Original Research Paper RADIOLOGY

STUDY OF VARIOUS PATHOLOGIES OF APPENDIX USING CT SCANS.

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ABSTRACT

INTRODUCTION: Appendicitis is the most common acute surgical condition of abdomen[1]. It usually affects adolescents and young adults of both genders and occurs at any age.[2]
It occurs due to obstruction of the narrow appendiceal lumen.
AIM: To study various pathologies of appendicitis using CT scans in 50 patients.
MATERIALS AND METHODS: Imaging studies of 50 patients from age group of 20-60 years came to Radio-diagnosis at MGM Hospital, Kamothe, Navi Mumbai was done using CECT scan during JANUARY 2016 TO DECEMBER 2016 period.
RESULTS: Of the 50 cases, abnormal findings were present in 39 patients.
CONCLUSION: CECT is gold standard technique for diagnosis of various pathologies of appendix. Early detection and intervention prevents serious morbidity and mortality due to appendicitis.

KEYWORDS Appendix, Contrast enhanced Computed Tomography (CECT)

INTRODUCTION:

The appendix is a diverticulum from the posteromedial wall of the cecum. It measures approximately 10 cm in length. The base of the appendix is fixed to the cecum, while the remainder of the appendix is free. It can be of variable location (i.e., retrocaecal, subcecal, retroileal, pre-ileal, or pelvic).

A retrocaecal appendix causes flank or back pain while a pelvic appendix causes suprapubic pain.[4]

Appendicitis is defined as inflammation or infection of appendix.[2]

The clinical features in acute appendicitis are: right lower quadrant pain with migration of pain from the periumbilical region to the right lower quadrant and abdominal rigidity[1]; followed by nausea and vomiting and tenderness over McBurney's point.

Laboratory signs : Elevation in peripheral white blood count to greater than 10,000mm^3.

Causes include: Obstruction to narrow appendiceal lumen can occur due to fecoliths, lymphoid hyperplasia (related to viral illnesses such as upper respiratory infections, mononucleosis, or gastroenteritis), gastrointestinal parasites, foreign bodies, and Crohn's disease. Continued secretion of mucus from within the obstructed appendix results in elevated intraluminal pressure, leading to tissue ischemia, over-growth of bacteria, transmural inflammation, appendiceal infarction, and possible perforation. Inflammation may then quickly extend into the parietal peritoneum and adjacent structures.[1]

A good quality contrast enhanced CT demonstrates different pathologies of appendicitis.

MATERIALS AND METHODS:

A total of 50 patients who were clinically suspected of having appendicular pathology between the age group of 20 to 60 years attending MGM Hospital, Kamothe , Navi Mumbai constituted our study.

The study was conducted for a period of 1year from January 2016 to December 2016 using contrast enhanced Computed tomography scan. Patients were selected on the basis of clinical history, laboratory data or other imaging modality such as ultrasonography suggestive of pathology of appendix. Each patient underwent a thorough clinical evaluation including a detailed history and physical examination. All the patients underwent routine baseline blood investigations. Serum creatinine is an important blood test which was checked for all these patients and informed consent had been obtained prior to imaging study.

INCLUSION CRITERIA:

1. Patients between age groups 20- 60 years who were clinically suspected of having appendicitis or other pathologies of appendix.

EXCLUSION CRITERIA:

1. Patients who were not ready to undergo CECT scan.
2. Patients whose serum creatinine values were higher than normal values.
3. Patients having allergy to contrast media.
4. Patients < 20 years and > 60 years of age.

METHODS:

- These patients were scanned using a 64 slice Toshiba Aquilion CT machine.
- Thin slices were made form top of the diaphragm through the ischial tuberosities.
- Scan was acquired at 2.5 X 2.5mm slices.
- The scan was done without contrast when risk of perforation is suspected and with contrast for thin patients and when perforation was not highly suspected.
- The scans were done in the supine position.
- Contrast medium 60-70 cc of non-ionic low osmolar contrast medium (lohexol) was injected intravenously with a flow rate of 3 mL/sec.
- Oral contrast of 1000 mL was given one hour prior to the scan in the form of taking 250 mL every 15 mins.

