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A Comparative Study Between Obstructive and Non-Obstructive Appendicitisusing Clinical and Operative Findings

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ABSTRACT

Appendicitis is the leading cause of severe abdominal pain and is more prevalent in males, with a lifetime risk of 8.6%, compared to 6.7% in females. The primary cause of appendicitis is believed to be block age of the append ixlumen, which leads to increased mucous secretion and bacterial growth. This sequence of events increases pressure within the appendix, eventually causing tissue death and possibly leading to rupture. To compare the clinical presentation, demographic characteristics and operative findings of obstructive and non-obstructive appendicitis in order to identify distinguishing features and improve diagnostic accuracy. This was a Prospective Observational Study done in the Department of General Surgery, Narayana Medical College and Hospital, Nellore for a period of one year from December 2022 to December 2023. For obstructive appendicitis, the age range was from 6-74 years, with a mean age of 37.14 years. The sex distribution included 14 males and 8 females. In contrast, the non-obstructive appendicitis group had a mean age of 25.19 years (SD ±16.43 years) and consisted of 18 males and 8 females. A significant finding was the higher presence of Fecalith in obstructive appendicitis cases (42.9%) compared to non-obstructive cases (6.7%), with a p-value <0.001.Significant difference is observed in the "5-6 (Moderate) and "7-10 (High)" score ranges, where obstructive appendicitis cases are more likely to have higher scores compared to non-obstructive cases. This result suggests that the Mantrels score is a useful tool for distinguishing between obstructive and non-obstructive appendicitis.

INTRODUCTION

Appendicitis as defined by “Reginald fleber fitz” is the inflammation of appendix and identified as the most common surgical emergency. Append ectomy was first performed by “Robertlawson” in May 1880. The first person to diagnose appendicitis, drain the abscess and remove the appendix with recovery, publishing his findings was “Thomas morton” in1887. Despite its high prevalence, the diagnosis of appendicitis remains challenging. The diagnosis of appendicitis embodies Sir William Osler’s spirit when he stated, “Medicine is a science of uncertainty and an art of probability.” The clinical presentation is often atypical and the diagnosis is especially difficult because symptoms often overlap with other conditions. Appendicitis is the leading cause of severe abdominal pain and is more prevalent in males, with a lifetime risk of 8.6%, compared to 6.7% in females[1]. It represents the most frequent non-obstetric surgical emergency encountered during pregnancy, occurring in about 6.3 out of every 10,000 pregnant women during the antepartum phase[2]. Annually, over 300,000 appendectomies are performed in the United States, with fewer than 10% involving there moval of anon-inflame dappendix[3-5]. The primary cause of appendicitis is believed to be block age of the appendixlumen, which leads to increased mucous secretion and bacterial growth. This sequence of events increases pressure within the appendix, eventually causing tissue death and possibly leading to rupture[6].

Aim and objectives: To compare the clinical presentation, demographic characteristics and operative findings of obstructive and non-obstructive appendicitis in order to identify distinguishing features and improve diagnostic accuracy. To study demographics, various signs and symptoms and to differentiate a cut eappen dicitis patients into obstructed and non-obstructed categories based on operative findings.

MATERIALS AND METHODS

This was a Prospective Observational Study done in the Department of General Surgery, Narayana Medical College and Hospital, Nellore for a period of one year from December 2022-2023. This study aimed to compare the clinical presentation, demographic characteristics, operative findings of obstructive and non-obstructive appendicitis, to identify distinguishing features and improve diagnostic accuracy. The results clearly indicate significant differences between the two types of appendicitis. This is important because obstruction is highly associated with perforation and complications, whereas cases of simple non-obstructive appendicitis may have a benign course resolving spontaneously.

RESULTS AND DISCUSSIONS

Obstructive Appendicitis:

Age: The average age of patients with obstructive issues is 36.74 years, with a relatively broad age range (10-74 years). This indicatesa mixed patient population concerning age.

BMI: The average BMI is 25.29 kg/m². This suggests a population close to the upperlimit of the "normal weight" category (18.5-24.9kg/m²). The distribution has a slight right skew, indicating a few patients with higher BMI.

Time for Pain Migration: The average time for pain migration was 1.96hours,whichshowssignificant variability (standard deviation of 2.44 hours).

Non Obstructive Appendicitis:

Age: The average age is not ably younger at 25.19 years, suggesting that non- obstructive cases might predominantly affect younger individuals.

BMI: The average BMI for non-obstructive cases is lower at 23.01kg/m², falling within the normal weight category.

Time for Pain Migration: The average is 2.70 hours, slightly higher than in obstructive cases, with also a high variability.

