



## Clinical sign and symptoms in patients diagnosed with the acute appendicitis

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### Abstract

Acute appendicitis can be defined as an acute inflammation of the appendix. Acute appendicitis is the most common cause of an acute abdomen in young adults and, as such, the associated symptoms and signs have become a paradigm for clinical teaching. Appendicitis is sufficiently common that appendicectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training. The classical features of acute appendicitis begin with abdominal pain is associated with anorexia, nausea and usually one or more episodes of vomiting that follow the onset of pain. Hence based on above findings the present study was planned for Clinical Sign and Symptoms in Patients Diagnosed with the Acute Appendicitis.

The present study was planned in Department of Surgery, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar. Total 20 cases diagnosed with the acute appendicitis were enrolled in the present study. All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

The data generated from the present study concludes that Pain abdomen, nausea, vomiting are the commonest symptoms. Also, the commonest sign were Tenderness over McBurney's point and rebound tenderness observed in the enrolled patients. Advances in modern radiographic imaging have improved diagnostic accuracy, however the diagnosis of acute appendicitis remains essentially clinical, requiring a mixture of observation, clinical acumen and surgical science and as such it remains an enigmatic challenge and remainder of the art of surgical diagnosis.

**Keywords:** acute appendicitis, treatment, diagnosis, symptom, etc

### Introduction

Appendicitis is defined as an inflammation of the inner lining of the vermiform appendix that spreads to its other parts. This condition is a common and urgent surgical illness with protean manifestations, generous overlap with other clinical syndromes, and significant morbidity, which increases with diagnostic delay (see Presentation). In fact, despite diagnostic and therapeutic advancement in medicine, appendicitis remains a clinical emergency and is one of the more common causes of acute abdominal pain.

No single sign, symptom, or diagnostic test accurately confirms the diagnosis of appendiceal inflammation in all cases, and the classic history of anorexia and periumbilical pain followed by nausea, right lower quadrant (RLQ) pain, and vomiting occurs in only 50% of cases.

Appendicitis may occur for several reasons, such as an infection of the appendix, but the most important factor is the obstruction of the appendiceal lumen. Left untreated, appendicitis has the potential for severe complications, including perforation or sepsis, and may even cause death. However, the differential diagnosis of appendicitis is often a clinical challenge because appendicitis can mimic several abdominal conditions (see Diagnostic Considerations <sup>[1]</sup>).

Appendectomy remains the only curative treatment of appendicitis. The surgeon's goals are to evaluate a relatively small population of patients referred for suspected appendicitis and to minimize the negative appendectomy rate without increasing the incidence of perforation. The

emergency department (ED) clinician must evaluate the larger group of patients who present to the ED with abdominal pain of all etiologies with the goal of approaching 100% sensitivity for the diagnosis in a time-, cost-, and consultation-efficient manner.

The appendix is a wormlike extension of the cecum and, for this reason, has been called the vermiform appendix. The average length of the appendix is 8-10 cm (ranging from 2-20 cm). The appendix appears during the fifth month of gestation, and several lymphoid follicles are scattered in its mucosa. Such follicles increase in number when individuals are aged 8-20 years.

The appendix is contained within the visceral peritoneum that forms the serosa, and its exterior layer is longitudinal and derived from the taenia coli; the deeper, interior muscle layer is circular. Beneath these layers lies the submucosal layer, which contains lymphoepithelial tissue. The mucosa consists of columnar epithelium with few glandular elements and neuroendocrine argentaffin cells.

Taenia coli converge on the posteromedial area of the cecum, which is the site of the appendiceal base. The appendix runs into a serosal sheet of the peritoneum called the mesoappendix, within which courses the appendicular artery, which is derived from the ileocolic artery. Sometimes, an accessory appendicular artery (deriving from the posterior cecal artery) may be found.

The vasculature of the appendix must be addressed to avoid intraoperative hemorrhages. The appendicular artery is

contained within the mesenteric fold that arises from a peritoneal extension from the terminal ileum to the medial aspect of the cecum and appendix; it is a terminal branch of the ileocolic artery and runs adjacent to the appendicular wall. Venous drainage is via the ileocolic veins and the right colic vein into the portal vein; lymphatic drainage occurs via the ileocolic nodes along the course of the superior mesenteric artery to the celiac nodes and cisterna chyli.

