

# Radiological Diagnosis vs. Surgical Results for Acute Appendicitis in 450 Patients at Qazi Hussain Ahmad Hospital, Nowshera

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## ABSTRACT

**Objectives:** Investigating the surgical findings of acute appendicitis against the radiological diagnosis

**Methods:** This cross-sectional study was conducted in the department of Radiology Qazi Hussain Ahmad hospital Nowshera from Jan 2019 to Dec 2019. For sample size who sample size calculator was used. Patients who reported right iliac fossa discomfort, a symptom often associated with acute appendicitis, were included in the research. Participants had to be between the ages of 12 and 65, have had abdominal discomfort, and have it focused in the right iliac fossa/ lower quadrant. Patients were sent to an experienced radiologist for Ultrasonography when they were thought to be experiencing symptoms of acute appendicitis. Patients with negligible ultrasonographic results were assessed for right lower abdominal discomfort. Those with ultra-sonographic results highly indicative of acute appendicitis were subsequently evaluated to rule out complications.

**Results:** There were 450 participants included in our analysis, ranging in age from 6 to 55 (mean 337.8 years), and with a male to female ratio of 3.19:2. We performed 550 ultrasonographic scans on these patients and 500 regular urine examinations. Only 350 patients with suspected acute appendicitis confirmed their suspicions by imaging tests, whereas 450 patients with a confirmed clinical diagnosis had surgery. One hundred forty-four individuals had a laparoscopic appendectomy, and 300 patients underwent open surgery. Each patient had a tissue sample taken for histopathology. Sonographic findings included the presence of an appendix in 351 patients (79 percent), an uncompressible tubular structure in 351 patients (79 percent), fluid in the right iliac region in 118 (13.11%), 103 (11.44%) patients have mesenteric node enlargement, 23 (2.55%) have high-up subhepatic appendix and 24 (2.66%) have mass formation in Hyperemic swelling of the appendix occurred in 648 (72%), blackened/gangrenous appendix in 84 (9.33%), pus around the appendix in 57 (6.33%), enlarged mesenteric lymph nodes in the appendix in 210 (23.33%), perforated appendix in 58 (6.44%), early mass formation in 35 (3.88%), and subhepatic appendix in 23 (2.55%) patients.

**Practical implication:** The results of this study will help the surgeon to make Clinical judgments of acute appendicitis.

**Conclusion:** It is recommended to diagnose appendicitis using Ultrasonography since it is a non-invasive examination. An appropriate diagnostic approach for evaluating appendicitis complications with high sensitivity. Acute appendicitis can be accurately diagnosed 84% of the time using Ultrasonography, although there is a 15% false negative rate.

**Keywords:** Incompressible appendicitis, tubular structure, clinical diagnosis, radiological diagnosis

## INTRODUCTION

The appendix serves no specific function and is thus considered a "vestigial" organ. The length of this cecum's tubular extension is between 6.5 and 12 centimetres<sup>1</sup>. Acute appendicitis results from an inflamed appendix and needs immediate medical attention. It's the most frequent unexpected need for abdominal surgery. There are various possible clinical manifestations since the appendix's tip may be in multiple locations. About three-quarters of patients diagnosed with retrocausal/retro colic discomfort report soreness on probing and localization to the right side of the loin<sup>2</sup>. Symptoms and signs may deviate from the norm. 1. Tenderness on deep probing and muscular tightness is reduced when the cecum overlaps the ileum. The psoas muscle is protected by the patient maintaining a flexed hip position. This explains why some people feel so much worse when their hips are fully extended. Subcaecal and pelvic (21%); patient complains of rectal irritation-related diarrhea and associated suprapubic discomfort. An increase in urination frequency is possible<sup>3</sup>. Tenderness in the genitourinary or rectal regions is expected. It's possible that you're not feeling any soreness in your stomach. Urine tests show white blood cells (leukocytes) and little amounts of blood (microhematuria). There are no distinguishing symptoms other than severe vomiting, which may originate from the ileum or the colon (8%)<sup>4</sup>. Damage to the intestines might trigger loose stools. Patients often exhibit poor oral hygiene symptoms such as a dry tongue and flushed face. High-grade fever is typical, and so is tachycardia. In most cases, the patient will gesture to the right iliac fossa<sup>3</sup> to indicate where the discomfort is located. The exact location was determined after a check of the belly<sup>5</sup>. Features tight muscles that are painful to the touch and a receptive "rebound" pain when touched. Right iliac fossa discomfort is experienced during coughing. Patients with severe pain are advised against any movement. Tenderness may