RESULTS:

In our study, 50 patients with clinically suspected appendicitis were studied. Of which, 28 (56%) were male and 22 (44%) were female patients.

CT and CECT abdomen scans were reported as normal in 11 (22%) patients and abnormal findings were seen in 39 patients (78%).

TABLE 1: SUMMARY OF CECT FINDINGS

CECT FINDINGS	NO OF CASES	PERCENTAGE OF CASES
Acute Appendicitis	11	22%
Appendicolith with appendicular mass	7	14%
Retrocaecal appendix	2	4%
Obstruction due to enterocolith in ceacum	1	2%
Enlarged appendix, without inflammatory changes	13	26%
Other findings:		
1.Hydronephrosis and hydroureter	5	10%
2.Malrotated kidney with low lying urinary bladder	1	2%
3.Lymph nodes in right iliac fossa region	31	62%
4.Hepatomegaly	24	48%
5.Free fluid	33	66%
6.Bilateral Pleural effusion	12	24%
7.Left renal calculus	6	12%

TABLE 2: BASED ON GENDER

TOTAL NO OF PATIENTS	NO OF MALE PATIENTS (%)	NO OF FEMALE PATIENTS (%)
50	28(56%)	22(44%)

CASE FINDINGS:

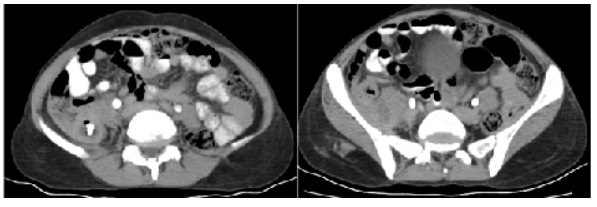

FIGURE 1. APPENDICOLITH WITH INFLAMMATORY APPENDICULAR MASS.

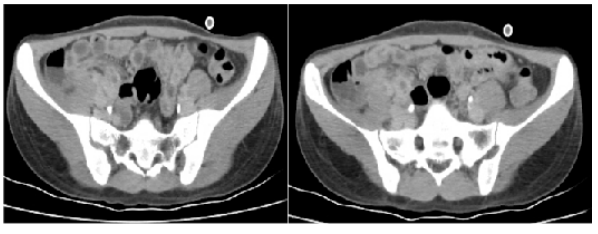

FIGURE 2: ACUTE APPENDICITIS

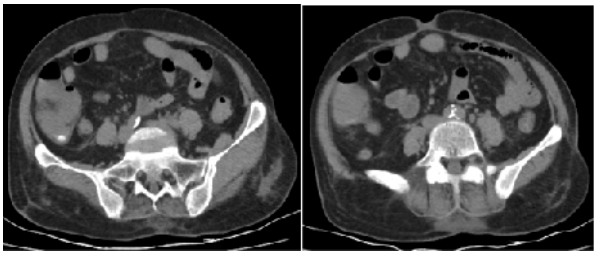

FIGURE 3: RETROCAECAL APPENDIX WITH ENTEROLITH IN CAECUM AT ENTRY OF APPENDIX

DISCUSSION:

CT is more precise than ultrasonography and more reproducible. Appendix diameter is the best single diagnostic criterion for appendicitis on CT scan. A cutoff between 8 and 9 mm provided the best balance of sensitivity/specificity in our study population, whereas a cutoff between 6 and 7 mm improved sensitivity at the expense of specificity.[5]

Factors contributing to false negative diagnosis of acute appendicitis are as follows:[3]

1) Anatomic alterations in the location of the appendix
2) Distal appendicitis
3) Nonopacification of the cecum and distal ileum
4) Paucity of intraabdominal fat
5) Small bowel dilatation or abscess formation
6) Stump appendicitis

CT scan findings of appendicitis are enlargement of the appendix (>10 mm in the outer diameter), hyperenhancement of the appendiceal wall, appendiceal wall thickening (>3 mm), lack of opacification in an enlarged appendix, increased intraluminal fluid, fat stranding in the periappendiceal region, and the presence of an appendicolith within the appendix. The appendicolith may be observed outside the appendix lumen, within an inflammatory mass or in a fluid collection.

