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ROLE OF COMPUTED TOMOGRAPHY IN SUSPECTED ACUTE APPENDICITIS: A STUDY

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ABSTRACT: BACKGROUND: Acute abdomen is one of the most common referral to the emergency radiologist is. In practice acute appendicitis is the most common diagnosis. Acute appendicitis is often considered as a clinical diagnosis and imaging is an adjuvant to it. With the increase in awareness among the layman present day practice it is difficult to convince the patient to undergo surgery when the ultrasound shows non visualization of the appendix. In view of the above, we decided to study the role of Computed Tomography in diagnosing appendix is not detected by ultrasound. **AIMS:** The role of Computed Tomography in diagnosing acute appendicitis when ultrasound cannot visualize the appendix. **METHODS AND MATERIALS:** This was a prospective study done from January 2008 to December 2013 on patients who presented with acute abdomen and had a strong clinical suspicion of appendicitis but on ultrasound appendix could not be visualized. After excluding patients who were managed conservatively and not willing for Computed Tomography the patients were subjected to Computed Tomography and the data was analyzed by percentage frequency. **RESULTS:** During the period 78 patients which were normal on ultrasound and had a strong clinical suspicion of appendicitis and who refused surgery without further imaging confirmations were included in the study.⁶ patients who had normal imaging on CT refused surgery and were managed conservatively. They continued to have symptoms of right iliac fossa discomfort. In the rest 72 patients who underwent CT, 35 patients had evidence of an appendicolith were subjective to surgery there was histological confirmation of appendicitis in 34; 1 had evidence of sub-acute appendicitis, rest of the of the 35 patients whom CT showed no signs of appendicitis; intra-operatively 16 had sand like granular sand like material in the appendiceal lumen and 2 were normal, but histopathological examination showed lymphoid hyperplasia suggesting a chronic insult. All the 72 patients were followed up and were symptom free. **CONCLUSION:** Whenever there is a strong clinical evidence of appendicitis and ultrasound does not pick up any pathology it's worthwhile to consider a Computed Tomography to diagnose the cause of acute abdomen so that negative appendectomy rate can be reduced.

KEYWORDS: CT, Appendix.

BACKGROUND: Acute abdomen is one of the most common referral to the emergency radiologist is in practice acute appendicitis is the most common diagnosis. Appendicitis is often considered as a clinical diagnosis and imaging is an adjuvant to it. With the increase in awareness among the layman present day practice it is difficult to convince the patient to undergo surgery when the ultrasound shows no signs of appendicitis. In view of the above, we decided to study the role of Computed Tomography in diagnosing appendix is not detected by ultrasound.

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AIMS: The role of Computed Tomography in diagnosing appendicitis when there is non-visualization of the appendix on ultrasound.

METHODS AND MATERIALS: This was a study done from January 2008 to December 2013. Patients who presented with acute abdomen and had a strong clinical suspicion of appendicitis but on ultrasound appendix could not be visualized were subjected to Computed Tomography. After excluding patients who were managed conservatively and not willing for Computed Tomography the patients were subjected to Computed Tomography followed by appendectomy and the appendectomy specimens were analyzed histopathologically for the presence of appendicitis and the data was analyzed by percentage frequency.

RESULTS: During the period 78 patients which were normal on ultrasound and had a strong clinical suspicion of appendicitis and who refused surgery without further imaging confirmation was included in the study. 6 patients who had normal imaging on CT refused surgery and were managed conservatively. They continued to have symptoms of right iliac fossa discomfort. In the rest 72 patients who underwent CT, 35 patients had evidence of an appendicolith were subjective to surgery there was histological confirmation of appendicitis in 34; 1 had evidence of sub-acute appendicitis, rest of the of the 35 patients whom CT showed no signs of appendicitis; intra-operatively 16 had sand like granular sand like material in the appendiceal lumen and 2 were normal, but histopathological examination showed lymphoid hyperplasia suggesting a chronic insult. All the 72 patients were followed up and were symptom free.

DISCUSSION: Ultrasound is considered as the initial first-line imaging modality of choice in diagnosing acute abdomen.¹ Bassler et al reported that goal-directed abdominal US, "Significantly impacts diagnostic, treatment, and disposition certainty."² Each investigation has its own limitation. In ultrasound a heavy built with lot of abdominal fat and Bowel gas are the most important hurdles in visualising the appendix.³

Appendix being an organ which is fixed only at one end can have variable positions. The location of the normal appendix was classified into 4 groups by site on the appendiceal tip according to the classification of Wakeley⁴ and Baldisserotto and Marchiori⁵ as follows abdominal when the tip is in the abdominal cavity; pelvic when the tip extending to the pelvis; Retrocecal when the tip is posterior to the cecum; and midline extension, extending to the midline without extending to the pelvis. The most descending intraperitoneal (31–74%) and retrocecal (26–65%) locations are the common ones.^{6,7} Retrocecal appendix is the most common appendix which has a high chance of being obscured.⁸ In case of doubt non – visualization of an appendix does rule out the possibility of.⁹

Acute appendicitis is the most challenging surgical emergencies a delay or misdiagnosis can give rise to complications like the appendiceal perforation and peritonitis¹⁰ The accuracy of sonography is around 90% in acute abdomen¹¹⁻¹⁴ and between 71–98% for acute appendicitis.¹⁵⁻¹⁸ CT misses fewer cases than ultrasound, but both ultrasound and CT can reliably detect common diagnoses causing acute abdominal pain.¹³

Multiple imaging modalities can be used to diagnose, but the favored modality of choice is the helical CT scan as it has a high degree of diagnostic accuracy.¹⁹ In today's practice in acute abdomen, even in the presence of classical signs no patient will be willing to undergo surgery even if explained

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the high morbidity of its complications.²⁰ As CT is a better modality of choice in investigating acute appendicitis ²⁰ we studied the role of CT in diagnosing not detected by ultrasound and compared our findings, our findings have a higher percentage in comparison to other studies probably due to the advances in ultrasound technology that have helped reduce the error of missing an appendix due to better resolution.