be evident on rectal and vaginal examination in the case of the pelvic appendix, although this is uncommon.

Tenderness on percussion, muscular guarding, and rebound tenderness are the most reliable indicators of acute appendicitis<sup>6</sup>. Diagnostic symptoms, including roving, psoas, and obturator muscles, are worth considering. An inflamed appendix without abscess, gangrene, or perforation is diagnosed as uncomplicated appendicitis. The appendix may be gangrenous, ruptured, or a periappendicular blemish may be present in the case of complicated appendicitis. A negative appendectomy is one in which a sample of the appendix taken after surgery for acute appendicitis turns up normal tissue<sup>7</sup>.

For an open appendectomy, two incisions are made. Gridiron is the name given to one such sport. Incision, which is given ahead of McBurney's argument. Another option is the Lanz incision, which, like McBurney's point, is done transversely but is aesthetically preferable. The use of laparoscopic techniques has allowed for the elimination of open appendectomy. Additionally, there is noticeably less postoperative discomfort and wound infection. Both the time spent in the hospital and the time it takes to return to normal are shortened. However, abdominal abscesses became more common after laparoscopic procedures<sup>8</sup>. Laparoscopic procedures need specialized training and equipment. Pathology and clinical diagnosis may be separated using this method. Migrating abdominal pain to the right lower quadrant (RLQ) (two points), loss of appetite (or the presence of acetone in the urine) (one point), nausea and vomiting (two points), RLQ tenderness (one point), rebound pain (two points), fever (temperature

>36.4) (one point), leukocytosis (white blood cell count >10,000) (two points), and a leftward shift in the WBC distribution (e.g., neutrophilia >73 Acute appendicitis has a cumulative score of five if the patient's sex is consistent with the diagnosis, eight if it's

likely, and nine or ten if it's very probable. It's possible to see a score of 5 or 6. With a score of 7 or above, an appendectomy is recommended<sup>9</sup>.

In most cases, the doctor will base the diagnosis only on the patient's history and physical examination. There are several contributing factors. Indicators such as diet and light exposure need consideration. When possible, a laparoscopic appendectomy is the best option. Males between 09 and 21 have a higher risk of developing acute appendicitis<sup>10</sup>. The pain starts in the periumbilical area, but as time goes on, it worsens and moves to the right iliac fossa. Loss of appetite, constipation, and nausea are common. The patient likely has peritonitis from the hole in their abdomen, given the severity of their vomiting. Except for migrating pain, no symptoms have been determined to be indicative of acute appendicitis. Elderly individuals with acute appendicitis have a higher death rate. Thus they need to be treated quickly<sup>11</sup>.

Computed tomography (C.T.) and Ultrasonography (U.S.) are utilized to confirm and correlate symptoms of acute appendicitis. Although it has lower sensitivity and specificity than other methods, Ultrasonography is commonly employed in clinical settings because of its low cost. As an added downside, it has not helped curb the occurrence of unsuccessful appendectomies. Clinical judgments should not be made by surgeons based on Ultrasonography alone. Thin people, however, nevertheless benefit from its accuracy. Because of the ongoing debate over sonography's sensitivity and the lack of prior systematic data collection at our facility, we aimed to keep track of relevant information and compare it to operational results<sup>12</sup>. In the literature very limited data is available about the clinical judgment of acute appendicitis. This study was therefore carried out to investigate the surgical findings of acute appendicitis against the radiological diagnosis