The appendix has no fixed position. It originates 1.7-2.5 cm below the terminal ileum, either in a dorsomedial location (most common) from the cecal fundus, directly beside the ileal orifice, or as a funnel-shaped opening (2-3% of patients). The appendix has a retroperitoneal location in 65% of patients and may descend into the iliac fossa in 31%. In fact, many individuals may have an appendix located in the retroperitoneal space; in the pelvis; or behind the terminal ileum, cecum, ascending colon, or liver. Thus, the course of the appendix, the position of its tip, and the difference in appendiceal position considerably changes clinical findings, accounting for the nonspecific signs and symptoms of appendicitis.

Reportedly, appendicitis is caused by obstruction of the appendiceal lumen from a variety of causes (see Etiology). Independent of the etiology, obstruction is believed to cause an increase in pressure within the lumen. Such an increase is related to continuous secretion of fluids and mucus from the mucosa and the stagnation of this material. At the same time, intestinal bacteria within the appendix multiply, leading to the recruitment of white blood cells and the formation of pus and subsequent higher intraluminal pressure.

If appendiceal obstruction persists, intraluminal pressure rises ultimately above that of the appendiceal veins, leading to venous outflow obstruction. As a consequence, appendiceal wall ischemia begins, resulting in a loss of epithelial integrity and allowing bacterial invasion of the appendiceal wall.

Within a few hours, this localized condition may worsen because of thrombosis of the appendicular artery and veins, leading to gangrene and perforation of the appendix. As this process continues, a periappendicular abscess or peritonitis may occur.

Appendicitis is caused by obstruction of the appendiceal lumen. The most common causes of luminal obstruction include lymphoid hyperplasia secondary to inflammatory bowel disease (IBD) or infections (more common during childhood and in young adults), fecal stasis and fecaliths (more common in elderly patients), parasites (especially in Eastern countries), or, more rarely, foreign bodies and neoplasms.

Fecaliths form when calcium salts and fecal debris become layered around a nidus of inspissated fecal material located within the appendix. Lymphoid hyperplasia is associated with various inflammatory and infectious disorders including Crohn disease, gastroenteritis, amebiasis, respiratory infections, measles, and mononucleosis.

Obstruction of the appendiceal lumen has less commonly been associated with bacteria (*Yersinia* species, adenovirus, cytomegalovirus, actinomycosis, *Mycobacteria* species, *Histoplasma* species), parasites (eg, *Schistosomes* species, pinworms, *Strongyloides stercoralis*), foreign material (eg, shotgun pellet, intrauterine device, tongue stud, activated charcoal), tuberculosis, and tumors.

Appendicitis is one of the more common surgical

emergencies, and it is one of the most common causes of abdominal pain. In the United States, 250,000 cases of appendicitis are reported annually, representing 1 million patient-days of admission. The incidence of acute appendicitis has been declining steadily since the late 1940s, and the current annual incidence is 10 cases per 100,000 population. Appendicitis occurs in 7% of the US population, with an incidence of 1.1 cases per 1000 people per year. Some familial predisposition exists.

In Asian and African countries, the incidence of acute appendicitis is probably lower because of the dietary habits of the inhabitants of these geographic areas. The incidence of appendicitis is lower in cultures with a higher intake of dietary fiber. Dietary fiber is thought to decrease the viscosity of feces, decrease bowel transit time, and discourage formation of fecaliths, which predispose individuals to obstructions of the appendiceal lumen.

In the last few years, a decrease in frequency of appendicitis in Western countries has been reported, which may be related to changes in dietary fiber intake. In fact, the higher incidence of appendicitis is believed to be related to poor fiber intake in such countries.

There is a slight male preponderance of 3:2 in teenagers and young adults; in adults, the incidence of appendicitis is approximately 1.4 times greater in men than in women. The incidence of primary appendectomy is approximately equal in both sexes.

The incidence of appendicitis gradually rises from birth, peaks in the late teen years, and gradually declines in the geriatric years. The mean age when appendicitis occurs in the pediatric population is 6-10 years. Lymphoid hyperplasia is observed more often among infants and adults and is responsible for the increased incidence of appendicitis in these age groups. Younger children have a higher rate of perforation, with reported rates of 50-85%. The median age at appendectomy is 22 years. Although rare, neonatal and even prenatal appendicitis have been reported. Clinicians must maintain a high index of suspicion in all age groups.

Acute appendicitis is the most common reason for emergency abdominal surgery. Appendectomy carries a complication rate of 4-15%, as well as associated costs and the discomfort of hospitalization and surgery. Therefore, the goal of the surgeon is to make an accurate diagnosis as early as possible. Delayed diagnosis and treatment account for much of the mortality and morbidity associated with appendicitis.

