

Clinical Presentations of Acute Appendicitis In Relation To Different Anatomical Positions of Appendix

Lakhi Chader¹, Laitonjam Chinglensana², Yumnam Priyabarta Singh³, Sunilkumar Singh Salam^{4*},
Khumukcham Sridartha⁵, Arman Wadhera⁶, Sameer Ashok Mesharam⁷

¹Consultant Surgeon, ^{2,3,4}Associate Professor, ⁵Assistant Professor,
^{6,7}Junior Resident/ Post-Graduate Trainee

¹Department of Surgery, Heema Hospital, Itanagar, Arunachal Pradesh, India

^{2,4,5,6,7}Department of Surgery, ³Department of Radiodiagnosis
Regional Institute of Medical Sciences, Imphal, Manipur, India

***Corresponding Author:**

Dr. Sunilkumar Singh Salam

Associate Professor, Department of Surgery,
Regional Institute of Medical Sciences, Imphal, Manipur, India
Email: shoenil24@gmail.com

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Abstract

Background: Acute appendicitis is one of the most common causes of “acute abdomen” in young adults. Diagnosis of acute appendicitis still remains a dilemma in spite of the advances in various laboratory and radiological investigations. compare the position of appendix on radiological evaluation with intra-operative findings. Materials and Methods: All patients admitted with clinical diagnosis of acute appendicitis with no comorbidity between 12-60 years of age were taken as subjects for a period of 2 years as a prospective longitudinal study. The data were collected using a proforma detailing history of all the patients with reference to the demographic profile, clinical signs and symptoms. A thorough physical examination were undertaken and blood examination, urine analysis, ultrasonography were performed. Emergency appendicectomies were done and appendix specimen were sent for histopathological examination. Data collected were analysed and results was interpreted accordingly. Results: Retrocaecal appendix was be most common position (58.7%) followed by pelvic (18%), paracaecal (10%), subcaecal (9%), preileal (8%), postileal (5%) & subhepatic (2%) intraoperatively. Conclusion: The accurate diagnosis of appendicitis still remains a challenge for the surgeon and the rate of negative appendicectomy with post appendicectomy symptoms are not rare. The diagnosis appendicitis and its position requires a combination of clinical examination, laboratory investigations, ultrasound.

Keywords: Appendicitis, graded compression, leucocytosis

Introduction

The vermiform appendix is considered by most to be a vestigial organ; its importance in surgery results only from its propensity for inflammation, which results in the clinical condition known as acute appendicitis.¹ Acute appendicitis is a common but sometimes confusing, and treacherous cause of acute abdomen at all ages. The most common position of

the appendix is variously described by many authors. Wakeley et al² as retrocaecal (65.3%), Collins et al³ as pelvic (78.5%) and Pickens G et al⁴ as postileal. Guidry SP et al⁵ have concluded that anatomic variations of the location of appendix are often responsible for delays in the diagnosis of appendicitis. Poole GV et al⁶ has stated that the paucity of symptoms and signs, in patients with

hidden appendix, is responsible for the delayed diagnosis of appendicitis before perforation. Varshney *et al*⁷ have concluded that the retrocaecal position of the appendix is less prone to infection, whereas Collins *et al*⁸ have described higher incidence of perforation and serious complications in acute appendicitis. Other studies one prospective⁹ and two retrospective studies have established that the retrocaecal position of the appendix does not alter the clinical course of acute appendicitis.^{10,11} It is evident that there are lots of controversies regarding the various positions of appendix and also clinical presentation of appendicitis, in relation to different positions.

The lifetime risk of developing appendicitis in western scenario is 8.6% for males and 6.7% for females, with the highest incidence in between second and third decades.¹² Ali U *et al*¹³ found the most common position of appendix was retrocaecal 78% followed by pelvic in 16%, both preileal, postileal 6% in emergency care patients.

Ultrasonography (USG) is a non-invasive and comparatively less expensive diagnostic procedure, along with it does not expose the patient to radiation, and also it has reported to have high sensitivity and specificity of 86% and 81% for the early diagnosis of acute appendicitis.¹⁴ Ali U *et al*¹³ concluded that the commonest retrocaecal position of appendix causing less symptoms and signs leading to delay in diagnosis and complication in emergency care. Although most of the times diagnosis of acute appendicitis is made clinically, later on which can be supported by various radiological and biochemical investigations, findings may not always be typical, in which case the establishment of diagnosis becomes difficult.

Materials And Methods

Prospective longitudinal study is conducted at Department of Surgery, Regional Institute of Medical Sciences, Imphal, Manipur between August 2018 to July 2020 diagnosed to have appendicitis of both sexes aged 12-60 years, using convenient sampling

method. Exclusion criteria were patients of appendicular lump or abscess, pregnant women, immuno-compromised and on steroids therapy. A proforma especially designed for this study was used to record relevant information for each individual patient. Statistical analysis was performed using SPSS software 21 version (IBM). Descriptive Statistics like mean, median and percentages were used for analysis. Inferential statistics like Chi square for categorical variables, Kappa statistics for inter-rater reliability and independent t-test for continuous variables was used. A p-value of less than 0.05 was considered significant.

