Original Research Article

Appendicitis and Appendectomy: A Retrospective Survey in South Indian Population

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Abstract

Appendectomy is the surgical procedure of removal of appendix. The inflamed or diseased condition of appendix also known as appendicitis is a common occurrence and is a surgical emergency. It commonly occurs due to obstruction of its lumen. The comprehensive information about the trends in the clinical profile of the appendicitis and appendectomy and pattern of its variation with respect to age and gender may help in clinical updates. Hence, this study included a review of case records of all appendectomy patients in a South Indian hospital since the last five years. The data was collected and analysed statistically. A total of 2402 appendectomy operations were found since the last five years (2006-2010). Among them, 1114 cases were males (46%) and 1288 were females (54%).Total number of 1961 (81.6%) cases of appendectomies were performed for the removal of an inflamed appendix and in remaining 441 (18.4%) cases, appendectomy was done along with the other procedures such as hysterectomy, and colectomy. The incidence of appendicitis and appendectomy were higher in females. The survey revealed, higher incidence rate among 16-30 year age group followed by 31-45 and 1-15 years.

Keywords: Appendicitis, appendectomy, appendix, inflammation, prevalence

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Date of submission: 14 Feb, 2013 Date of acceptance: 21 May, 2013

Introduction

The vermiform appendix is a tubular diverticulum which arises from the posteromedial wall of the cecum, about 30 mm below the ileocecal valve (1). The tip of appendix is variable in position and might lie in a retrocecal, subcecal, retroileal, preileal or pelvic location. The variability in location may influence the clinical presentation of appendicitis (2). Appendicitis is the inflammation of the vermiform appendix which accounts for the most common cause of acute abdomen (3). Appendectomy is the gold standard of treatment for acute appendicitis whereby, inflamed appendix is removed. If untreated, it may lead to several clinical complications, which may be fatal eventually. Appendectomy is one of the most frequent surgical procedures performed (4). Clinical studies may determine the best practice in the management of acute appendicitis (5). The knowledge about the clinical profile of appendicitis and appendectomy cases is an important milestone in public health. Since, the reports are scanty regarding this subject, especially from a South Indian population, the present study was undertaken. The main objective

of this study was to evaluate the trends in the clinical profile of appendicitis and appendectomy and pattern of its variation with respect to age and gender in south Indian population.

Materials and Methods

The present study comprised a review of records of all appendectomy operations in Kasturba Hospital, Manipal, India for the last five years. The total number of appendectomy procedures were noted and segregated into two groups. Group 1 included the cases of appendicitis irrespective of its histopathological variety and Group 2 included remaining cases, which were not included under appendicitis. The percentage distributions of both the groups were calculated separately. The incidence rate was sorted according to gender and age. The age groups of appendectomy cases, were distributed as 1-15 years age group, between 16 and 30 years, between 31-45 years, 46-60 years and the age group of more than 61 years. Percentage incidence of the histopathological variety of appendicitis was also calculated. Based on histopathological and or clinical findings, the appendicitis cases were classified into 4 types: acute type, chronic type, acute over chronic and other non specific varieties. Other non specific varieties included resolving appendicitis, recurrent appendicitis, and healing appendicitis.

Statistical analysis

Data was analyzed using Statistical Package for the Social Sciences software (SPSS version 16.0). Results were expressed in percentage. Chi-Square test was performed for gender and age wise comparison. A 'p' value <0.05 was considered as statistically significant.

Results

A total of 2402 appendectomy (n=2402) cases were found in five years duration between year 2006 to 2010. Among them, 1114 cases were males (46%) and 1288 were females (54%) (Fig.1).

Total of 1961 (81.6%) cases of appendectomies was performed for the removal of an inflamed appendix according to the clinical diagnosis made by the surgeon, where as in remaining 441 (18.4%) cases, appendectomy was done along with the other procedures such as hysterectomy, and colectomy. The gender-based frequency of appendectomy and appendicitis (Table 1) revealed significantly higher prevalence in females compared to males ($p \leq 0.001$, Chi-Square test).

The frequency of histopathological variety of appendicitis (Fig. 2) showed higher incidence of acute appendicitis (39%) followed by chronic appendicitis (38%) among the total appendicitis cases.

The statistical analysis was performed (Table 2) on the incidences of age wise distribution of appendectomy cases due to appendicitis and non-appendicitis cases (such as cases of benign or rare malignant tumors). It revealed higher incidence rate (51%) among 16-30 year age group followed by 31-45 (17%) and ≤ 15 years (16%) age range ($p \leq 0.001$, chi-Square test).

Discussion

An appendectomy (also known as appendicectomy) is the surgical removal of an appendix, generally performed

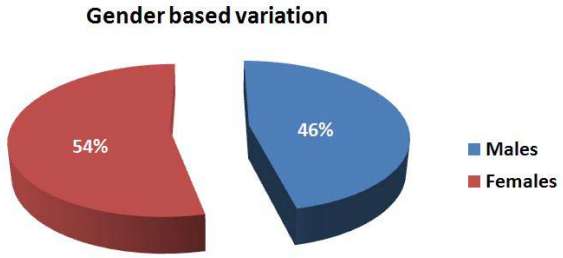

Figure 1: Showing the gender based variation in the frequency of appendectomy cases.