**PATIENTS AND METHODS**

The cross sectional study was carried out between January 2019 and December 2019 at the Department of Radiology, Qazi Hussain Ahmad Hospital, Nowshera. There were 450 participants included in our analysis based on who sample size calculator. Patients who presented with right iliac fossa pain, a symptom often associated with acute appendicitis, were included in the research. Participants had to be between 14 and 70, have had abdominal discomfort, and have it focused in the right iliac fossa/ lower quadrant. Patients with shock upon presentation were not considered. The surgeon, who has worked in the field for over a decade, conducted the examinations. An experienced (08 years) clinical radiologist performed Ultrasonography on subjects suspected of having acute appendicitis. Patients with negligible ultrasonographic results were assessed for right lower abdominal discomfort. In a few cases, Ultrasonography was unable to detect the appendix. Patients who had appendectomy did so by current recommendations.

Even though the patient's symptoms and physical examination were consistent with acute appendicitis, a rate-negative laparotomy was done in which the patient's appendix was removed without inflamed. An inflamed appendix without abscess, gangrene, or perforation is diagnosed as uncomplicated appendicitis. The appendix may be gangrenous, ruptured, or a periappendicular blemish may present in complicated appendicitis cases. Appendectomy that turns out to be negative after a biopsy of the appendix reveals that it was not infected with acute appendicitis. Version 24 of SPSS was used for the analysis. We used the Chi- squared test for qualitative and quantitative variables and the independent t-test. The Spearman test was used to determine the relationship between the variables. If the probability was less than 0.04, then it was significant.

**RESULTS**

There were 450 participants included in our analysis, ranging in age from 6 to 55 (mean 337.8 years), and with a male to female ratio of 3.19:2. We performed 550 ultrasonographic scans on these

patients and 500 regular urine examinations. Only 350 patients with suspected acute appendicitis confirmed their suspicions by imaging tests, whereas 450 patients with a confirmed clinical diagnosis had surgery. One hundred forty-four individuals had a laparoscopic appendectomy, and 300 patients underwent open surgery. Each patient had a tissue sample taken for histopathology. Sonographic findings included the presence of an appendix in 351 patients (79 percent), an uncompressible tubular structure in 351 patients (79 percent), fluid in the right iliac region in 118 (13.11%), 103 (11.44%) patients have mesenteric node enlargement, 23 (2.55%) have high-up subhepatic appendix and 24 (2.66%) have mass formation in Hyperemic swelling of the appendix occurred in 648 (72%), blackened/gangrenous appendix in 84 (9.33%), pus around the appendix in 57 (6.33%), enlarged mesenteric lymph nodes in the appendix in 210 (23.33%), perforated appendix in 58 (6.44%), early mass formation in 35 (3.88%), and subhepatic appendix in 23 (2.55%) patients.

Table I displays the aggregate findings of the investigation. In Table II, we can see the frequencies discovered thanks to the sonograms. Table III details the operation's outcomes. Table IV displays the findings of the analysis and comparison. Sonographic results were compatible with acute appendicitis in 83% of 450 surgeries, whereas 5% had normal appendices. This means that 82%, or 350 of 415, had their appendices verified, whereas 45% had appendectomies done based on a clinical diagnosis. There were 422 positive diagnoses of appendicitis (92%) and 28 negative diagnoses (8%).

