International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article

Prospective Evaluation of Clinical and USG Findings of Acute Appendicitis at a Tertiary Care Teaching Hospital

Sanjeev Kumar[1*], Sudhir Tyagi[2]

[1*]**Associate Professor, Department of Surgery,**
Saraswathi Institute of Medical Sciences, Anwarpur, Hapur, Uttar Pradesh, India.
[2]**Associate Professor, Department of Surgery,**
Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India.

ABSTRACT

Introduction: Acute appendicitis is one of the commonest surgical emergencies requiring surgery in both adults and children. The overall frequency of appendicitis for symptomatic patients younger than 20 years is 41%; the frequency for those older than 20 years is 59%. Present study was conducted in clinical cases representing the inflamed appendix cases. Various positions of appendix in patients with appendicitis and also the clinical picture, radiology investigations, intra operative findings and histopathology was studied.

Materials & Methods: Present study was a prospective, observational study carried out in Department of Surgery, Saraswathi Institute of Medical Sciences, Anwarpur, Hapur, Uttar Pradesh, India. 60 cases were included in study on the basis of inclusion and exclusion criteria and subjected to clinical assessment using signs, symptoms and laboratory criteria, histopathology and also the position of the appendix, which were recorded in the proforma.

Results: 60 patients were included in present study; among them 37 were males and 23 were females. Appendicitis was more common during the 3rd decade of life -25 cases (41.7%), followed by the 4th decade-14 cases (23.3%). Overall sensitivity of 91.1% was detected in cases of retrocaecal appendicitis. On comparing the position of appendix with USG and intra operative findings; USG has sensitivity of 91.9% in retrocaecal type followed by 90.9% in detection of pelvic type.

Conclusions: As evidenced by high misdiagnosis and perforation rates of appendicitis, the diagnosis of appendicitis in children can be extremely difficult. The accurate diagnosis of appendicitis still remains a challenge for the surgeon and the rate of negative appendicectomy with post appendicectomy symptoms are increasing due to inaccurate diagnosis. No single test and no combination of clinical or laboratory features is 100% reliable in discriminating between patients with and without appendicitis. More widespread use of combination of all the modalities should be done to decrease misdiagnosis rates and prevent post appendicectomy complications and symptoms.

Keywords: Appendix, Appendicitis, USG, Laboratory investigations.

***Correspondence to:**

Dr. Sanjeev Kumar,
Associate Professor, Department of Surgery,
Saraswathi Institute of Medical Sciences, Anwarpur, Hapur, Uttar Pradesh, India.

Article History:

Received: 25-04-2016, **Revised:** 12-05-2016, **Accepted:** 29-05-2016

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2016.2.3.058	

INTRODUCTION

Acute appendicitis is one of the commonest surgical emergencies requiring surgery in both adults and children.[1-3] The overall frequency of appendicitis for symptomatic patients younger than 20 years is 41%; the frequency for those older than 20 years is 59%.[4,5]

Simple appendicitis can progress to perforation, which is associated with a much higher morbidity and mortality, and surgeons have therefore been inclined to operate when the diagnosis is probable rather than wait until it is certain.[6] Despite considerable recent expansion of knowledge concerning appendicitis, accurate diagnosis remains suboptimal.

The appendix is a long, thin diverticulum arising from the inferior tip of the cecum. The neonatal appendix averages 4.5 cm in length compared with 9.5 cm for adults.[7] The appendix is funnel-shaped in neonates and infants, limiting its propensity to obstruct. By 1 to 2 years of age, the appendix assumes a normal adult like conical shape. The function of the appendix is unknown, although its lymphatic tissue and secretion of immunoglobulins suggest that it may play a specialized role in the immune system. The appendix is lined with colonic epithelium with interspersed submucosal lymphoid follicles. An increase in lymphoid follicle hyperplasia occurs until follicles reach their maximal size in the late teenage

years, corresponding to the time period with the highest risk of developing appendicitis.[8,9]

