (100%)

$\chi 2$=1.70; p>0.05.

In present study, maximum cases were in the age group 21-30 years, followed by 11-20 years. More number of perforation cases can be seen among >50 years age group (23.3%), less number of perforation can be seen among 11-20 years (7%).

In present study, maximum number of acute appendicitis cases were seen in rainy season. However, perforation cases were more in winter months (10%) compared to others season. The difference was not statistically significant (p>0.05).

In this study, acute appendicitis cases were more in rural place. Among this perforated case were also high among rural patients (9.7%) compared to urban, which was statistically significant.

Table 4: Distribution of acute appendicitis by place of residence.

Place of residence	Nonperforated appendicitis (N=490)	Perforated appendicitis (N=42)	Total (N=532)
Urban	175 (95.6%)	8 (4.3%)	183
rural	315 (90.2%)	34 (9.7%)	349

$\chi 2=4.76$; $p<0.05$.

DISCUSSION

Study findings regarding sex distribution of appendicitis cases were consistent with the results of previous studies with a marked male predominance.[11,12] Ad- diss et al estimated the lifetime risk of appendictis as 8.6% for males in the United States population, while the corresponding figure for females was 6.7%.[13] In the present study, acute appendicitis was mostly seen from 21 to 30 years of age, whereas it was least common at ages <10 years. The results were similar to other studies conducted in different parts of the world.[14,15] Perforation was seen at early ages or in the elderly. Our results were parallel to the previous studies.[16-17]

Hardin Jr defined lymphoid hyperplasia as the most important cause of appendicitis in children and adolescents, resulting in an increased frequency of this condition at these ages.[16] In another study, lymphoid hyperplasia was observed in 91% of the infected appendicitis cases, and it was described as the most common cause of acute appendicitis seen at early ages.[17] The non-specific nature of the symptoms and laboratory findings, misdiagnosis or delayed diagnosis, delayed admission to hospital, communication problems, and socioeconomic factors have been cited for the high perforation rates at very early ages and in the elderly.[18-20]

According to Eldar et al, these factors increase postoperative infection rates and duration of hospitalization.[21] Therefore, duration of hospital stay was two days longer among patients with perforation. In the present study, more number of cases were from rural areas and perforation was also found to be high among them. The reasons may be delayed admission to hospital, communication difficulties, transportation and financial issues. Many studies show that appendicitis was mostly seen during winter, whereas perforated appendicitis was mostly seen during summer and autumn.[22,23] No such association was found in the present study.

CONCLUSION

Acute appendicitis was most commonly seen among males than females and in the age group 20-30 years. Perforation was higher among >50 years age group which was found to be statistically significant. There was a significant association between place of residence and occurrence of perforation, where perforation was more in rural patients. The reasons can be misdiagnosis, delayed diagnosis, financial and transportation problems. Early diagnosis (clinical, hematological and radiological) and immediate surgical intervention is necessary to prevent perforation. Availability of imaging modalities like ultrasound, CT scan and specialist doctors at the primary care level can address the problem to some extent.

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