ORIGINAL ARTICLE

RADIOLOGICAL ASSESSMENT OF APPENDICITIS: INSIGHTS FROM APPENDICEAL DIAMETER, WBC COUNT, AND FAT STRANDING

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ABSTRACT

BACKGROUND: Appendicitis diagnosis relies on radiological factors like appendiceal diameter, white blood cell (WBC) count, and peri-appendiceal fat stranding. **OBJECTIVES:** Analyze 30 patient cases to understand these factors, assess appendicitis prevalence, and explore age-related differences. **SETTING:** Department of Radiology Sandemen Provincial Hospital Quetta. **METHODS:** Retrospective study of patient data, categorized into "Appendicitis with fat stranding and increased WBC count" and "Increased diameter, no appendicitis, no fat stranding, and normal WBC count." Statistical tests used. **RESULTS:** 40% showed appendicitis indicators; 60% had increased diameter without inflammation. Age influenced presentations. **CONCLUSIONS:** Diagnosing appendicitis requires considering radiological and clinical factors, and age-related differences in presentation.

Introduction

Appendicitis remains a common abdominal emergency, often requiring prompt diagnosis and intervention. Radiological assessments, particularly computed tomography (CT) scans, play a pivotal role in confirming this condition. The presence of certain factors such as appendiceal diameter, white blood cell (WBC) count, and peri-appendiceal fat stranding can provide valuable diagnostic insights.

This study delves into the distribution of these factors among a cohort of 30 patients to enhance our understanding of their significance in diagnosing appendicitis, contributing to the existing body of knowledge in this field. By examining the relationships between these factors and their diagnostic accuracy, we aim to improve the clinical management and outcomes of patients presenting with appendicitis symptoms.

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Methodology

Study Design:
This study adopts a retrospective observational design. Patient data from medical records and radiological reports were reviewed to assess the distribution of key factors in diagnosing appendicitis.

Data Collection:

Patient Selection: A cohort of 30 patients who presented with symptoms suggestive of appendicitis and underwent abdominal CT scans at Sandeman provincial hospital quetta between 1st of January to 30th June 2023 were included in the study.

Data Extraction: Data were collected from electronic medical records, including patient demographics, clinical history, laboratory results (specifically WBC counts), and radiological reports.

Variables:

Appendiceal Diameter: The maximum diameter of the appendix was measured in millimeters (mm) from the CT scans.

WBC Count: White blood cell counts, measured in x10^3/ L, were recorded from the patient s laboratory reports.

Peri-appendiceal Fat Stranding: The presence or absence of peri-appendiceal fat stranding was determined based on radiological reports.

Data Analysis:

Descriptive statistics were used to summarize patient demographics, including age and gender.

The distribution of patients was tabulated based on appendiceal diameter, WBC count, and the presence of peri-appendiceal fat stranding.

Patients were categorized into two groups: "Appendicitis with fat stranding and increased WBC count" and "Increased diameter, no appendicitis, no fat stranding, and normal WBC count."

The percentage of patients in each category was calculated to analyze the prevalence of appendicitis and its radiological features.

Data were further stratified by age groups (0-18, 19-40, 41-60, and 61+ years) to investigate variations in presentation across different age cohorts.

Ethical Considerations:

This study was conducted in accordance with the ethical standards and guidelines set by Sandeman Provincial Hospital Quetta.

Patient data were anonymized to protect confidentiality.

Limitations:

The study's retrospective nature may introduce selection bias.

The sample size (30 patients) is relatively small and from a single institution, limiting generalizability.

Other clinical variables that could influence appendicitis diagnosis, such as symptoms and physical examination findings, were not included in this analysis.

Data Interpretation:

The study aims to provide insights into the distribution of radiological features in appendicitis diagnosis and their potential relationship with age.

Statistical analyses will be conducted to determine the significance of these relationships and identify any age-related patterns in appendicitis presentation.

