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Original Research Article

Diagnostic dilemma of right iliac fossa pain in females: a prospective study of 100 cases

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ABSTRACT

Background: Right iliac fossa (RIF) pain in females presents a significant diagnostic challenge due to the wide range of potential underlying causes. This study aims to elucidate the complexities and diagnostic dilemmas associated with RIF pain in females, focusing on the prevalence of various conditions, the utility of laboratory markers, and the outcomes of surgical interventions.

Methods: This prospective study was conducted at Shaheed Tajuddin Ahmad Medical College Hospital, Gazipur, Bangladesh and involved 100 female patients provisionally diagnosed with acute appendicitis. The study included females aged 12 years and above, presenting with symptoms suggestive of acute appendicitis and who were operable. Patients underwent clinical evaluations, laboratory testing, and, where indicated, surgical intervention, including appendectomy. Data were analyzed using SPSSV.19, with findings presented in table format.

Results: The most common presenting symptoms were central abdominal pain shifting to RIF, nausea, vomiting, and pyrexia (45%). Laparotomy findings indicated acute suppurative appendicitis in 68% of cases. Appendicectomy results showed a 61% positive diagnosis rate for appendicitis, with 23% negative appendicitis findings. Laboratory results revealed leukocytosis (>11000/mm^3) in 66% and a neutrophil count of ≥70% in 71% of the cases. Histopathological analysis post-appendectomy revealed 57.14% acute appendicitis, 15.48% gangrenous appendicitis, and 27.38% normal vermiform appendix.

Conclusions: The study highlights the diagnostic challenges in females presenting with RIF pain, with a significant rate of negative appendicitis diagnoses post-appendectomy. The findings underscore the need for a comprehensive diagnostic approach and suggest the potential utility of laboratory markers in supporting diagnoses. The study advocates for improved diagnostic criteria and methods to enhance accuracy and patient outcomes.

Keywords: Right iliac fossa pain, Appendicitis, Laparotomy, Histopathology

INTRODUCTION

The accurate diagnosis of abdominal pain, particularly in the right iliac fossa (RIF) region, is a critical aspect of clinical medicine. This is especially true given the complexity and variety of potential causes of RIF pain, which can range from benign to life-threatening conditions. In the female population, the prevalence and impact of RIF pain are significant, often presenting a diagnostic dilemma for clinicians due to the overlap of gynecological, gastrointestinal, and urinary tract pathologies.[1,2] Anatomically and physiologically, the RIF is a common site of pain in females, partly due to the presence of several vital organs and structures in this area, including the appendix, right ovary, and fallopian tube. The proximity of these organs to each other often complicates the clinical picture, making differential diagnosis challenging.[3] Common conditions associated with RIF pain in females include appendicitis, ectopic pregnancy, ovarian torsion, and various gastrointestinal disorders such as diverticulitis and bowel obstructions.[5] Each of these conditions presents with its own set of symptoms, which can often mimic other diseases, leading to diagnostic uncertainty. The complexity in diagnosing RIF pain in females is further compounded by the overlap of symptoms across various conditions. For instance, both appendicitis and ectopic pregnancy may present with acute abdominal pain, nausea, and vomiting, making it difficult to distinguish between these conditions without further diagnostic testing.[6] Additionally, the limitations of current diagnostic methods, such as the variable sensitivity and specificity of imaging techniques like ultrasound and CT scans, contribute to the challenge.[7,8] The need for improved diagnostic approaches is underscored by the potential consequences of misdiagnosis or delayed diagnosis, which can lead to severe complications, including infertility, chronic pain, or even life-threatening conditions.[9] This highlights the importance of developing more accurate and efficient diagnostic strategies to enhance patient outcomes. Despite the prevalence and impact of RIF pain, there is a notable gap in the current literature regarding prospective studies focused specifically on this condition in females. Most existing studies are retrospective or case-based, which, while valuable, do not provide the same level of insight as prospective research.[10] Our study aims to fill this gap by adopting a prospective approach, which is crucial for gathering real-time data and understanding the natural progression of RIF pain in females. By focusing on a prospective analysis, our research has the potential to contribute significantly to the field. It aims to provide a more comprehensive understanding of the various conditions associated with RIF pain in females, the risk factors involved, and the effectiveness of different diagnostic methods. This, in turn, could lead to more accurate and timely diagnoses, ultimately improving patient outcomes and reducing the burden of misdiagnosis or delayed treatment in this population.[11] The current study aims to investigate the diagnostic problems associated with iliac fossa pain in women.

