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CASE STUDY

PREOPERATIVE EVALUATION OF WHITE BLOOD CELLS (WBCS) AND NEUTROPHILS IN THE DIAGNOSIS OF APPENDICITIS

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ABSTRACT

Introduction: Appendicitis is the most common abdominal surgical emergency. The cause of acute appendicitis is unknown but is probably multifactorial; luminal obstruction and dietary and familial factors have all been suggested. Appendicectomy is the treatment of choice and is increasingly done as a laparoscopic procedure. Objective of this study is to evaluate the white blood cells (WBCS) and neutrophils. But the use of this value in the diagnosis of appendicitis is unclear.

Methods: It was a prospective, observational study. The study was conducted at RMMCH, Chidambaram for a period of one year i.e., from November 2009 to 2010. Data were collected by using data collection forms and analyzed the diagnostic values by using proper statistical tools.

Results: White blood cells and neutrophils count was high in patients with inflamed and complicated appendix than normal appendix and in complicated than inflamed appendix. The males were significantly more affected than females. The WBC count in normal appendix patients was 10.46±6.56, in inflamed appendix patients was 14.03±4.18 and in complicated appendix patients was 15.10±5.12. The neutrophil count in normal appendix patients was 8.12±5.67, in inflamed appendix patients was 9.93±3.87 and in complicated patients was 12.6±4.37.

Conclusion: The White blood cells and Neutrophils count should not be used for the diagnosis of appendicitis. Clinical data playsa major role in the diagnosis of appendicitis.

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INTRODUCTION

The cause of acute appendicitis is unknown but is probably multifactorial; luminal obstruction and dietary and familial factors have all been suggested. Appendicectomy is the treatment of choice and is increasingly done as a laparoscopic procedure. Appendicitis is most common between the ages of 10 and 20 years, but no age is exempt. 3 A male preponderance exists.

Simple appendicitis: Inflamed appendix, in the absence of gangrene, perforation, or abscess around the appendix.

Complicated appendicitis: Perforatedorgangrenous appendicitis or the presence of peri-appendicular abscess.

Negative appendicectomy: Term used for anoperation done for suspected appendicitis, in which the appendix is found to be normal on histological evaluation. Diagnosis of acute appendicitis relies on a thorough history and examination.

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Abdominal pain is the primary presenting complaint of patients with acute appendicitis. The diagnostic sequence of colicky central abdominal pain followed by vomiting with migration of the pain to the right iliac fossa was first described by Murphy but may only be present in 50% of patients.

MATERIALS AND METHODS

Study design and setting

This was a prospective e, observational study conducted at RMMCH in Chidambaram between November 2015 and November 2016. RMMCH is a tertiary care teaching hospital. One hundred fifty patients (91 male and 59 female) who underwent appendectomy in the Department of Surgery at RMMCH. The diagnosis of Acute Appendicitis was confirmed by the history of the patient (Past history of the patient, Present history of the patient, personal history, past medication history, personal history etc.,), clinical examination, and laboratory tests including WBCs and neutrophil counts. Demographic details, symptoms, signs, surgical procedures, and histo-pathological results of appendix examination were recorded.

Patients who underwent appendectomy as a part of another procedure, and patients who were taking steroids or immunosuppressive medications were excluded from the study. The laboratory investigations were taken before the administration of antibiotics.

Data collection

Data were collected with the help of data collection forms. The data collection form contains the details like Patient's demographic data (age, sex), Past medication history, symptoms of the appendicitis and Post-operative complaints etc.

Statistical analysis

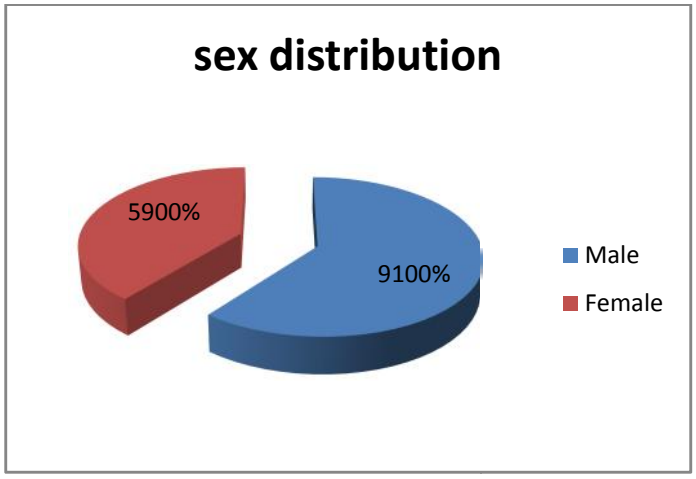
The data collected from the data collection form were entered in the Microsoft excel programme and analyzed. The values of quantitative variables were expressed as mean ± standard deviation (SD).