Results

The (Tab.1) illustrates the distribution of 30 patients based on three key factors: appendiceal diameter, WBC count and the presence of peri-appendiceal fat stranding. These factors are crucial in the context of diagnosing appendicitis and provide insights into the relationship between appendiceal diameter WBC count and the presence of inflammation.

	Appendicitis with fat stranding increased WBC count	Increased diameter, no appendicitis, no fat stranding and normal WBC count
Number of patients	12	18
Percentage of patients	40%	60%

Table 1: Distribution of Patients Based on Appendiceal Diameter, fat Stranding and WBC Count

Appendicitis with fat stranding and increased WBC count (12 Patients - 40%):

In this category, 12 out of the 30 patients (40%) exhibited increased appendiceal diameter along with peri-appendiceal fat stranding and inceased WBC count.This group represents patients who not only had an enlarged appendix but also showed radiological evidence of inflammation in the surrounding tissues with more quantity of WBC count in lab. The presence of increased diameter, WBC count and fat stranding is often indicative of acute appendicitis.

Increased diameter, no appendicitis, no fat stranding normal WBC count (18 Patients - 60%):

In contrast, the majority of patients, comprising 18 out of 30 (60%), displayed increased appendiceal diameter but lacked evidence of appendicitis orperi-appendiceal fat stranding normal WBC count in a lab.

These patients had an enlarged appendix but did not exhibit radiological signs of acute inflammation or fat stranding and normal WBC count in lab.This category emphasizes the complexity of diagnosing appendicitis solely based on appendiceal diameter, as an increased diameter alone does not necessarily imply the presence of appendicitis.The results highlight the significance of considering multiple radiological and clinical factors when diagnosing appendicitis. While appendiceal diameter is an important diagnostic parameter, it is not conclusive on its own. The presence of peri-appendiceal fat stranding alongside increased diameter and increased WBC count is a strong indicator of appendicitis. A significant proportion of patients with an increased diameter did not have appendicitis or associated fat stranding, underscoring

the need for a comprehensive diagnostic approach. This distribution underscores the complexity of diagnosing appendicitis and reinforces the importance of a holistic evaluation, including lab findings and radiological findings, in making an accurate diagnosis and treatment decision for patients presenting with abdominal pain and suspected appendicitis.

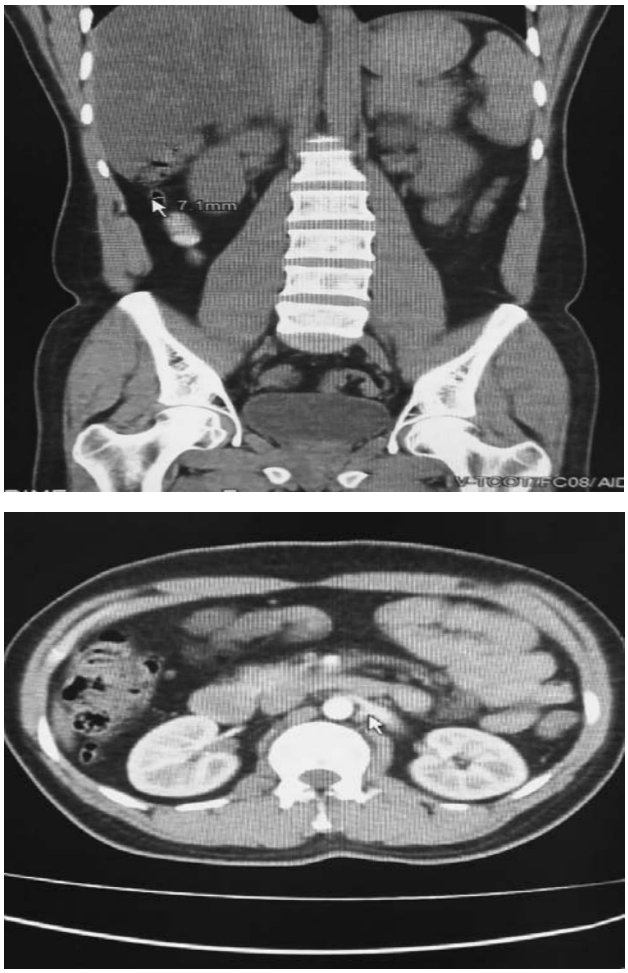

Figure 1: (Top) CT abdomen coronal view showing appendix having increased luminal dimeter with no peri-appendiceal fat stranding (Bottom) CECT abdomen axial view showing retroceacal appendix with no signs of inflammation