Table 1: Overall statistical analyses

In all, patients with right iliac discomfort were scanned using sonography.	815
Total patients operated on in 3 years	560
Patients who met pre-operative sonography requirements and received the procedure	450
Age	10-65 years (mean 32±5.10 years)
Main M.F.	202: 84(1.19: 2)
reported Ultrasonography	560
reported TLC	550
reported Urine R/E	430
Acute appendicitis was diagnosed via radiology.	350
diagnosis Clinical of Surgeon	450
Open surgery	300
Laparoscopic appendectomy	144
Follow up period	Six months
Duration of hospitalization	3±2 days
Histopathology reports	450

Table 2: Findings from X-rays and sonography (n=450)

Visualizing Appendix	350(79%)
tubular structure Uncompressible	300(81%)
region Fluid in right iliac	60(14%)
Mesenteric nodes enlargement	51(12%)
(subhepatic appendix) High up appendix	12(3%)
formation Mass	12(3%)

Table 3: Results of Operations (n = 450)

An appendix that is red, swollen, or hyperemic	380(71%)
Appendix with a blackened or gangrenous appearance	42(10%)
Pus-filled appendix and its environ	28(7%)
Inflammation of the appendix and enlargement of the mesenteric lymph nodes.	105(24%)
Appendix rupture	29(8%)
The Beginnings of a Mass	18(4%)
Location of the Appendix Below the Liver	12(3%)

Table 4: Diagnostic Sonography: A Detailed Analysis (n=450)

Diagnosis Preoperative	333(83%)
Diagnosis Operative	415(92%)
Diagnosis via sonography for appendices when surgery is planned	350 out of 415=(83%)
Diagnostic Errors in Ultrasound	115(14%)
Surgical Negative Diagnosis	26(8%)

## DISCUSSION

While appendicitis may strike at any time, the risk of dying from the condition depends on several variables, including but not limited to age, sex, race, geography, diet, and appendix position. Appendicitis is often characterized by stomach discomfort, nausea, vomiting, and fever<sup>13</sup>. In 35-95% of instances, pain is the presenting symptom. It is common to have discomfort after experiencing nausea and vomiting.

The somatic discomfort is often localized in the belly button. In addition to sensitivity and guarding, rebound tenderness is crucial to a thorough abdominal examination. Patients in our study had hyperemic enlarged appendices 71% of the time, blackened/gangrenous appendices 09% of the time, pus surrounding the appendix 8% of the time, enlarged mesenteric lymph nodes 24% of the time, perforated appendices 7% of the time, early mass formation 4% of the time, and subhepatic appendices 3% of the time, according to the surgical operative findings. Both the symptoms and the surgical results are remarkably similar to the research of Irish et al. 14.

The results of our research demonstrate that, out of 450 (100%) procedures, 385 (83%) patients had sonographic findings indicative of acute appendicitis, and 27 (8%) had normal appendices. A total of 350 of 444 appendixes (83% accuracy) were verified by surgical removal, whereas 425 (92%) were proven to have inflammatory appendices and 27 (8% accuracy) were negative<sup>15</sup>. One of the best ways to lessen the likelihood of perforation is by promptly and accurately diagnosing appendicitis. But problems from the surgery and anesthesia are common after a negative appendectomy, leading to procedures like a positive appendectomy. For this reason, several techniques, including laboratory testing, ultrasound, C.T., and laparoscopy, have been proposed to boost diagnostic accuracy in situations of suspicion. Ultrasound has a better theoretical diagnostic value, particularly in youngsters, due to their lower body thickness and less fat than adults, making it one of the most attractive imaging modalities. For this reason, Ultrasonography, using a well-crafted procedure, is essential for accurately identifying acute and severe appendicitis in children. When using ultrasonography as a diagnostic tool for acute appendicitis, it is crucial to evaluate each center's sensitivity and specificity because they differ based on the technician and approach<sup>16</sup>.

## CONCLUSION

Diagnosing appendicitis using Ultrasonography is recommended since it is a non-invasive examination. The diagnostic approach used to evaluate the likelihood that appendicitis would lead to complications is sensitive and specific. Ultrasound has a sensitivity of 83% and specificity of 83% for diagnosing acute appendicitis.

However, it has a false negative rate of 17%. Comparatively, the clinical accuracy is 92%, but only 8% of appendix removals turn out to be negative.

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