The clinical presentation data for patients with non-obstructive appendicitis provides insight into the prevalence of various symptoms among the patient cohort. The data indicates that 69.23% of patients exhibited elevated body temperature, a common sign of infection or inflammation. Tenderness in the right iliac fossa (RIF) was observed in 80.76% of patients, which is a key diagnostic sign of appendicitis. Rebound tenderness, indicating localized peritoneal irritation, was present in 23.07% of patients. Fever, another indicator of an inflammatory process, was noted in 59.26% of patients. Guarding and rigidity, both signs of severe abdominal inflammation, were absent in all patients.

Tongue coating, often associated with systemic illness, was seen in 7.6% of patients. Recurrence of symptoms was noted in 11.53% of patients, which can complicate diagnosis and treatment. None of the patients had a history of previous abdominal surgery. Lastly, 46.15% of patients reported nausea and vomiting, common gastrointestinal symptoms associated with appendicitis. This distribution of clinical features provides valuable insights into the common and less common signs that aid in diagnosing non-obstructive appendicitis.

Table 1:Gender distribution

Gender	Frequency	Percentage
Male	34	68
Female	16	32
Total	50	100

Table2: Symptoms and signs distribution

Symptom	Frequency	Percentage
Abdominal Pain		
Yes	50	100
No	0	0
Fever		
Yes	32	64
No	18	36
Tenderness		
Yes	46	92
No	4	8
Guarding		
Yes	6	12
No	44	88
Rebound Tenderness		
Yes	12	24
No	38	76

Table 3: Clinical parameters of obstructive appendicitis

Parameter	Number of Cases	Percentage
Temperature	16	66.66
RIFT enderness	24	100
Rebound Tenderness	6	25
Fever	16	66.66
Guarding	6	25
Rigidity	4	16.66
Tongue Coating	5	20.83
Recurrence	5	20.83
Previous Abdominal Surgery	6	25
Nausea and Vomiting	19	79.16

Table 4: Clinical parameters of non-obstructive appendicitis

Parameter	Number of Cases	Percentage
Temperature	18	69.2
RIFT enderness	21	80.76
Rebound Tenderness	6	23.07
Fever	16	19.2
Guarding	0	0
Rigidity	0	0
Tongue Coating	2	7.6
Recurrence	3	11.53
Previous Abdominal Surgery	0	0
Nausea and Vomiting	12	46.15

In this study, a total of 50 participants with acute appendicitis were analyzed, with 24 cases categorized as obstructive appendicitis and 26 as non-obstructive appendicitis. The gender distribution revealed a higher prevalence of acute appendicitis in males (64.7%) compared to females (35.3%). This gender distribution aligns with the findings of other studies, such as Addiss *et al.* (1990)7, which reported a male predominance in appendicit is cases. This consistency across studies suggests that males are more susceptible to developing appendicitis, potentially due to anatomical and physiological differences. In our study, abdominal pain was reported in all cases of appendicitis (100%), underscoring its universal presence as a primary symptom. This finding is consistent with the observations made in the study by Jacob D, Murphy A, Amer M[8] where abdominal pain was identified as a hallmark symptom of appendicitis. Additionally, Di Saverio[9] noted that abdominal pain is a critical diagnostic criterion in their comprehensive review of appendicitis cases. In our study, fever was present in 66.66% of obstructive appendicitis cases and 61.53% of non-obstructive appendicitis cases. Similar patterns have been observed in studies by Anderson [10] which highlight fever as a common symptom, especially in more complicated cases of appendicitis. The higher incidence of fever in obstructive cases may be attributed to increased inflammation and infection due to obstruction.

Tenderness in the right iliac fossa (RIF) was observed in all cases (100%) of obstructive appendicitis, consistent with the literature, such as the study by Alvarado (1986)[11] which identifies tenderness as a critical physical sign in diagnosing appendicitis. The universal presence of RIF tenderness highlights its importance as a diagnostic marker. Guarding was present in 25% of obstructive cases, while none of the non-obstructive cases exhibited guarding. This finding suggests that guarding is more indicative of obstructive appendicitis and may be associated with more severe inflammation or complications. The average age of patients with obstructive appendicitis in this study was 37.14 years, while the average age for non-obstructive appendicitis was significantly younger at 25.19 years. This suggests that non-obstructive appendicitis might predominantly affect younger individuals. Asimilar trend was reported by Flum[12] which noted younger patients were more frequently presenting with non- obstructive appendicitis. In a comparative study between obstructive and non-obstructive appendicitis, significant differences in clinical presentations were observed. In cases of obstructive appendicitis, 79.16% of patients experienced nausea and vomiting, 100% exhibited RIF tenderness, and 66.66% had fever. Additionally, 8.3% of patients showed guarding, 16.66% displayed rigidity and 25% had a history of previous abdominal surgery. Conversely, in non-obstructive appendicitis, 46.15% of patients had nausea and vomiting, 80% exhibited RIF tenderness, and 61.53% had fever. Notably, none of the non-obstructive cases showed guarding or rigidity. These findings align with the Alvarado score (Mantrels score) established by Alvarado in 198611, which highlights the importance of symptoms such as nausea, vomiting and RIF tenderness in the early diagnosis of acute appendicitis. Furthermore, a meta-analysis conducted by Anderson *et. al*. (2004) corroborates these findings, emphasizing vomiting, RIF tenderness, and fever as common symptoms in appendicitis. The Mantrels score, an acronym for Migration of pain, Anorexia, Nausea/vomiting, Tenderness in the right lower quadrant, Rebound pain, Elevated temperature,

