

Assessment of Role of Computed Tomography in Diagnosis of Appendicitis and its Complications

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A B S T R A C T

Background: Acute appendicitis is one of the most common causes of acute abdominal pain, the most common condition that requires abdominal surgery in childhood, and the most common condition associated with lawsuits against emergency physicians. Use of intravenous iodinated contrast is the standard imaging practices. Positive oral (high-attenuation) contrast, and positive rectal contrast, also has been recommended. Hence; the present study was undertaken for assessing the role of computed tomography in diagnosis of appendicitis and its complications.

Material and methods: Assessment of a total of 25 patients was done who reported with right lower quadrant or right flank pain. All the patients were instructed to maintain 6 hours fasting before IV administration of the contrast. CT was done all the patients for assessing abdominal region. All the results were analyze by skilled and experienced radiologists. All the results were recorded and analyzed by SPSS software.

Results: On CT scan, abnormal findings were detected in 72 percent of the patients while normal findings were found in 28 percent of the patients. Out of 18 cases with abnormal CT findings, acute appendicitis was detected in 44.44 percent of the patients while perforated appendicitis was seen in 33.33 percent of the patients. Appendicular abscess was seen in 11.11 percent of the patients.

Conclusion: From the above results, the authors concluded that CT should be routinely used in diagnosing appendicular lesions, especially, acute appendicitis. Whenever, CT is considered necessary, clinicians should use it as early as possible.

Keywords: Computed Tomography, Appendicitis

INTRODUCTION

Acute appendicitis is one of the most common causes of acute abdominal pain, the most common condition that requires abdominal surgery in childhood, and the most common condition associated with lawsuits against emergency physicians. Acute appendicitis occurs when the appendiceal lumen is obstructed, leading to fluid accumulation, luminal distention, inflammation, and, finally, perforation.¹⁻³

For almost two decades CT being used widely in diagnosing appendicitis and its complications; studies demonstrated that CT has high specificity and sensitivity in diagnosis. Use of intravenous iodinated contrast is the standard imaging practices. Positive oral (high-attenuation) contrast, and positive rectal contrast, also has been recommended. CT scans showed uniformly high performance in diagnosing appendicitis with 95% specificity and 99% sensitivity, when using only oral, rectal, or intravenous (IV) contrast scanning techniques or combining oral, intravenous (IV) or rectal contrasts.³⁻⁶ Hence; the present study was undertaken for

assessing the role of computed tomography in diagnosis of appendicitis and its complications.

MATERIAL AND METHODS

The present study was undertaken for assessing the role of computed tomography in diagnosis of appendicitis and its complications. Assessment of a total of 25 patients was done who reported with right lower quadrant or right flank pain. Inclusion criteria for present study included:

- Patients within the age range of 15 to 60 years,
 - Clinically suspected appendicitis patients
 - Patients with right lower quadrant or right flank pain
- Pregnant subjects, subjects with presence of malignant pathology or metabolic disorder involving any other organ primarily were excluded from the present study. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. All the patients were instructed to maintain 6 hours fasting before IV administration of the contrast. CT was done all the

patients for assessing abdominal region. When using CT to diagnose appendicitis, there are 2 main options: the standard abdominal and pelvic scan and the appendiceal scan with rectal contrast. The former displays classic patterns such as concentric, thickened appendiceal walls; an appendicolith, fat stranding, or other signs of inflammation. A phlegmon, abscess, or free air can also be suggestive of appendicitis. Contrast or air present within the lumen of the appendix virtually excludes the diagnosis of appendicitis. All the results were analyze by skilled and experienced radiologists. All the results were recorded and analyzed by SPSS software.

RESULTS

Mean age of the patients was 32.8 years. 40 percent of the patients belonged to the age group of 31 to 40 years. 28 percent of the patients belonged to the age group of 15 to 30 years. 64 percent of the patients were males while the remaining were females. On CT scan, abnormal findings were detected in 72 percent of the patients while normal findings were found in 28 percent of the patients. Out of 18 cases with abnormal CT findings, acute appendicitis was detected in 44.44 percent of the patients while perforated appendicitis was seen in 33.33 percent of the patients. Appendicular abscess was seen in 11.11 percent of the patients. Figure 1 shows acute appendicitis- Tubular structure noted in right iliac fossa (RIF) with thickened enhancing wall which extending up to pelvic cavity. Figure 2 shows acute appendicitis with Mucocele formation- Tubular fusiform grossly dilated structure noted in right iliac fossa

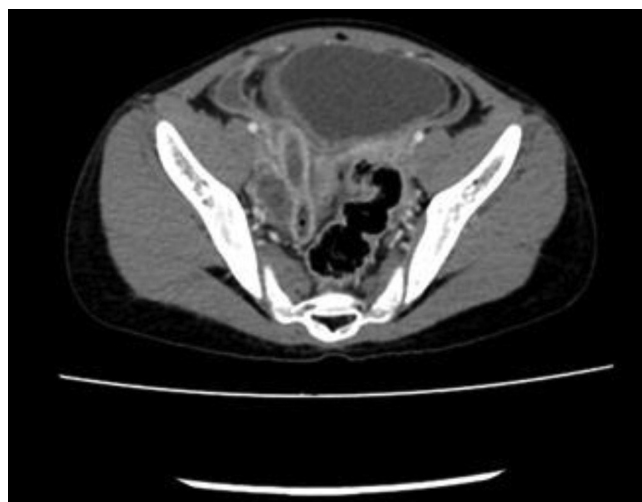


Figure-1: Acute appendicitis- Tubular structure noted in right iliac fossa (RIF) with thickened enhancing wall which extending up to pelvic cavity



