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ACUTE APPENDICITIS: EPIDEMIOLOGICAL TRENDS AND SEASONAL VARIATION IN SUBSET OF SOUTH WESTERN PART OF INDIA

Surgery

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ABSTRACT

Acute Appendicitis is the most common acute surgical condition of the abdomen. Many studies have observed variations in incidence as per age group, sex and seasons. To describe and find possible differences in the incidences in different age group, gender and seasonal variations of acute appendicitis south western part of India, we carried out a retrospective observational study of all patients with acute appendicitis admitted to Command Hospital Pune.

Material & Methods: By using hospital discharge summary of patients who were admitted with the diagnosis of acute appendicitis from 01 Jan 2016 to 31 Dec 2017, we studied demographic features particularly date of admission, age, sex final diagnosis and histopathological reports of these patients. All those patients with negative appendectomy were excluded from this study.

Results: During the observation period from Jan 2016 to 31 Dec 2017, 191 admitted with the diagnosis of acute appendicitis. Of these, 144 were male and 47 were female. The age specific incidence of cute appendicitis has similar pattern in males and female. The incidence was highest in age group 20-29 years in both genders. The youngest case recorded was 6 years of age and oldest 85 years of age. Significant seasonal effect was observed and the occurrence was peak in pre-monsoon season and rainy season with minimal incidence in winter.

Conclusion: Acute appendicitis could occur in wide range of age with peak incidence in 20 to 40 years. The occurrence was peak in pre-monsoon & Monsoon season.

KEYWORDS

Acute Appendicitis, Appendectomy, Seasons (winter, Pre-monsoon, Monsoon & Post Monsoon), Www.worldweatheronline.com, Indian Mateorological Department (imd)

INTRODUCTION

Acute Appendicitis has been recognized as a clinical entity for over 100 years [23] and is the most common acute surgical condition of the abdomen [1]. Appendectomy is one of the most common operations worldwide [2]. Age, sex, and seasonal variations of acute appendicitis have been observed in many studies, but the reasons for these variations are not yet known [3]. This study was conducted to explore epidemiological trends and seasonal variations in cases of acute appendicitis which was proven postoperatively by histopathological reports.

METHODS

STUDY DESIGN

We conducted a retrospective population based observational study to assess the demographic features, incidence and seasonal variations. Patients included in the study were those with clinically diagnosed as well as histopathologically proven cases as acute appendicitis. Duration of the study was 24 months between 01 Jan 2016 and 31 Dec 2017. Pathologically proven negative appendectomy patients were excluded from this study.

Data source

Cases of acute appendicitis were obtained from Hospital admission and discharges register Operation theatre register and discharge summary of each patient and histopathological reports.

RESULTS

During the observation period, 191 cases had undergone emergency or interval lap/open appendectomy and their histopathological reports were confirmed as acute appendicitis. Of these, 79.39% were males (Male: Female ratio = 3.06).

Table 1 Incidence of Appendicitis as per gender and age group

Age group (Years)	Male		Female		Total	
	n	% of gender	n	% of gender	n	% of gender
0 - 9	8	5.55%	1	2.13%	9	4.71%
10 - 19	38	26.39%	9	19.15%	47	24.61%
20 - 29	47	32.63%	17	36.17%	64	33.51%
30 - 39	40	27.78%	10	21.27%	50	26.18%
40 – 49	3	2.08%	6	12.76%	10	5.24%
50 - 59	2	1.39%	2	4.25%	4	2.09%
60 - 69	4	2.78%	2	4.25%	6	3.14%
70 - 89	1	0.69%	0	0%	1	0.52%
>89	1	0.69%	0	0%	1	0.52%
Total	144	100%	47	100%	191	100%

The age- specific incidence had similar pattern in both genders. The highest incidence of acute appendicitis was seen in 10 to 39 years in both genders with 20 to 29 years as peak age group (male=32.63%, Female=36.17%). Only 5.55% and 1.68% of the total cases were recorded in first decade of life and age group more than 70 years respectively. Acute appendicitis occurs throughout the year with two peaks of higher incidence. However maximum occurrence i.e. two peaks were found in pre-monsoon and monsoon seasons. The incidence started declining post monsoon with minimal in winter season. Data from Indian meteorological Department (IMD) showed maximum rainfall during pre-monsoon and monsoon season [figure 2 & 3]. **www.worldweatheronline.com** showed vast difference of average temperature between winter season and Pre-monsoon season. **www.worldweatheronline.com** also showed constant rise of humidity from pre-monsoon with maximum humidity at monsoon season.