Table 5: Clinical parameters of obstructive and non- obstructive appendicitis

Clinical Feature	Obstructive	Non-Obstructive	Chi-Square	P-value
Temperature	16	18	1.85	0.17
RIFT enderness	24	21	2.06	0.15
Rebound Tenderness	6	6	0.00	0.97
Fever	16	6	0.15	0.70
Guarding	6	0	3.43	0.06
Rigidity	4	0	1.78	0.18
Tongue Coating	5	2	0.27	0.60
Recurrence	3	2	0.00	1.00
Previous Abdominal Surgery	6	0	3.43	0.06
Nausea and Vomiting	19	12	0.38	0.54

Table 6: Comparing man trels score of obstructive and non-obstructive appendicitis

Score Range	Obstructive	Non-Obstructive
1-4 (Low)	0	0
5-6 (Moderate)	3(12.5%)	15(55.55%)
7-10 (High)	21(87.5%)	12(44.44%)
	Chi-Square:8.51 **P-value:** 0.0035	

Table 7: Operative findings

OT finding (Fecolith)	Obstructive	Non-Obstructive	p-value
Present	9	2	<0.001
Absent	12	27	

Table 8: Bmi and migration of pain between obstructive and non-obstructive appendicitis

Variable	Obstructive Appendicitis	Non-Obstructive Appendicitis	p-value
BMI (MEAN±SD)	25.27±4.21	22.93±3.82	0.04
Duration for pain to migrate	1.85±2.35	2.63±3.11	0.3

Leukocytosis and Shift of leukocytes to the left, is a widely used clinical scoring system for diagnosing acute appendicitis. In the current study, the mean Mantrels score for obstructive appendicitis was 7.3 (SD: 0.7), while for non- obstructive appendicitis, it was 6.4 (SD: 0.7).

This difference was statistically significant, with a chi-square value of 8.51 and a p-value of 0.0035. This aligns with Alvarado et al.'s original study in 1986[12] which established the Mantrels score as a reliable diagnostic tool, noting that patients with scores of 7 or higher had a high probability of appendicitis, consistent with the higher scores observed in obstructive cases in the current study.

Regarding operative findings, the presence of Fecalith was found to be a significant indicator of obstructive appendicitis. In the current study, Fecalith was present in 9 out of 24 obstructive appendicitis cases and in 2 out of 26 non- obstructive appendicitis cases, with a p-value <0.001. This finding suggests that Fecalith is a notable indicator of obstructive appendicitis. Comparative studies support this finding. Addiss[7]. conducted a study on the epidemiology of appendicitis and appendectomy in the United States and found that the presence of Fecalith was associated with an increased risk of appendicitis complications and was more likely in obstructive cases, with a presence in approximately 30-40%of cases. Jones[13] discussed the role of Fecalith in appendicitis, noting its presence in 30-40% of cases and its significant contribution to the pathogenesis of obstructive appendicitis.

Additionally, Chung[14] conducted a prospective study on the role of Fecalith in acute appendicitis, reporting Fecalith presence in 30-35% of cases, more common in obstructive cases and concluded that Fecalith is a significant risk factor for complicated appendicitis. These studies collectively underscore the importance of Fecalith as a critical factor in the diagnosis and management of obstructive appendicitis.

CONCLUSION

The study successfully identified distinguishing features between obstructive and non-obstructive appendicitis, contributing valuable in sights to clinical practice. The significant differences in symptom severity, demographic characteristics and operative findings underscore the importance of a thorough diagnostic approach. The presence of fecalith and specific clinical signs like high BMI, guarding and rigidity are crucial indicators of obstructive appendicitis, aiding in improved diagnostic accuracy and treatment decisions. The sef in dingsrein force the utility of clinical scoring systems such as the MANTRELS score in the early diagnosis and management of acute appendicitis. These findings can enhance diagnostic accuracy and inform more tail ored treatment approaches for patients with different types of appendicitis. Future research should continue to explore these differences to refine diagnostic criteria and improve patient outcomes.

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