Appendicitis is typically precipitated by luminal obstruction from lymphoid follicle hyperplasia, fecaliths, foreign bodies, or parasites. In other cases, direct mucosal ulceration with bacterial invasion occurs without luminal obstruction.[9,10] Fecaliths form when inspissated feces act as a nidus with progressive layering of calcium salts and fecal debris over time. When they enlarge to the point of obstructing the lumen, epithelial cells lining the appendix continue to secrete mucus, distending the structure and eventually inhibiting lymphatic and venous drainage. Bacterial invasion of the wall ensues with edema and blockage of arterial blood flow. Eventually, if surgery is delayed, the appendix perforates and the spillage of pus into the peritoneal cavity leads to diffuse peritonitis or abscess formation. Typically 3 to 10 different organisms can be recovered from the peritoneal fluid of each patient. The most common isolates are *Escherichia coli, Bacteroides fragilis, Peptostreptococcus,* and *Pseudomonas* species.[11-13]

As inflammation spreads to the parietal peritoneum, pain typically localizes to the right lower quadrant. For unknown reasons, this classic migration of pain is not observed in more than one quarter of adult and one third of pediatric cases.[14] After perforation, either diffuse peritonitis ensues or a localized abscess forms.

The most common appendiceal locations at surgery and autopsy are retrocecal in 28% to 68% and pelvic in 27% to 53%.[8,15-17] Clinical features typically do not differ between retrocecal (posterior to the cecum) and nonretrocecal appendicitis.[18,19] When the appendix is extraperitoneal (ie, posterior to the peritoneum with no peritoneal lining, unlike more cases which are intraperitoneal) and retrocecal, patients exhibit less abdominal pain, less focal abdominal tenderness, more back or flank pain, a longer duration of symptoms before diagnosis, and higher perforation rates.[18-20] Other appendiceal locations include subcecal (2%), anterior or preilial (1%), within a hernial sac (2%), right upper (4%), and left upper and lower quadrants (<0.1% each).[8,17]

Guidry SP et al have concluded that anatomic variations of the location of appendix are often responsible for delays in the diagnosis of appendicitis.[21] Varshney et al have concluded that the retrocaecal position of the appendix is less prone to infection,[22] whereas Collins et al have described higher incidence of perforation and serious complications in acute appendicitis.[8]

Importantly, delays in diagnosis lead to increased morbidity and mortality and risk of malpractice litigation.[23,24]

Hence, Present study was conducted in clinical cases representing the inflamed appendix cases. Various positions of appendix in patients with appendicitis and also the clinical picture, radiology investigations, intra operative findings and histopathology was studied.

MATERIALS & METHODS

Present study was a prospective, observational study carried out in Department of Surgery, Saraswathi Institute of Medical Sciences, Anwarpur, Hapur, Uttar Pradesh, India. 60 cases were included in study on the basis of inclusion and exclusion criteria and subjected to clinical assessment using signs, symptoms and laboratory criteria, histopathology and also the position of the appendix, which were recorded in the proforma. An ultrasound examination was performed on all cases to exclude any other associated pathology and also to confirm the diagnosis. Surgery was done either under general anesthesia or spinal anesthesia. Abdomen was opened with Lanz or Mc Burney's, or right lower Para median incision. At surgery the Position of the appendix was first identified before disturbing the structures and the position of the appendix identified and recorded together with the length of the appendix and also weather it was fixed or freely mobile in the peritoneal cavity, peri-appendiceal collection, presence of perforation or other complications of appendicitis. After completion of the appendectomy the specimen was subjected to histopathological examination. Only those cases, which were proved as, appendicitis by the histopathology were included in the study.[25]

RESULTS

60 patients were included in present study; among them 37 were males and 23 were females. Appendicitis was more common during the 3rd decade of life -25 cases (41.7%), followed by the 4th decade-14 cases (23.3%). Overall sensitivity of 91.1% was detected in cases of retrocaecal appendicitis.

On comparing the position of appendix with USG and intra operative findings; USG has sensitivity of 91.9% in retrocaecal type followed by 90.9% in detection of pelvic type as shown in table 2.

Table 1: Position of appendix with clinical presentation and intra operative findings.