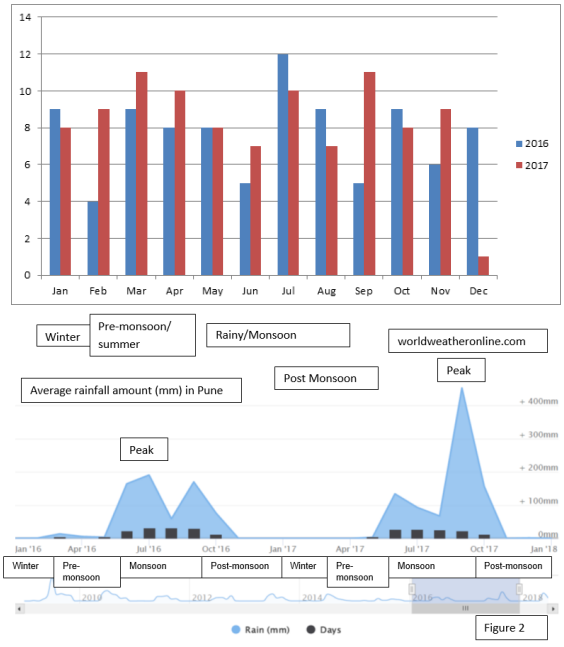

Figure 2

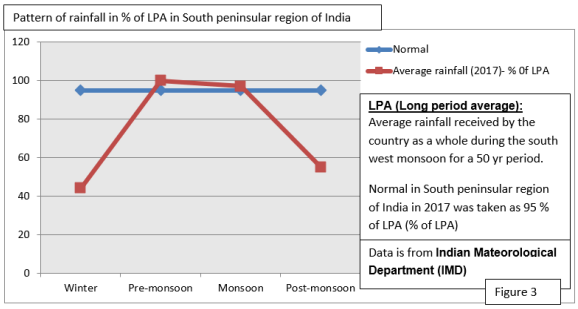

Figure 3

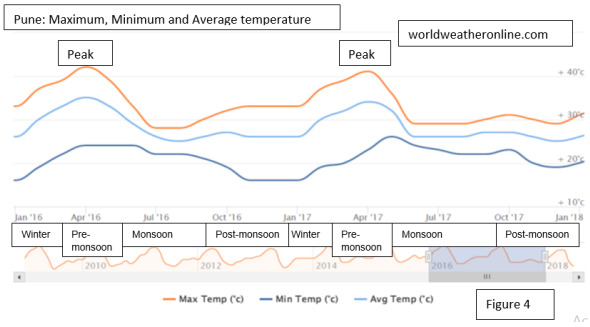

Figure 4

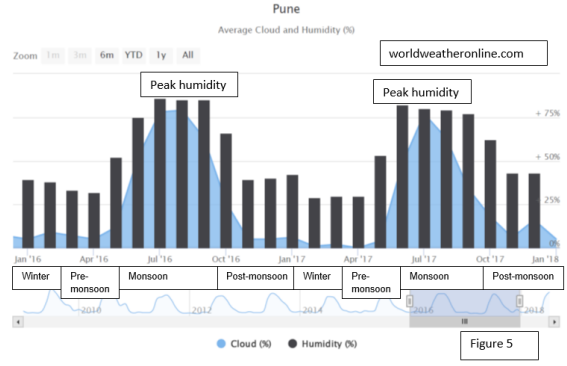

Figure 5

DISCUSSION

The incidence of appendicitis varies substantially by country, geographical region, race, sex, age, and seasons [3,4,5,6]. The predisposing factors to appendicitis are thought to be multi-factorial, ranging from dietary, age, genetic predisposition, viral and bacterial infections, and parallel changes in humidity[7], Mechanical obstruction [21],Vascular disorders, stressful life [8], smoking [9], Inadequate dietary fiber [22] and inadequate childhood breast feeding [10]. The high prevalence of intestinal parasites in the developing world could also account for some cases of appendicitis, as it has been noticed to be initiated by or associated with them. The commonly associated parasites are schistosoma mansoni, haematobium, Enterbious vermicularis, ascaris, Entamoeba histolytica, and pin worm, among others. Badmus et al [19] and Adebamowo et al [20] have reported some cases of schistosomal appendicitis from south western Nigeria. Large consumption of sweets and sugary diets has been implicated by some authors[11,12].

Most authors reported a higher incidence in males [3,5,7,13]. In this study, 79.39% were males with Male: Female ratio of 3.06. Appendicitis is basically a disease of young age [24]. This study has revealed similar pattern of age distribution in both sexes with peak incidence in 2nd and 3rd decade of life. This findings is matching with the finding of studies carried out by A S Oguntola et al [24]. This supports the non influence of the X chromosome as a predisposing factor to acute appendicitis [13]. Acute appendicitis is relative rare and its incidence decline progressively after third and fourth decade. Appendix is mostly made up of lymphoid tissue and the peak incidence seems to coincide with the age endowed to active lympho-reticular activity in the mucosa associated lymphoid tissues.

The India Meteorological Department (IMD) designates four following climatological seasons

a. Winter (Jan-Feb) b. Pre-monsoon season (Mar-May) c. Monsoon/Rainy season (Jun-Sep) d. Post monsoon seasons (Oct-Dec).

Appendicitis occurs throughout the year however higher incidences were noticed in some particular month although this varies from region to region. Higher incidences are noted to be associated with summer months by many authors [3,14,15].

In this study the incidence had two peaks, first in Mar-Apr (Pre-monsoon) and second peak in Jul-Sep (Monsoon season).This variations shows the possibility of heterogeneous extrinsic factor such as humidity, allergens, sun radiations and viral/bacterial infections in the aetiogenesis of acute appendicitis. The first peak in the month of mar and Apr may be because of vast fluctuation of temperature and allergic reaction to pollen. Allergic reaction to pollen from flowers and palm produce [16] for example, maize may also account for some of the cases, which appear as lymphoid hyperplasia; a form of immunological response. Khaevel et al, also postulated the importance of the actual reduction of sun radiation and vast fluctuations in air temperature, in the incidence of appendicitis [17].

The second peak in this study was in the month of Jul to Sep which corresponds to the onset of monsoon season and may be because of higher humidity, higher incidence of bacterial and viral infections owing to poor sanitation. Higher humidity, which occurs during monsoon season has been implicated by some authors [7,17]. Increase in the incidence of bacterial and viral infections is causing lymphoid hyperplasia leading to appendix lumen obstruction[18].

CONCLUSION

Acute Appendicitis affects both sexes though the incidence is higher in males. The age distribution has a similar pattern in both sexes with peak incidence in second and third decades, the period of a highly responsive lympho-reticular system. The Acute appendicitis has two peaks of maximum incidence. First peak is in the beginning of Pre-monsoon season which may be because of Allergic reaction to pollens and vast differences in temperature. Second peak occurs during the monsoon season and this may be because of high humidity, high incidence of bacterial and viral infections and high prevalence of parasites.

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