The overall mortality rate of 0.2-0.8% is attributable to complications of the disease rather than to surgical intervention. The mortality rate in children ranges from 0.1% to 1%; in patients older than 70 years, the rate rises above 20%, primarily because of diagnostic and therapeutic delay.

Appendiceal perforation is associated with increased morbidity and mortality compared with nonperforating appendicitis. The mortality risk of acute but not gangrenous appendicitis is less than 0.1%, but the risk rises to 0.6% in gangrenous appendicitis. The rate of perforation varies from 16% to 40%, with a higher frequency occurring in younger age groups (40-57%) and in patients older than 50 years (55-70%), in whom misdiagnosis and delayed diagnosis are common. Complications occur in 1-5% of patients with appendicitis, and postoperative wound infections account for almost one third of the associated morbidity<sup>[2]</sup>.

Acute appendicitis can be defined as an acute inflammation of the appendix. Acute appendicitis is the most common cause of an acute abdomen in young adults and, as such, the associated symptoms and signs have become a paradigm for clinical teaching. Appendicitis is sufficiently common that appendectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training. The classical features of acute appendicitis begin with abdominal pain is associated with anorexia, nausea and usually one or more episodes of vomiting that follow the onset of pain. Hence based on above findings the present study was planned for Clinical Sign and Symptoms in Patients Diagnosed with the Acute Appendicitis.

### **Methodology**

The present study was planned in Department of Surgery, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar. Total 20 cases diagnosed with the acute appendicitis were enrolled in the present study.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

**Inclusion Criteria:** All the cases with acute appendicitis diagnosis by clinical examination.

**Exclusion Criteria:** Acute abdomen of cause other than appendicitis. Patients with generalized peritonitis due to appendicular perforation.

### **Results & Discussion**

Acute appendicitis can be defined as acute inflammation of the appendix. For many years, the appendix was erroneously viewed as a vestigial organ with no known function. It is now well recognized that the appendix is an immunologic organ that actively participates in the secretion of immunoglobulin, particularly immunoglobulin A. Although, there is no clear role for the appendix in the development of human disease, recent studies demonstrate a potential correlation between appendectomy and the development of inflammatory bowel disease. There appears to be a negative age-related association between prior appendectomy and subsequent development of ulcerative colitis. The association between Crohn's disease and appendectomy is less clear. Although, earlier studies suggested that appendectomy increases the risk of developing Crohn's disease, more recent studies that carefully assessed the timing of appendectomy in relation to the onset of Crohn's disease demonstrated a negative correlation.

The appendix, ileum, and ascending colon are all derived from the mid gut. Appendix developing at 8th week of Gestation as an out pouching of the caecum and it becomes fixed in right lower quadrant after the medial rotation. It is a blind muscular tube with mucosal, submucosal, muscular and serosal layers with average length 7.5 to 10 cm. Base of the Appendix is constant found at the confluence of three Taenia coli of the caecum which fuse to form the outer longitudinal muscle coat. Mesentery of the Appendix is called Mesoappendix. Appendicular artery a branch of lower division of the Ileocolic artery lies in the free border of Mesoappendix, being an end artery thrombosis, of which results in necrosis of Appendix. Lumen contains multiple

longitudinal folds of mucous membrane lined by columnar cells of Colonic type.

Submucosa contains numerous Lymphatic follicles seems to be important in etiology of Acute appendicitis. Appendix lying in various positions common being the Retrocaecal (74%). The varying location of the tip of the appendix likely explains the myriad of symptoms that are attributable to the inflamed appendix. Abdominal pain first noticed in peri umbilical region with progressive inflammation of the appendix, pain shifting to Right iliac fossa, Anorexia (especially in children), Nausea and Vomiting, and Fever, this is Typical presentation. Atypical presentation includes in elderly patients in whom localization to right iliac fossa unusual. An inflamed appendix in the pelvis may cause supra pubic pain and tenesmus. Typically, two clinical syndromes of acute appendicitis are Acute catarrhal (non-obstructive) and Acute obstructive appendicitis. Later characterized by more acute and abrupt onset with generalized abdominal pain and vomiting which may mimic acute intestinal obstruction. On examination low grade pyrexia with Right iliac fossa tenderness, Muscle guarding and Rebound tenderness. Patient asked to point where the pain began and where it moved (Pointing Sign). Maximum tenderness and muscle guarding present in Mc Burney’s point. Deep palpation of the left iliac fossa may cause pain in the Right iliac fossa (Rovsing’s Sign). Inflamed appendix may lie on the psoas muscle and the patient lies with the right hip flexed for pain relief (Psoas Sign). If an Inflamed appendix is in contact with obturator internus, when the hip is flexed and internally rotated will cause pain in the Hypogastrium (Obturator Sign). If left untreated acute appendicitis may lead to complications leading to inflammatory mass, appendicular abscess or rupture with generalised peritonitis. Diagnosis of complicated acute appendicitis is clinically supplemented by ultrasound or CT scan [3, 4]. However, it is common in practice to admit and observe the patients with an uncertain diagnosis and to delay their surgery until the diagnosis is more definite in order to reduce the negative appendectomy rate. Pre-admission delay on the part of the patient and post-admission delay by surgeon are responsible for combined delay in diagnosis and definite management [5, 6].