Figure-2: Acute appendicitis with Mucocele formation- Tubular fusiform grossly dilated structure noted in right iliac fossa (RIF) with thickened enhancing wall



Figure-3: Acute appendicitis with perforation- Tubular structure noted in right iliac fossa (RIF) with thickened enhancing wall with compressed lumen and peri appendiceal free fluid and air foci

Parameter		Number of patients	Percentage
Age (years)	15 to 30	7	28
	31 to 40	10	40
	41 to 50	5	20
	51 to 30	3	12
Gender	Males	16	64
	Females	9	36

Table-1: Demographic data

Findings	Number of patients	Percentage of patients
Normal	7	28
Abnormal	18	72
Total	25	100

Table-2: Findings of abdominal CT scan

Lesion	Number of patients	Percentage of patients
Acute appendicitis	8	44.44
Chronic appendicitis	2	11.11
Perforated appendicitis	5	33.33
Acute appendicitis with Mucocele formation	1	5.56
Appendicular abscess	2	11.11
Total	18	100

Table-3: Type appendicular lesion



Figure-4: perforated appendix and appendicolith with secondary abscess formation-appendix noted with collapsed lumen and appendicolith with peri appendiceal collection and air foci within

(RIF) with thickened enhancing wall. Figure 3 shows the acute appendicitis with perforation- Tubular structure noted in right iliac fossa (RIF) with thickened enhancing wall with compressed lumen and peri appendiceal free fluid and air foci. Figure 4 shows perforated appendix and appendicolith with secondary abscess formation-appendix noted with collapsed lumen and appendicolith with peri appendiceal collection and air foci within

DISCUSSION

Acute appendicitis is an emergent surgically treated disease generally represented by right lower abdominal pain. The most common location of the appendix is descending intraperitoneal. However, the appendix can also show atypical locations such as inguinal canal, femoral canal, subhepatic, retrocecal, intraperitoneal abdominal midline and left side in situs inversus or intestinal malrotation patients. Atypical location can lead to atypical clinical presentations. Subhepatic, retrocecal ascending appendicitis can present with right upper abdominal pain or right side pain, and be confused with acute cholecystitis, pyelonephritis, renal/ureter stone, cecal/ascending colon diverticulitis, terminal ileitis, neoplasm and irritable bowel syndrome.⁶⁻⁸ Hence; the present study was undertaken for assessing the role of computed tomography in diagnosis of appendicitis and its complications.

In the present study, mean age of the patients was 32.8 years. 40 percent of the patients belonged to the age group of 31 to 40 years. 28 percent of the patients belonged to the age group of 15 to 30 years. 64 percent of the patients were males while the remaining were females. On CT scan, abnormal findings were detected in 72 percent of the patients while normal findings were found in 28 percent of the patients. Naglaa HS et al described the value and role of Multi-slice computed tomography in diagnosing appendicitis and its complications. They concentrated on continuity and thickness of the appendiceal wall. The normal appendix thickness is less than 1 mm. When appendix got inflamed, it usually appears thickened, asymmetric and enhancing with i.v.

contrast from 1 to 3 mm thickness. CT is helpful for accurate and prompt diagnosis in suspected cases of appendicitis & its complications and conditions that mimic appendicitis.⁹ Iqbal J et al determined the diagnostic efficiency of Multi-detector CT (MDCT) in clinically equivocal cases of acute appendicitis correlating it with surgical/histopathological findings. A group of 116 patients was included. The results proved that MDCT had a sensitivity of 97.5%, specificity of 97.0%, and accuracy of 97.4% for the diagnosis of appendicitis with one false positive and two false negative cases. The study showed 100% accuracy in diagnosing acute appendicitis in children. In 33 patients, an alternate cause was identified with CT. The alternate diagnosis made on CT findings was consistent with the final diagnosis in 27 (81.8%) of 33 patients in whom there was no evidence of acute appendicitis. The clinical diagnosis disagreed with the CT diagnosis in six patients (18.18%). Their study verified that MDCT plays an important role in evaluation and consequent management of equivocal cases of acute appendicitis.

In the present study, Out of 18 cases with abnormal CT findings, acute appendicitis was detected in 44.44 percent of the patients while perforated appendicitis was seen in 33.33 percent of the patients. Appendicular abscess was seen in 11.11 percent of the patients. Figure 1 shows acute appendicitis- Tubular structure noted in right iliac fossa (RIF) with thickened enhancing wall which extending up to pelvic cavity. Figure 2 shows acute appendicitis with Mucocele formation- Tubular fusiform grossly dilated structure noted in right iliac fossa (RIF) with thickened enhancing wall. Figure 3 shows the acute appendicitis with perforation- Tubular structure noted in right iliac fossa (RIF) with thickened enhancing wall with compressed lumen and peri appendiceal free fluid and air foci. Figure 4: perforated appendix and appendicolith with secondary abscess formation-appendix noted with collapsed lumen and appendicolith with peri appendiceal collection and air foci within. Rao et al used limited CT of the lower abdomen after oral and per-rectal contrast material administration, the technique used by us differed in several aspects as they included all patients clinically suspected of having acute appendicitis, whereas we examined only those patients who presented with equivocal sign and symptoms of acute appendicitis. CT was not performed in clinically obvious cases of acute appendicitis as the referring surgeons did not expect an added advantage and feared increased complications.¹¹

CONCLUSION

From the above results, the authors concluded that CT should be routinely used in diagnosing appendicular lesions, especially, acute appendicitis. Whenever, CT is considered necessary, clinicians should use it as early as possible.

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