METHODS

The current prospective observational study was conducted at the Shaheed Tajuddin Ahmad Medical College Hospital, Gazipur, Bangladesh from January 2019 to December 2019, involving a cohort of 100 female patients provisionally diagnosed with acute appendicitis. These patients were selected from various surgical units, predominantly through the emergency department, with some transferred from medical and gynecological units as surgical emergencies. All female patients aged 12 years and above, showing clinical signs suggestive of acute appendicitis and deemed operable, and those who underwent appendectomy based on a preoperative diagnosis of acute appendicitis were included in the study. This focus allowed us to analyze the accuracy of initial diagnoses against surgical findings. Exclusion criteria included male patients, females under 12 years, those who did not undergo emergency appendectomy, and females suffering from chronic right iliac fossa pain. This helped maintain the study's focus on acute conditions in a specific demographic. All collected data were analyzed using SPSS Version 19, a robust statistical software, to ensure comprehensive data analysis. The results were presented in table format for clarity and ease of interpretation. This format was chosen to facilitate a straightforward comparison of preoperative diagnoses with postoperative findings. Prior to the study's commencement, ethical approval was obtained from the ethical review committee of Dhaka Medical College Hospital.

RESULTS

The age distribution of the participants was as follows: the majority, 54%, were aged between 12 and 20 years; 26% were between 21 and 30 years; 14% were between 31 and 40 years; and the remaining 6% were over 40 years old. Regarding marital status, 47% of the participants were married, while 53% were unmarried. The duration of symptoms prior to presentation varied among the participants. 28% experienced symptoms for less than 6 hours, 23% for 6 to 12 hours, 20% for 12 to 24 hours, 16% for 24 to 36 hours, 9% for 36 to 48 hours, and 4% had symptoms for more than 48 hours. In terms of menstrual history, a significant majority of the participants, 88%, reported having a regular menstrual cycle. Only 3% were at the menarche stage, 2% were postmenopausal, and 7% experienced amenorrhea.

The most common presentation, experienced by 45% of the participants, was central abdominal pain that shifted to the right iliac fossa, accompanied by nausea, vomiting, and pyrexia. Another 24% of participants presented with pain in the right lower quadrant, vomiting, and mild fever. Pain in the suprapubic region with tenesmus was reported by 10% of the participants. Additionally, 7% of the participants experienced vague pain in the abdomen along with vomiting and diarrhea. Spasmodic pain in the right lower quadrant and in the pelvic region,

accompanied by haematuria, was reported by 8% of the participants. A smaller percentage, 2%, presented with pain in the right iliac fossa and vomiting, coupled with amenorrhea. Lastly, 4% of the participants experienced severe pain in the right lower quadrant, vomiting, a high rise in temperature, and had an irregular menstrual history.

Table 1: Distribution of participants by baseline characteristics distribution (n=100).

Variables	Frequency	%
Age (years)		
12-20	54	54
21-30	26	26
31-40	14	14
>40	6	6
Marital status		
Married	47	47
Unmarried	53	53
Duration of symptoms (hours)		
<6	28	28
6-12	23	23
12-24	20	20
24-36	16	16
36-48	9	9
>48	4	4
Menstrual history		
Regular	88	88
Menarche	3	3
Post-menopausal	2	2
Amenorrhea	7	7

Table 2: Distribution of participants by presenting symptoms (n=100).