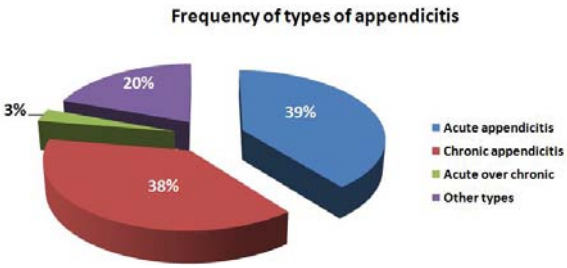

Figure 2: Showing the frequency of different types of appendicitis based on the histopathological diagnosis.

Table 1: Showing the gender based prevalence of appendectomy due to appendicitis and non-appendicitis cases.

Total cases (n = 2402)	Males	Females	Total
Appendicitis cases	947	1014	1961
(group 1)	(39.4%)	(42.2%)	(81.6%)
Other than appendicitis	167	274	441
(group 2)	(6.9%)	(11.4%)	(18.3%)

Table 2: Showing the age group wise distribution of appendectomy due to appendicitis and non-appendicitis cases (n = 2402)

Age group (in years)	Appendicitis	Other than appendicitis	Total
≤ 15	327 (16%)	75	402
16-30	1007(51%)	185	1192
31-45	412(21%)	93	505
46-60	160(9%)	63	223
≥61	55(3%)	25	80
Total	**1961**	**441**	**2402**

in emergency conditions when the patient is suffering from acute appendicitis. In recent times, laparoscopic appendectomy has been ahead in the increasing consensus over the traditional open surgery (4). A diagnosis of appendicitis was most likely in a patient with the presence of pain, vomiting, and fever. Severe pain at the peri-umbilical region to the right lower quadrant with rigidity are classical signs and symptoms of appendicitis (6). In retrocecal appendix, the patient with appendicitis experiences pain on extension of right hip joint due to tension. The anatomical factors producing inflammation may be due to the presence of fecolith, appendix supplied by an end artery, or even deficiency in the muscular wall. Sometimes, blockage of the appendix is due to a build-up of thick mucus within it. Owing to infection, the lymphatic tissue present in the appendix might enlarge and obstruct its lumen. This attracts the normal flora found within the appendix to invade its wall. The body responds to this process by attacking the bacteria. Untreated, patients with appendicitis develop complications such as gangrene, perforation, and abscess formation. The inflammation may spread through the wall of the appendix which may result in rupture of the inflamed appendix. The consequence of rupture of appendix is spread of infection throughout the abdomen. However, mostly it is confined to a small area surrounding the appendix (7). Acute appendicitis may occur at any age, although it is relatively uncommon in the two extremes of life, i.e. in infants because of relatively wide lumen of the appendix and in elderly due to frequent obliteration of the lumen (8). The maximum incidence of appendicitis occurs in the 2nd decade; thereafter, the disease incidence declines with age (9, 10). The gender-based lifetime risk of acute appendicitis reported in males and females, are 8.6%, 6.7%, respectively with the lifetime risk of having an appendectomy reported to be 12% for men and 25% for women (11,12).

Al-Omran et al. (13) reported that, appendicitis is more common in males with the higher incidence in the age group of 10-19 years. Authors also documented the seasonal variation on incidences of appendicitis being increased during the summer seasons. Similar observation was made by Noudeh et al. (14) with respect to gender and seasonal variations on the prevalence of appendicitis. However, in their study, the age group which showed higher incidence of appendicitis was 20 – 29 years. Oguntola et al. (15) observed trends in the incidence with respect to age, gender and seasonal variations from their south western Nigerian population. According to them, the increasing incidence of appendicitis in both genders of their subjects may be due to the change in their lifestyle. The same author suggested that the higher incidence of appendicitis in rainy season may be due to infections and allergens from pollens.

Studies conducted by Lai et al. (7) observed that in patients over 40 years who presented with symptoms of acute appendicitis, the possibility of a concurrent colonic neoplasm cannot be ignored. Therefore, it may be obligatory to perform colonoscopy few weeks after the surgery, to exclude the possibility of a coexistent colorectal malignancy. Sanda et al. (16) suggested that intense challenge to the mucosa associated lymphoid tissue from allergens, bacteria and viruses, occurring during the sandstorm season, may be causally related to acute appendicitis and would explain the seasonal variation. The age-specific incidence and gender ratio of acute appendicitis with the rare data of seasonal variations gives the impression that epidemiologic features of acute appendicitis are different worldwide.

Conclusion

The present study from the South Indian population revealed that, appendectomy cases and frequency of appendicitis were higher among females than in males. Further, the age group between 16 and 30 years is more vulnerable to appendicitis. We believe that the life style of an individual of this age group could contribute to this observation, as this age group population is more attracted towards the unhygienic food. The role of genetic pre-disposition cannot be ruled out. However, further studies are warranted to ascertain the reason for higher prevalence of

appendicitis in females and also in 16-30 years age group.

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