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Seasonal Variation in Cases of Acute Appendicitis Incidence

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ABSTRACT

Introduction: Several acute diseases exhibit a circannual pattern. Acute appendicitis has been reported to be present throughout the year, but some particular months are associated with higher incidences. Several researchers have suggested that the heterogeneous extrinsic factors such as gastrointestinal infection, air pollution and low fiber diet, during summer months could be contribute to the higher incidence of appendicitis. The exact reason why acute appendicitis cases present in summer more than other seasons is still not clear. The identification of the reasons for seasonality may offer the possibilities for preventive measures.
Aim: To examine the global trends in the seasonality of appendicitis.
Objectives: This study was conducted to investigate the possibility of existence of seasonal variability in the onset of acute appendicitis.
Materials and Methods: A single-center cross-sectional, retrospective study was conducted for cases of appendicitis. The study was conducted in the Department of General surgery and alleged super specialities, Vijayanagar Institute of Medical Sciences, Bellary, Karnataka, India from January 2019 to December 2021
Results: Patients who were managed conservatively were excluded. Study was conducted for a period of three years. Among which the incidence acute appendicitis requiring surgical management is more during summer
Conclusion: More cases of appendicitis were noted during summer. Larger numbers over several years are needed to draw better conclusions and reach the possible causes behind such variation.

Key Words: *Acute. Appendicitis, Circannual pattern, Summer season, Surgical management.*

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INTRODUCTION

Acute inflammation of vermiform appendix is Appendicitis [1]. Acute appendicitis is a common global acute abdominal surgical condition. Its etiology is poorly understood. Incidence is increased in certain ethnic groups and complications are increased in minorities, likely due to lack of healthcare access[2]. Cases are classified into simple and complex (gangrenous, perforated, and pelvic/abdominal abscess)[3].

Appendicitis has been noted to have a slight male predominance and to occur most often during the second and third decades of life. Although the appendix is considered a true diverticulum of the cecum, the presence of B and T lymphoid cells in the mucosa and submucosa makes the appendix histologically distinct from the cecum and creates lymphoid pulp as a part of the gut-associated lymphoid tissue system. Lymphoid hyperplasia is one of the patho-mechanisms underpinning appendicitis and functions through the obstruction of the lumen. Therefore, because climatic factors could affect the incidence and prevalence of the infection, and lymphoid hyperplasia is often caused by infection and can lead to appendicitis, it is possible that the occurrence of acute appendicitis could, in turn, vary with season or temperature[4,5].

Several acute diseases exhibit a circannual pattern. Acute appendicitis has been reported to be present throughout the year, but some particular months are associated with higher incidences[6].

Several researchers have suggested that the heterogeneous extrinsic factors such as gastrointestinal infection, air pollution and low fiber diet, during summer months could be contribute to the higher incidence of appendicitis[7].

The exact reason why acute appendicitis cases present in summer more than other seasons is still not clear. The identification of the reasons for seasonality may offer the possibilities for preventive measures. This study was conducted to explore the seasonal variations in patients admitted with the diagnosis of acute appendicitis in the period of 3 years from January 2019 to December 2021.

Aim:

To examine the trends in the seasonality of appendicitis in our institute

Objectives:

This study was to investigate the possibility of existence of seasonal variability in the onset of acute appendicitis.

Materials and Methods:

A single-center cross-sectional, retrospective study was conducted for cases of appendicitis. The study was conducted in the Department of General surgery, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India from January 2019 to December 2021 for a period of 3 years.

Inclusion criteria:

* Patients diagnosed with acute appendicitis diagnosed clinically and radiologically.

*Patients completed full course of management i.e conservative & surgical.

Exclusion criteria:

Patients those who did not underwent full course of management.