Principal symptoms	Frequency	%
Central abdominal pain, which shift to right iliac fossa, nausea, vomiting, pyexia	45	45.00
Pain right lower quadrant vomiting, mild fever	24	24.00
Pain in suprapubic region with tenesmus	10	10.00
Vague pain in the abdomen with vomiting and diarrhoea	7	7.00
Spasmodic pain in the right lower quadrant and in the pelvic region with haematuria	8	8.00
Pain right iliac fossa, vomiting with amenorrhea	2	2.00
Pain right severe pain in right lower quadrant, vomiting, high rise of temperature with irregular menstrual history	4	4.00

The most common finding was acute suppurative appendicitis, identified in 68% of the cases. This was followed by perforated or gangrenous appendicitis, which was found in 16% of the participants. Other notable findings included twisted ovarian cysts and ruptured luteal cysts, each accounting for 5% of the cases. Ruptured tubal pregnancy was observed in 4% of the participants. Additionally, rarer conditions were also identified: intussusception and Meckel's diverticulitis were each found in 1% of the cases.

Table 3: Distribution of participants by laparotomy findings (n=100).

Laparotomy findings	Frequency	%
Acute supportive appendicitis	68	68
Perforated or gangrenous appendicitis	16	16
Twisted overlain cyst	5	5
Ruptured luteal cyst	5	5
Ruptured tubal pregnancy	4	4
Intussusception	1	1
Meckel's diverticulitis	1	1

The majority of the cases, 61% (61 participants), were diagnosed with appendicitis following the appendectomy. However, a significant portion, 23% (23 participants), had a negative appendicitis diagnosis, meaning that the appendectomy did not reveal appendicitis. Additionally, for 16% of the participants, an appendectomy was not performed.

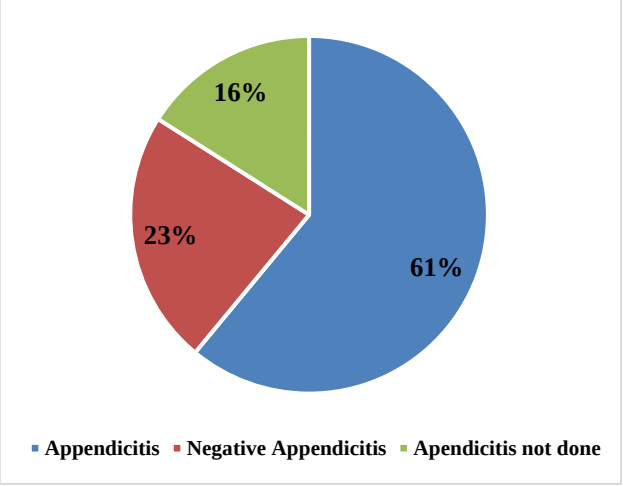

Figure 1: Distribution of participants by appendectomy findings (n=100).

For leukocytosis, none of the participants had a leukocyte count of less than 4000/mm^3. However, 34% of the participants (34 individuals) had a leukocyte count in the normal range of 4000-11000/mm^3. The majority, 66% (66 participants), exhibited leukocytosis with a leukocyte count greater than 11000/mm^3. Regarding the neutrophil count, 29% of the participants (29 individuals) had a neutrophil count of less than 70%. In contrast, a

significant majority, 71% (71 participants), had a neutrophil count of 70% or higher.

Table 4: Distribution of laboratory findings among the total population (n=100).

Laboratory findings	Frequency	%
Leukocytosis/mm^3		
<4000	0	0
400-11000	34	34
>11000	66	66
Neutrophil count (%)		
<70	29	29
≥70	71	71

For leukocytosis, among the 61 participants with a positive appendicitis diagnosis, none had a leukocyte count of less than 4000/mm^3. Only 6.56% (4 participants) had a leukocyte count within the normal range of 4000-11000/mm^3, while a significant majority, 93.44% (57 participants), exhibited leukocytosis with a leukocyte count greater than 11000/mm^3. In contrast, among the 39 participants with a negative appendicitis diagnosis or excluded cases, none had a leukocyte count of less than 4000/mm^3, 76.92% (30 participants) had a leukocyte count within the normal range, and 23.08% (9 participants) had a count greater than 11000/mm^3. Regarding the neutrophil count, among those with a positive appendicitis diagnosis, 88.52% (54 participants) had a neutrophil count of less than 70%, and 11.48% (7 participants) had a count of 70% or higher. In the group with a negative appendicitis diagnosis or excluded cases, 35.90% (14 participants) had a neutrophil count of less than 70%, while 64.10% (25 participants) had a count of 70% or higher.