All blood samples were obtained from venous system like complete haemogram, blood sugar, Liver Function Test (LFT), Kidney Function Test (KFT) with serum electrolytes, urine sample, Chest X-ray and Electrocardiography (ECG), USG. Emergency appendectomy were done with observations on location, position of appendix. Appendectomy specimen was sent for histopathological examination for confirmation.

Results

A total of 150 patients underwent emergency appendectomy for appendicitis where 80 were males and 70 were females. On comparison of laboratory investigations with clinical presentation leukocytosis was present in 119 patients with acute presentation as compared with 8 patients of recurrent appendicitis, with neutrophils being predominantly elevated. There is a slight agreement between the USG and the intraoperative findings for postileal, paracaecal, subcaecal and subhepatic positions of appendix. There is fair agreement between the USG and the intraoperative findings for pelvic and preileal positions of appendix. There is moderate agreement between the USG and the intraoperative findings for retrocaecal position of appendix. Retrocaecal appendix was found to be most common (58.7%) position followed by pelvic (18%).

Table 1 showing moderate agreement between the USG findings and intraoperative findings of the appendix

USG positions	Intraoperative position of appendix							Total	Kappa	p-value
	Retrocaecal	Pelvic	Paracaecal	Subcaecal	Preileal	Postileal	Subhepatic			
Retrocaecal	66	3	3	3	3	1	1	80	0.513	0.00
Pelvic	3	16	0	0	0	0	0	19		
Paracaecal	0	0	4	0	0	0	0	4		
Subcaecal	0	0	0	5	0	0	0	5		
Preileal	0	1	0	0	5	0	0	6		
Postileal	0	0	0	0	0	4	0	4		
Subhepatic	0	0	0	0	0	0	2	2		
Not visible	19	7	3	1	0	0	0	30		
Total	88	27	10	9	8	5	3	150		

Table 2 showing fair agreement between the Cope’s Psoas test and the intraoperative positions of the appendix.

Cope’s Psoas test	Intraoperative position of appendix							Total	Kappa	p-value
	Retrocaecal	Pelvic	Paracaecal	Subcaecal	Preileal	Postileal	Subhepatic			
Positive	72	2	2	2	3	4	3	88	0.39	0.00
Negative	16	25	8	7	5	1	0	62		

On comparison of laboratory investigations with clinical presentation; leukocytosis was present in 119 patients with acute presentation as compared with 8 patients of recurrent appendicitis, with neutrophils being predominantly elevated.

Table 3 showing association between HPE (Histo-pathological examination) and TLC

TLC Total leucocyte count	Histopathological studies		Total	p-value
	Acute appendicitis n (%)	Recurrent appendicitis n (%)		
Normal	18(90)	2(10)	20(100)	0.35
Leucocytosis	106(81)	24(18.5)	130(100)	
Total	124(82.7)	26(17.3)	150(100)	

Discussion

Although surgeons have been confronting acute appendicitis as a clinical entity for over a hundred years, an accurate preoperative diagnosis remains a challenge because of the various other conditions, which mimic appendicitis. The problem is further compounded by the variations in the position of the appendix and the associated varied clinical picture of the appendicitis.

In our study, appendicitis was more common during the 2nd decade (35.5%), followed by the 3rd decade (24%). Appendicitis is slightly more common in males, (53.3%) in my study. Lewis et al¹⁵ (1975) in their study found that the 2nd and 3rd decades to be the most common age groups for acute appendicitis. Men outnumbered women in my study, men are believed to suffer from appendicitis more often because, probably the male is being subjected to more stress and strain, as highlighted by Addis et al¹². Korner et al¹⁶ have reported a slight male preponderance (with male to female ratio of 1.2 to 1.3:1).

All the patients with acute appendicitis had pain and most of the patients had pain in the right iliac fossa. The site of maximum pain was in the right iliac fossa in 135 of 150 cases. Only 15 cases had maximal pain at a site other than right iliac fossa. In pelvic appendix patients had suprapubic pain, in retrocaecal appendix patient had pain in the right lumbar region

or right flank, in subhepatic position the patients had pain in the right hypochondriac region. Atypical pain was more common in cases of fixed retrocaecal appendix and in cases of pelvic appendicitis.

Anorexia was seen in 70% of the cases, while nausea is less constant is seen in 55% of the cases. Vomiting is seen in 50% and is usually few episodes. Incidence and severity of vomiting is more in patients with complicated appendicitis as compared to simple acute appendicitis. Vomiting usually does not relieve pain. Lewis et al¹⁵ found anorexia, nausea or vomiting to be present in 66% of the cases. Fever was commonly encountered among patients in my study, being present in 55% of our patients; the fever was usually mild degree except in cases of perforated appendix. Berry et al¹⁷ in 1984 found that temperature elevation is rarely more than 2°C. Changes of greater magnitude suggest complication.