Results:

Study was conducted for a period of three years with sample size of 539 who have undergone both conservative and surgical management. Study also included patients with age group ranging from 10years to 70 years

Table no 1: Year 2019

MONTH	GENDER		MANAGEMENT		TOTAL
	MAL E	FEMAL E	Conservative	Surgical	
January	7	3	3	7	10
February	7	4	2	9	11
March	14	3	4	13	17
April	7	2	2	7	9
May	30	17	12	35	47
June	16	4	3	17	20
July	35	10	4	41	45
August	27	11	2	36	38
September	4	6	4	6	10
October	7	3	1	9	10
November	8	2	2	8	10
December	5	3	1	7	8
TOTAL	167	68	40	195	235

Table no 2: Year 2020

MONTH	GENDER		MANAGEMENT		TOTAL
	MALE	FEMALE	Conservative	Surgical	
January	5	2	2	5	7
February	4	3	2	5	7
March	6	2	3	5	8
April	8	6	5	9	14
May	17	3	6	14	20
June	7	2	7	2	9
July	2	6	3	5	8
August	8	1	2	7	9
September	4	1	2	3	5
October	4	2	3	3	6

November	4	1	4	1	5
December	4	1	1	4	5
TOTAL	73	30	40	63	103

Table no 3: Year 2021

MONTH	**GENDER**		**MANAGEMENT**		**TOTAL**
	MALE	FEMALE	Conservative	Surgical	
January	14	7	5	16	21
February	10	6	4	12	16
March	17	9	5	21	26
April	12	2	2	12	14
May	13	15	3	25	28
June	11	9	3	17	20
July	12	5	1	16	17
August	16	2	3	15	18
September	8	0	2	6	8
October	11	3	4	10	14
November	7	3	3	7	10
December	8	1	1	8	9
TOTAL	139	62	36	165	201

Table no 4: Age wise distribution

AGE	2019	2020	2021
10-19	38	24	40
20-29	85	34	75
30-39	73	23	45
40-49	29	8	16
50-59	9	8	18
60-70	1	6	7
TOTAL	235	103	201

DISCUSSION

The incidence of appendicitis varies substantially by country, geographical region, race, sex, age, and seasons.The finding of an increasing incidence in this study is in-keeping with the previous reports from the developing countries.The predisposing factors to appendicitis are thought to be multifactorial, ranging from dietary, age, genetic predisposition, viral and bacterial infections, and parallel changes in humidity. Vascular disorders, stressful life, smoking, and inadequate childhood breast feeding, are also being suggested by some authors[8].

The increasing number of ‘fast food’ restaurants where mainly high-carbohydrate, low-fiber diets, confectionaries, and sweets are served could have contributed to the increase in the incidence, as an increasing number of young men and women, at times the whole family patronize these facilities, thus consuming less of the traditional high-fiber, less sugary diet. Large consumption of sweets and sugary diets has been implicated by some authors[9].

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 schistosomamansoni, haematobium, Enterbiousvermicularis, ascaris, Entamoebahistolytica, and pin worm, among others.

Cases of appendicitis present throughout the year, but some particular months are associated with higher incidences, although this varies from region to region. Higher incidences are noted to be associated with summer months by many authors[10].

The presence of seasonal variation shows the possibility of heterogenous extrinsic factors such as, humidity, allergens, sun radiation, and viral and bacterial infections in the etiogenesis of appendicitis.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[11].

Jacob E et al, conducted study Association of Appendicitis Incidence with Warmer Weather Independent of Season and concluded that there is increased incidence in Acute Appendicitis in warmer weather[12].

Fares A told that Seasonal patterns of acute appendicitis is quite clearly demonstrated by data; showing mostly a peak during the summer months in his study Summer Appendicitis[13].

Hanumanth P Lohar et all states that the occurrence of appendicitis was peak in the spring and low in the summer. Acute appendicitis should be suspected irrespective of age, sex and socioeconomic status of individual in his study Epidemiological aspects of appendicitis in a rural setup[14].

Increase in the incidence of bacterial and viral infections and parasitic infestations during this period could also contribute to the higher incidence of appendicitis

Study has shown that out of 539 patients 423[78.42%] underwent surgical management and 116[21.52%] underwent conservative management. Out of 235 patients in the year 2019 26 patients[11%] & 112[47%] had suffered by appendicities in early & late summer respectively. In the year 2020, 21[22%]patients in early summer37 [35%] in late summer out of 103 had suffered the same.

Subsequently it was 40 [16%] patients in early summer & 67 [35%] in late summer out of 201 in the year 2021According to the above mentioned data it was found that the incidence of acute appendicitis during early summer in months of march, april was 21% and late summer in may and June was 40%.

CONCLUSION

More cases of appendicitis were noted during summer season. The exact reason for the difference in incidence is not known. The identification of the reasons for seasonality may offer the possibilities for preventive measures.Larger numbers over several years are needed to draw better conclusions and reach the possible causes behind such variation

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