Table 5: Comparison of positive appendicitis finings in relation to laboratory findings.

Laboratory findings	Appendicitis positive (n=61)		Appendicitis negative and excluded cases (n=39)	
	Frequency	%	Frequency	%
Leukocytosis/mm^3				
<4000	0	0.00	0	0.00
400-11000	4	6.56	30	76.92
>11000	57	93.44	9	23.08
Neutrophil count (%)				
<70	54	88.52	14	35.90
≥70	7	11.48	25	64.10

Table 6: Distribution of participants by histological diagnosis of patients who underwent appendicitis (n=84).

Histopathological diagnosis	Frequency	%
Acute appendicitis	48	57.14
Gangrenous appendicitis	13	15.48
Normal vermiform appendix	23	27.38

Among the 84 participants who had undergone appendicectomy, 57.14% (48 individuals) were diagnosed with acute appendicitis based on histopathological examination. Gangrenous appendicitis was identified in 15.48% (13 participants) of the cases. Interestingly, 27.38% (23 participants) of the appendectomies revealed a normal vermiform appendix upon histopathological examination.

DISCUSSION

Our study's presentation of symptoms aligns with the broader understanding that right iliac fossa pain in females manifests variably. Notably, 45% of our cases presented with central abdominal pain shifting to the right iliac fossa, accompanied by nausea, vomiting, and pyrexia. This symptomatology is consistent with findings in other studies, highlighting the commonality of these symptoms in conditions presenting with right iliac fossa pain.[12,13] The overlap of symptoms with various conditions, as discussed in Rajendran's 2015 study, underscores the diagnostic challenges and potential for misdiagnosis in such cases.[13,14] The laparotomy findings in our study, where acute suppurative appendicitis was diagnosed in 68% of cases, reflect the prevalence of appendicitis as a common cause of right iliac fossa pain. However, our study also identified other conditions, such as twisted ovarian cysts and ruptured luteal cysts, each accounting for 5% of cases. These findings emphasize the necessity of considering a range of differential diagnoses in females presenting with right iliac fossa pain, a perspective supported by similar studies.[15,16] The appendicectomy findings, where 61% of participants were diagnosed with appendicitis and 23% had a negative appendicitis diagnosis, highlight a significant area of concern. The rate of negative appendicitis diagnoses suggests potential over-diagnosis and unnecessary surgeries, a concern mirrored in other research.[17,18] This aspect of our study calls for more stringent diagnostic criteria and perhaps a more conservative approach to surgical intervention. Our laboratory findings, where 66% of participants exhibited leukocytosis and 71% had a neutrophil count of ≥70%, suggest the potential utility of these markers in predicting positive appendicitis findings.[19,20] However, these markers should be interpreted with caution due to the possibility of false positives. Finally, the histopathological analysis, revealing 57.14% acute appendicitis and 27.38% normal

vermiform appendix, resonates with findings from other studies. The presence of a significant percentage of normal appendices in histopathological analysis suggests a common challenge in the accurate preoperative diagnosis of appendicitis.[21,22] This finding is critical as it highlights the need for improved diagnostic methods to reduce unnecessary surgical interventions.

Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

Our findings reveal a wide spectrum of symptoms and conditions, with acute appendicitis being the most prevalent but not the sole cause of right iliac fossa pain. The high rate of negative appendicitis diagnoses post-appendectomy underscores the need for more accurate diagnostic methods to prevent unnecessary surgeries. Laboratory findings, particularly leukocytosis and elevated neutrophil counts, show potential as diagnostic aids, yet they should be used judiciously alongside clinical assessment to enhance diagnostic accuracy. The presence of a significant percentage of normal appendices in histopathological analysis further highlights the diagnostic challenges faced in clinical practice. This study emphasizes the importance of a comprehensive, multi-faceted diagnostic approach, integrating clinical, laboratory, and imaging findings to improve patient outcomes. It also underscores the need for ongoing research to refine diagnostic criteria and approaches, ultimately aiming to reduce the burden of misdiagnosis and ensure appropriate treatment for females presenting with right iliac fossa pain.

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