Study	Result- a nonvisualized appendix on USG had acute, appendicitis
Paul et al ⁵	2%
Estey et al ²¹	8.8%
Our study	44.87%

CONCLUSION: Whenever there is a strong clinical evidence of appendicitis and ultrasound does not pick up any pathology it's worthwhile to consider a CT to diagnose the cause of acute abdomen including for acute so that negative appendectomy rate can be reduced. The role of CT in recurrent and subacute appendicitis is not much but in acute cases it is highly sensitive in reducing the negative appendectomy rates.

REFERENCES:

1. Laméris W, Randen A, Es HW, et al. Imaging strategies for detection of urgent conditions in patients with acute abdominal pain: diagnostic accuracy study. *BMJ*. 2009;338:b2431.
2. Bassler D, Snoey ER, Kim J. Goal-directed abdominal ultrasonography: impact on real-time decision making in the emergency department. *J Emerg Med*. 2003 May; 24(4):375-8.
3. Eber J, Villaseñor C. Ultrasound: advantages, disadvantages, and controversies. . *Nurse Pract Forum*. 1991 Dec; 2 (4):239-42.
4. Wakeley CP. The position of the vermiform appendix as ascertained by an analysis of 10,000 cases. *J Anat* 1933; 67:277-283.
5. Baldisserotto M, Marchiori E. Accuracy of noncompressive sonography of children with according to the potential positions of the appendix. *AJR Am J Roentgenol* 2000; 175:1387-1392.
6. Seddique M, Eqbal P, Rajput A, Kumar r. Atypical presentation of: diagnosis and management. *Journal of Surgery Pakistan* 2009;14 (4): 157-60.
7. Kazemier G, Bijnen AB, Schilthuis MS. Pelvic inflammatory disease. *Integrated Med Surg Gastroenterology* 2004; 338-45.
8. Meyers MA, Oliphant M. Ascending retrocecal. *Radiology* 1974; 110: 295-9.
9. Nikolaidis P, Hwang CM, Miller FH, Papanicolaou N. The nonvisualized appendix: incidence of acute when secondary inflammatory changes are absent. *AJR Am J Roentgenol*. 2004 Oct; 183(4):889-92.
10. Carr NJ. The pathology of acute. *Annals of Diagnostic Pathology* 2000 Feb 4 (1): 46-58.
11. Hoffmann J, Rasmussen OO. Aids in the diagnosis of acute. *Br J Surg* 1989, 76(8):774-9.
12. Ohmann C, Yang Q, Franke C. Diagnostic scores for acute: Abdominal Pain Study Group. *Eur J Surg* 1995, 161(4):273-81
13. Pickuth D, Heywang-Kobrunner SH, Spielmann RP. Suspected acute: is ultrasonography or computed tomography the preferred imaging technique? *Eur J Surg* 2000, 166(4):315-9.

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14. Rao PM, Boland GW. Imaging of acute right lower abdominal quadrant pain. Clin Radiol 1998, 53(9):639-49
15. McGrath FP, Keeling F. The role of early sonography in the management of the acute abdomen. Clin Radiol 1991, 44(3):172-4
16. Moberg AC, Ahlberg G, Leijonmarck CE, Montgomery A, Reiertsen O, Rosseland AR, Stoerksson R. Diagnostic laparoscopy in 1043 patients with suspected acute .Eur J Surg 1998, 164(11): 833-41.
17. Allemann F, Cassina P. Ultrasound scans done by surgeons for patients with acute abdominal pain; a prospective study. Eur J Surg 1999, 165(10):966-970
18. Binnebösel M, Otto J, Stumpf M, Mahnken AH, Gassler N, Schumpelick V, Truong S. Acute. Modern diagnostics–surgical ultrasound. Chirurg 2009, 80(7):579-587
19. Adrienne VR, Wytze LH. Wouter VE, Hans PM. Bert VR, Wim HT, et al. A comparison of the Accuracy of Ultrasound and Computed Tomography in common diagnoses causing acute abdominal pain. Eur Radiol. 2011 July; 21(7): 1535–1545.
20. Stoker J, Randen A, Laméris W, Boormeester MA. Imaging patients with acute abdominal pain. Radiology. 2009; 253:31–46.
21. Estey A, Poonai N, Lim R. Appendix not seen: the predictive value of secondary inflammatory sonographic signs. Pediatr Emerg Care. 2013 Apr; 29 (4):435-9.

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Estey et al ²¹	8.8%
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TABLE – 1: COMPARISION OF OUR STUDY WITH OTHER STUDIES

Figure 1: The percentage of appendicolith showed on ct in whom usg was normal

Figure 2: Appendicitis ct and intra-operative correlation

Figure 3: Appendicolith in CT

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