Age Group	Appendicitis with fat stranding and increased WBC count	Increased diameter, no appendicitis, no fat stranding and normal WBC count
0-18	4	3
19-40	5	7
41-60	2	6
61+	1	2

Table 2: Distribution of patients with appendicitis based on age groups

(Tab.2) displays patient data for suspected appendicitis across various age groups. Two categories exist: "Appendicitis with fat stranding and increased WBC count" and "Increased diameter, no appendicitis, no fat stranding, and normal WBC count."In the 0-18 age group, 4 cases (about 30%) showed appendicitis with enlarged diameter, fat stranding, and elevated WBC count. In the 19-40 age group, 5 patients (around 42%) had appendicitis with these features, and 7 patients (about 58%) had an increased diameter without appendicitis. Among those aged 41-60, 2 patients (approximately 25%) had appendicitis with fat stranding and elevated WBC count, while 6 patients (about 75%) had an increased diameter without these indicators. For individuals aged 61 and above, 1 case (roughly 33%) had appendicitis with fat stranding and elevated WBC count, and 2 patients (approximately 67%) had an increased diameter without signs of appendicitis.

Discussion

The results in (Tab.1) underscore the complexity of diagnosing appendicitis, emphasizing the significance of a comprehensive diagnostic approach. In the category labeled "Appendicitis with fat stranding and increased WBC count," which accounted for 40% of the patients, individuals exhibited an enlarged appendiceal diameter, peri-appendiceal fat stranding, and an elevated white blood cell (WBC) count.[1,3] These factors align with previous research findings that suggest these radiological and clinical indicators are strong indicators of acute appendicitis. However, the majority of patients, constituting 60%, belonged to the "Increased diameter, no appendicitis, no fat stranding, normal WBC count" category.[5] Despite having an enlarged appendix, these patients did not display radiological signs of inflammation or elevated WBC counts, highlighting the challenge of relying solely on appendiceal diameter for diagnosis.

(Tab.2) delves into the age-related variations in appendicitis presentation. In the "0-18 age group," approximately 30% of patients exhibited both an increased appendiceal diameter and radiological signs of inflammation, suggesting that younger patients may more commonly present with appendicitis characterized by these radiological features.[1,3,5]

Moving to the "19-40 age group," around 42% displayed appendicitis with fat stranding and increased WBC count, indicating a higher incidence of appendicitis with radiological features in this age range. In contrast, the majority of patients in the "41-60 age group" (approximately 75%) had an increased appendiceal diameter without signs of inflammation or elevated WBC counts. Finally, among patients aged 61 and above, around 33% had appendicitis with fat stranding and increased WBC count, while approximately 67% exhibited an increased appendiceal diameter without radiological evidence of appendicitis or abnormal WBC counts. These age-related variations emphasize the importance of considering age-related factors in the diagnostic process.[1,3,5]

In summary, the results of this study highlight the multifaceted nature of diagnosing appendicitis. While certain radiological and clinical factors such as appendiceal diameter, fat stranding, and WBC count play critical roles in diagnosis,[1,3] they are not always conclusive on their own. These findings underscore the need for a comprehensive and age-specific diagnostic approach to accurately identify and treat patients with suspected appendicitis.

Conclusion

The distribution of patients based on appendiceal diameter, fat stranding, and WBC count underscores the intricacies of diagnosing appendicitis. It reinforces the significance of a holistic evaluation, combining clinical and radiological findings, to achieve accurate diagnoses and treatment decisions for patients with suspected appendicitis. Age-related variations further emphasize the need for a tailored approach in clinical practice.

Conflict of Interest: None

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