Tenderness in the right iliac fossa was a constant feature in all the cases of appendicitis. The site of maximum tenderness was in the right iliac fossa in 136 of 150 cases even though few had tenderness at other sites leading to difficulty in the diagnosis. Only 14 cases had maximal tenderness at a site other than right iliac fossa. In retrocaecal position tenderness may be present in the right flank or in the right lumbar region more so if the appendix is fixed either by the adhesions or because of its extra-peritoneal location (in these cases tenderness will be more in this region rather than right iliac fossa). In case of

pelvic position tenderness may be present in the suprapubic region or the patient may have rectal tenderness. In sub-hepatic position patient may have tenderness in the right hypochondriac region. Sinha RN *et al*¹⁸ have reported that the site of maximum tenderness was in the right iliac fossa in 89 of 100 cases. Only 6 cases had maximal pain at a site other than right iliac fossa. Leukocytosis was present in 130 of the 150 cases, with an accuracy of 86.7%. The position of the appendix and its relation to the clinical presentation and course of acute appendicitis has been a subject of controversy with various authors giving various results and conclusions.

A total of 88 cases presented with clinical features suggestive of retrocaecal appendicitis, out of which 77 had typical presentation & 11 had atypical presentation with overall sensitivity of 87.5%, followed by pelvic position which had a sensitivity of 63.63% in which 14 patients had typical presentation & 8 had atypical presentation. The clinical presentation of retrocaecal type when compared with intraoperative has sensitivity of 90% as compared with the pelvic type which has sensitivity of 84.61% in our series. Varshney *et al*⁷ have described that advanced appendicitis (perforation or gangrene) is more common in those with retrocaecal appendicitis. They have given the explanation that some early cases may have been misdiagnosed, as urinary tract infection, leading to delay in the diagnosis, and increased incidence of complications. In Collins⁸ series of 751 patients with retrocaecal appendicitis, only 19% had typical symptoms, 18% had non-localizing pain, 28% had right flank pain and 12% had right shoulder pain. In his series 53% of the cases were perforated. Out of 150 cases; 120 patients had ultrasound proven appendicitis, out of which 80 were retrocaecal, 19 were pelvic, 4 paracaecal, 5 subcaecal, 6 preileal, 4 postileal and 2 subhepatic. On comparison with intraoperative findings, Ultrasound has sensitivity of 95% in detection of pelvic type followed by 86.25% in retrocaecal type appendicitis. All these patients who underwent appendicectomy the specimen was sent for histopathology examination for confirmation of the type of appendicitis. Out of 150 patients 139 were suspected to have acute appendicitis but histopathology showed 124 cases of acute type (89%), 11 were suspected to have recurrent appendicitis but histopathology showed 26 (42.30%).

Patel KG *et al*⁹ in his study found that Out of 100 cases; 69 patients had ultrasound proven appendicitis, out of which 41 were retrocaecal, 16 were pelvic, 5 preileal, 3 postileal, 2 paracaecal and one each for subhepatic and subcaecal. On comparison with intraoperative findings Ultrasound has sensitivity of 88.88% in detection of pelvic type followed by 85.41% in retrocaecal type appendicitis.

On the basis of individual modality 86.66% were suspected to have appendicitis on clinical presentation, 82% were suspected to have appendicitis on laboratory investigations, 80% were ultrasound proven appendicitis and histopathology proved appendicitis in all the cases (100%). Sinha RN *et al*¹⁸ in his study found that on individual modality 85% were suspected to have appendicitis on clinical presentation, 78% were suspected to have appendicitis on laboratory investigations, 69% were ultrasound proven appendicitis and histopathology proved appendicitis in all the cases (100%). The retrocaecal appendix was found to be most common (58.7%) position followed by pelvic (18%), paracaecal (10%), subcaecal (9%), preileal (8%), postileal (5%) & sub-hepatic (2%) when seen intraoperatively. Wakeley CPG *et al*² in his study found that retrocaecal being most common (65%) followed by pelvic (31%) and subcaecal (2.26%).

Conclusion

Appendicitis is a very common surgical entity with a wide of complications and post appendicectomy symptoms. The accurate diagnosis of appendicitis still remains a challenge for the surgeon. In our study we used a total of five modalities for the diagnosis of position of appendix & appendicitis, i.e. clinical features, laboratory investigations, ultrasound, intraoperative findings and histopathology. In this study, the retrocaecal appendix was found to be most common (58.7%) position followed by pelvic (18%), paracaecal (10%), subcaecal (9%), preileal (8%), postileal (5%) & sub-hepatic (2%) when seen intraoperatively. So the accurate diagnosis of position of appendix and appendicitis is a combination of all the modalities and not just dependent on one.

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