**Table 1:** Demographic Details

Parameters	No. of Cases
Age	
15 – 20 years	6
20 – 30 years	8
31 – 40 years	3
41 – 50 years	3
51 – 60 years	0
61 & above years	0
Sex	
Males	11
Females	09
Total	20

**Table 2:** Symptoms Observed

Parameters	No. of Cases
Abdominal Pain	20
Nausea	20
Vomiting	14
Fever	12

**Table 3:** Clinical Signs

Parameters	No. of Cases
Mc Burney’s Point Tenderness	20
Rebound Tenderness	18
Rovsing’s sign	3
Obturator sign	4
Iliopsoas sign	2

Our study have male more than females. In previous studies [7], male was more affected than females. Age group 21-30 have maximum cases of acute appendicitis followed by age group 14-20 years, this finding correlates with study done by kazarian *et al.* [8] abdominal pain was most common symptom followed by the nausea and vomiting and fever. Ashraf *et al.* [9] state that a “certain level of experience is required for skilful interpretation” of noncontrast CT and have established an imaging protocol at their institution that includes noncontrast CT for evaluating the appendix. Lane *et al.* [10] mention that as a result of their study on noncontrast CT for suspected appendicitis; their institution now considers noncontrast CT as an alternative to ultrasonography for diagnosing appendicitis. Therefore, it appears that there is already some degree of acceptance for using noncontrast CT scans among radiologists for the diagnosis of appendicitis. Imaging has a well-established and definite role in the assessment of RIF pain including acute appendicitis. Imaging of appendicitis has seen paradigm shift from graded compression ultrasonography to multidetector CT each with its pros and cons [11, 13]. A dedicated appendiceal ultrasonography by an experienced sonologist preferably a radiologist should be the frontline imaging modality for a suspected case of appendicitis even today. CT scan is best reserved as a second line imaging modality when ultrasonography findings are negative or equivocal in a case with strong clinical suspicion [14, 16]. Advantages of ultrasonography are that it can be carried out with minimum delay and can yield surgically relevant information like confirmation of diagnosis of appendicitis, status of inflamed appendix, location and orientation of appendix, presence or absence of any associated complications, etc. besides suggesting alternative diagnoses, which helps in appropriate surgical planning. However, the potential pitfalls of USG as well as CT scan in the diagnosis of appendicitis need to be understood. To avoid additional morbidity from getting missed or diagnosis of acute appendicitis getting delayed, surgeons have traditionally accepted that up to 20% of patients undergoing appendectomy for suspected acute appendicitis will have a normal appendix. This has come to be accepted as negative appendectomy rate [17]. A significant number of patients without acute appendicitis who have equivocal clinical presentations could be spared the expense and morbidity of surgery by improved diagnosis with judicious use of preoperative imaging. Conversely, patients with atypical presentations of acute appendicitis could be spared the morbidity and burden on health care resources associated with missed or late diagnosis and consequent delay in appropriate treatment besides the risk of complications [18].

**Conclusion**

The data generated from the present study concludes that Pain abdomen, nausea, vomiting are the commonest

symptoms. Also, the commonest sign were Tenderness over Mc Burney's point and rebound tenderness observed in the enrolled patients. Advances in modern radiographic imaging have improved diagnostic accuracy, however the diagnosis of acute appendicitis remains essentially clinical, requiring a mixture of observation, clinical acumen and surgical science and as such it remains an enigmatic challenge and remainder of the art of surgical diagnosis.

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