RESULTS

Sex distribution

Ninety one (60.6%) males and fifty nine (39.3%) females were affected with Acute Appendicitis. The males were significantly more affected than females.

Sl. No	Gender	No. Of patients	Percentage
1.	Male	91	60.6%
2.	Female	59	39.3%



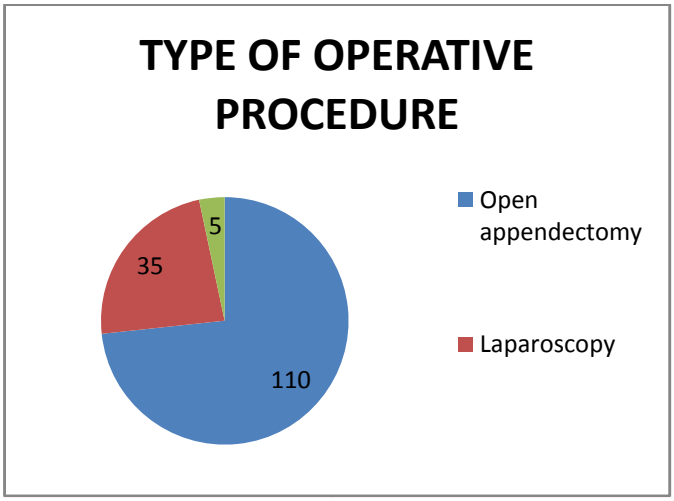
Based on operative procedure

One hundred patients underwent Opened appendectomy, Thirty five patients had laparoscopic appendectomy and five had laparoscopic converted to opened appendectomy.

Sl. No	Type of operative procedure	No. of patients	Percentage
1.	Open appendectomy	110	73.3%
2.	Laparoscopy	35	23.3%
3.	Both	5	3.3%

Based on Histo-pathological findings

In normal, inflamed and complicated appendix, the type of pain was mainly localized 90.6%, 86.6%, 56% than generalized10%, 16%, 42% respectively.



Based on duration of pain

In normal, inflamed and complicated appendix, the duration of pain was mainly greater than twelve hours, 64%, 78%, 95.3% than less than or equal to twelve hours, 28%, 12%, 1.3%.

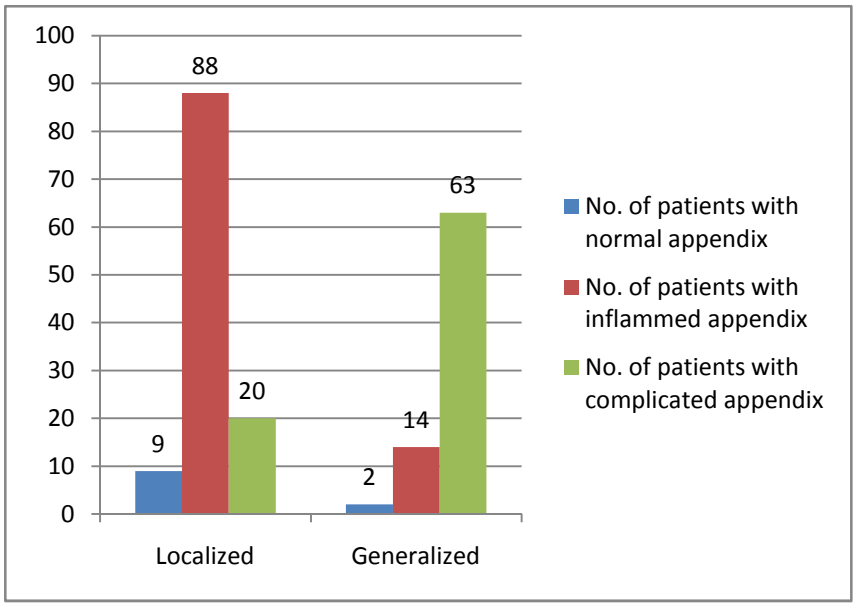
White Blood Cells (WBC) and Neutrophil count

The WBC count in normal appendix patients was 10.46±6.56, in inflamed appendix patients was 14.03±4.18 and in complicated appendix patients was 15.10±5.12. The neutrophil count in normal appendix patients was 8.12±5.67, in inflamed appendix patients was 9.93±3.87 and in complicated patients was 12.6±4.37.