A few secondary findings often accompany acute appendicitis. Focal thickening of the cecum may occur. The inflammatory process can be observed to separate the cecal lumen from the base of the appendix or an appendicolith (cecal bar). Contrast medium is observed within the cecum channeling to the point of the appendiceal obstruction (arrowhead sign)[6].

Complications in appendicitis are: [7]
1)Perforation
2)Periappendiceal abscess
3)Peritonitis
4)Bowel obstruction
5)Septic seeding of mesenteric vessels
6)Gangrenous appendicitis

Appendicitis can also be:[7]
a) Recurrent appendicitis refers to repeated episodes of right lower quadrant pain that, after appendectomy, are due to the result of an inflamed appendix.

b) Chronic appendicitis refers to right lower quadrant pain of at least 3 weeks' duration that completely disappears after appendectomy.

Differential diagnosis for appendicitis:[7]
1) Mesenteric adenitis
2) Crohns diseases
3) Epiploic appendagitis
4) Caecal diverticulitis
5) Omental infarction
6) Infectious terminal ileitis
7) Appendiceal mucocoele.

In our study, the male: female ratio was found to be 7: 5. Of 50 total cases,11(22%) cases were evaluated with acute appendicitis, 7(14%) cases were of appendicolith with inflammed appendicular mass, 2(4%) cases were of retrocaecal appendix of which 1 case of retrocecal appendix showed enterolith in caecum at entry of appendix in our study.

13 (26%) cases showed enlarged appendix, but without any inflammatory changes.

Of amongst 7 cases of appendicolith with inflammatory appendicular mass, 1 (2%) case had associated finding of malrotated kidney with low lying bladder.

Secondary findings included in our study lymph nodes in right iliac fossa region in 31(62%) cases, free fluid in 33 (66%) cases, Hepatomegaly in 24(48%) cases , Hydronephrosis and hydroureter in 5 (16%) cases and bilateral pleural effusions in 12 (24%) cases.

REFERENCES:

1. Imaging for Suspected Appendicitis JERRY L. OLD, M.D., REGINALD W. DUSING, M.D., WENDELL YAP, M.D., and JARED DIRKS, M.D. University of Kansas School of Medicine, Kansas City, Kansas.
2. Radiography of acute appendicitis: Nicholas Jospeh; Online Radiography Continuing Education for Radiologic Xray Technologist 1-800-370-0614.
3. The Indian Journal of Radiology and Imaging : Medknow Publications Pictorial essay: CT scan of appendicitis and its mimics causing right lower quadrant pain. Monika Sharma, Anjali Agrawal.
4. Schwartz's Principles of Surgery > Chapter 30. The Appendix. Copyright © The McGraw-Hill Companies.
5. Independent Predictors of acute appendicitis on CT with pathologic correlation. Ives EP, Sung S, McCue P, Durrani H, Halpern EJ, Acad Radiol 2008 aug;15(8):996-1003.doi: 10.1016/j.acra.2008.02.009.PUBMED
6. Appendicitis Imaging UPDATED MAY 19 2016 Author: Lutfi Incesu MD, chief editor: Eugene C Lin MD source: MEDSCAPE
7. CT evaluation of appendicitis and its complications: imaging techniques and key diagnostic findings. Nuno PintoLeite1 JoseM. Periera1Rui Cunha1 Pedro Pinto1,2 Claude Sirlin 1,3 AJRonline