Position of appendix	Clinical presentation	Intra operative
Retrocaecal	41	37
Paracaecal	4	4
Pre-ileal	2	3
Post- ileal	4	3
Pelvic	7	10
Sub-caecal	2	2
Sub-hepatic	0	1
Total	60	60

Table 2: Position of appendix with USG findings and intra operative finding

Position of appendix	USG finding	Intra operative
Retrocaecal	34	37
Paracaecal	3	4
Pre-ileal	4	3
Post- ileal	5	3
Pelvic	11	10
Sub-caecal	1	2
Sub-hepatic	2	1
Total	60	60

DISCUSSION

In present study, appendicitis was more common during the 3rd decade of life -25 cases (41.7%), followed by the 4th decade-14 cases (23.3%). Lewis et al. (1975) in their study found that the 2nd and 3rd decades to be the most common age groups for acute appendicitis.[5] Appendicitis is slightly more common in males, (61.7%) in our 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 al & Korner et al, have reported a slight male preponderance (with male to female ratio of 1.2 to 1.3:1).[9,26]

All the patients with acute appendicitis had pain and most of the patients had pain in the right iliac fossa (56 of 60 cases). Only 4 cases had maximal pain at a site other than right iliac fossa. Atypical pain was more common in cases of fixed retro-caecal appendix and in cases of pelvic appendicitis.[25]

The classically described location of the appendix, McBurney's point, is one third of the distance (1.5 to 2 inches in adults) from the right anterior superior iliac spine to the umbilicus.[27] However, Karin OM et al. and Bartlett RH et al suggested that 75% of normal appendices lie inferior and medial to this point with 50% located 5 to 10 cm and 15% more than 10 cm from this point.[27,28]

Tenderness in the right iliac fossa is a constant feature in all the cases of appendicitis. The site of maximum tenderness was in the right iliac fossa in 53 of 60 cases even though few had tenderness at other sites leading to difficulty in the diagnosis. Only 7 cases had maximal tenderness at a site other than right iliac fossa. In retro-caecal 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.

A total of 45 cases presented with clinical features suggestive of retrocaecal appendicitis, out of which 41 had typical presentation & 4 had atypical presentation with overall sensitivity of 91.1%,

Varshney et al.[22] have described that advanced appendicitis (perforation or gangrene) is more common in those with retro-caecal 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 Collins DC series of 751 patients with retro-caecal 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.[8] Guidry S et al. have concluded that the patients with gangrene and perforation were more likely to have pain and tenderness at a site other than right lower quadrant. The appendix was in hidden location (retro-caecal, retro-ileal, pelvic appendicitis as compared with 68% of the patients with gangrenous or perforated appendicitis.[21]

Ram NS found that 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 85% were suspected to have appendicitis on clinical presentation, 78% were suspected to have appendicitis on lab Ix, 69% were ultrasound proven appendicitis and histopathology proved appendicitis in all the cases (100%).[25]

In our study a total of five modalities are used for the diagnosis and confirmation of appendicitis. Out of which 88.3% were suspected to have appendicitis based on clinical presentation. 68.3% were suspected to have appendicitis on combining clinical presentation with laboratory investigations. On combining clinical presentation, lab Ix and USG 61.7% were suspected to have appendicitis. On combination of clinical presentation, lab Ix, USG with intraoperative findings 51.7% had appendicitis. And on combination of above mentioned four modalities with histopathology only 43.3% had appendicitis i.e. all five modalities were suggestive of appendicitis.

CONCLUSION

As evidenced by high misdiagnosis and perforation rates of appendicitis, the diagnosis of appendicitis in children can be extremely difficult. The accurate diagnosis of appendicitis still remains a challenge for the surgeon and the rate of negative appendicectomy with post appendicectomy symptoms are increasing due to inaccurate diagnosis. No single test and no combination of clinical or laboratory features is 100% reliable in discriminating between patients with and without appendicitis. More widespread use of combination of all the modalities should be done to decrease misdiagnosis rates and prevent post appendicectomy complications and symptoms.

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Source of Support: Nil. **Conflict of Interest:** None Declared.

Cite this article as: Sanjeev Kumar and Sudhir Tyagi. Prospective Evaluation of Clinical and USG Findings of Acute Appendicitis at a Tertiary Care Teaching Hospital. Int J Med Res Prof. 2016; 2(3): 263-66.