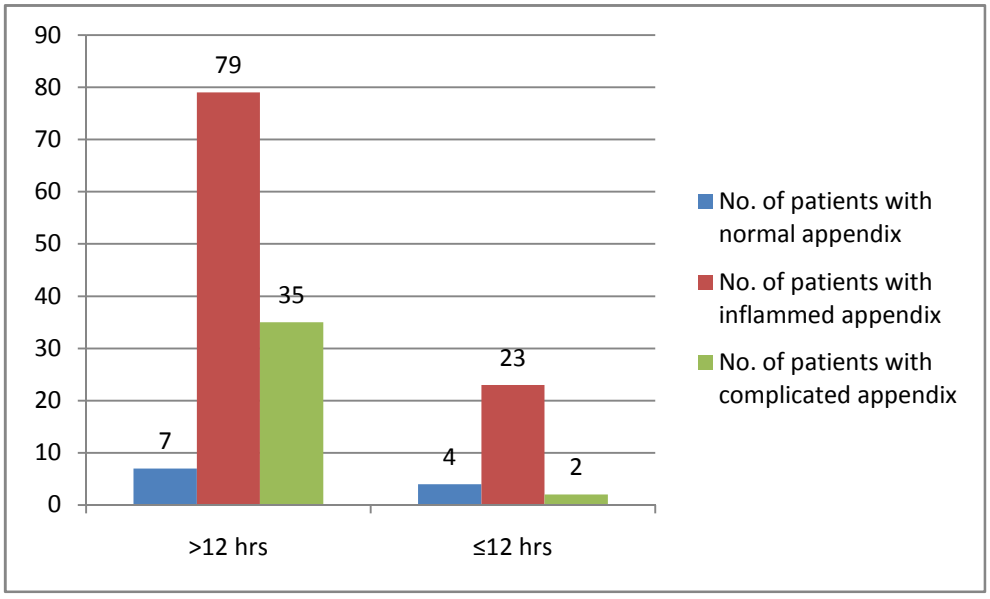
DISCUSSION

Appendicitis is overwhelmingly a disease of childhood and early adulthood. This is a consistent finding in almost all publications on the subject regardless of the population studied (Hale, *et al*., 1997; Lee JH, *et al*., 2010; Smink, *et al*., 2005; Uba, *et al*., 2006). The consistent observation of a slight preponderance of appendicitis in boys is not explained by a difference in fecolith formation. Since the peak incidence of appendicitis coincides with sexual maturity with the sex hormones being most active, it maybe that they play a role in the pathogenesis of appendicitis. Furthermore, antigen-presenting cells which play key roles in innate and adaptive immunity as well as tolerance have been found to express estrogen receptors on their surface implying that their functionsmay be modulated by sex hormones and would explain the purported immunological dimorphism between genders (Bouman, *et al*., 2005; Kovats & Carreras, 2008). The distribution between genders is still unclear. According toD J Humes and J Simpson a male preponderance exists, with a male to female ratio of 1.4:1; the overall lifetime risk is 8.6% for males and 6.7% for females. In this study Ninety one (60.6%) males and fifty nine (39.3%) females were affected with Acute Appendicitis. The males were significantly more affected than females. The rate of postoperative wound infection is determined by the intraoperative wound contamination. Rates of infection vary from <5% in simple appendicitis to 20% in cases with perforation and gangrene. The use of perioperative antibiotics has been shown to decrease the rates of postoperative wound infections. Analgesics should be used for preventing the post-operative pain. In this study in normal, inflamed and complicated appendix, the type of pain was mainly localized 90.6%, 86.6%,

Sl. No	Type of pain	No. Of patients with normal appendix (n=11)	Percentage of patients with normal appendix	No. Of patients with inflammed appendix (n=102)	Percentage of patients with inflammed appendix	No. Of patients with complicated appendix (n=37)	Percentage of patients with complicated appendix
1.	Localized	9	81.8%	88	86.2%	20	54.05%
2.	Generalized	2	18.8%	14	13.7%	17	45.9%



Sl. No	Duration of pain	No. Of Patient S with NormaL Appendi X (n=11)	Percentage of patients with normal appendix	No. Of patients with inflammed appendix (n=102)	Percentage patients with inflammed appendix	No. Of patients with complicated appendix (n=37)	Percentage of patients with complicated appendix
1.	>12 hrs	7	63.63%	79	77.4%	35	94.5%
2.	≤12 hrs	4	36.36%	23	22.5%	2	5.4%



56% than generalized10%, 16%, 42% respectively. Wide differences in negative appendicectomy rates are reported in the literature. Low rates are variously attributed to good clinical skills (repeated clinical examination by an experienced surgeon) (Lander, 2007) or attributed to the higher specificity of diagnostic tests (Seetahal *et al*., 2011). The WBC count in normal appendix patients was 10.46±6.56, in inflamed appendix patients was 14.03±4.18 and in complicated appendix patients was 15.10±5.12.The neutrophil count in normal appendix patients was 8.12±5.67, in inflamed appendix patients was 9.93±3.87 and in complicated patients was 12.6±4.37.

Conclusion

The diagnosis of appendicitis depends on the clinical data. There may be elevation of WBC and neutrophils. But these values should not be considered in the diagnosis of appendicitis. White blood cells and Neutrophils count do not indicate the severity of the disease.

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