



ROLE OF ULTRASONOGRAPHY AND MULTI DETECTOR COMPUTED TOMOGRAPHY IN EVALUATING CAUSES OF RIGHT ILIAC FOSSA PAIN.

Radiodiagnosis

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ABSTRACT

Aim: To assess the role of USG and MDCT in diagnosing the etiology of acute right lower quadrant pain and to suggest the mode of management. **Material and Methods:** 100 patients were studied in the Post Graduate Department of Radio-diagnosis and Imaging, Government Medical College, Jammu over a period of one year. All patients presenting with acute right lower quadrant pain were included in the study except; (i) who refused to give consent, (ii) who had documented allergic reaction to contrast material, (iii) multiple myeloma patients, (iv) pregnant females and (v) patients having renal impairment. An adequate history was elicited, followed by a focused clinical examination and relevant ancillary investigations of every patient was done prior to USG and MDCT. An attempt made to compare MDCT findings with clinical, ultrasound and operative findings wherever surgery was done. **Results:** A total of 100 patients (54 male & 46 female) were included in study with 65% of them falling between 21-40 years age group (Range 12-70 years) who had undergone both ultrasound and MDCT for RLQ pain. Besides abdominal pain the associated symptoms in the study group were fever (57%), vomiting (39%), anorexia (15%), weight loss (15%) and diarrhea (2%). Acute appendicitis (25%), appendicular lump (16%), ileocecal tuberculosis (15%), urolithiasis (11%) were the commonly seen pathologies. **Conclusion:** MDCT has diagnostic advantages in bowel pathologies like appendicular inflammation, ileocecal tuberculosis, right-sided colitis with or without abscess formation, pathologies and ureteric stones. USG is equally good to MDCT in diagnosing mesenteric lymphadenitis, intussusceptions and various gynecological causes of right lower quadrant pain. MDCT however is associated with hazardous radiation exposure and may be reserved for patients with non-diagnostic USG results, making USG the first line investigation

KEYWORDS

Right iliac fossa pain, right lower quadrant pain, appendicitis, torsion

INTRODUCTION

Right lower quadrant abdominal pain is one of the most common causes of patient's visit to the emergency department. Although appendicitis is the most common cause of acute right lower quadrant pain, a broad spectrum of common and uncommon entities may mimic acute appendicitis both clinically and on diagnostic imaging, thereby creating a diagnostic challenge. Pathologic conditions involving the ileocecal area beyond appendicitis are responsible for a significant percentage of surgical admissions of patients who present with acute right lower quadrant pain. They include inflammatory processes, infectious diseases, benign and malignant tumors, and miscellaneous conditions like cecal ischemia, typhilitis, omental infarct, cecal volvulus, ureteric calculi, mid cycle pain, ovarian torsion etc. (1) and diverticulitis, pelvic abscess, appendicitis, pseudomembranous colitis, intestinal hemorrhage, and typhlitis conditions like in the immunocompromised host (2). The aim of our study was to assess the role of USG and MDCT in diagnosing the etiology of acute right lower quadrant pain and to suggest the mode of management.

MATERIALS AND METHODS

This prospective study was carried out in the Post Graduate Department of Radio-diagnosis and Imaging, Government Medical College, Jammu over a period of one year. All patients presenting with acute right lower quadrant pain were included in the study except; (i) who refused to give consent, (ii) who had documented allergic reaction to contrast material, (iii) multiple myeloma patients, (iv) pregnant females and (v) patients having renal impairment. An adequate history was elicited, followed by a focused clinical examination and relevant ancillary investigations of every patient was done prior to USG and MDCT. A brief account of the procedure was explained to the patient with the emphasis on reassuring them prior to the procedure. Informed and written consent was taken from the patients/attendants.

Ultrasound was performed with patient in supine position and using Samsung SonoAce R7 machine in the same setting with a curvilinear (3-5 MHz) and linear array multi frequency (7-10 MHz) transducer. MDCT was performed in 256-slice MDCT Somatom Definition Flash (Siemens Healthcare, Forchheim, Germany) with 120 Kvp and 150-

350mAs and pitch of 0.6. Images were reconstructed at 1mm thickness and large FOV in cranio-caudal direction from the level of the Xiphisternum to pubic-symphysis before and after administration of oral (10-20ml water soluble contrast in 500-1000ml distilled water) and intravenous non-ionic iodinated contrast of 1.5-2ml/kg dose @ 3-4ml/s. An attempt was made to compare MDCT findings with clinical, ultrasound and operative findings wherever surgery was done.

RESULTS

A total of 100 patients (54 male & 46 female) were included in study with 65% of them falling between 21-40 years age group (Range 12-70 years) who had undergone both ultrasound and MDCT for RLQ pain. Besides abdominal pain the associated symptoms in the study group were fever (57%), vomiting (39%), anorexia (15%), weight loss (15%) and diarrhea (2%). Acute appendicitis (25%), appendicular lump (16%), ileocecal tuberculosis (15%), urolithiasis (11%) were the commonly seen pathologies. Table 1. enumerates rest of the pathological conditions that were diagnosed in our study.

Table No 1: Various pathologies detected are tabulated.

S. No	Pathology	Frequency	Percentage (%)
1	Acute appendicitis	25	25%
2	Appendicular lump	16	16%
3	Ileocecal tuberculosis	15	15%
5	Colitis and Abscess	10	10%
6	Ovarian dermoid with torsion	02	02%
7	Urolithiasis	11	11%
8	Intussusception	03	03%
10	Hemorrhagic cyst	03	03%
11	Mesenteric lymphadenitis	05	05%
12	Endometriotic cyst	03	03%
13	Ovarian torsion	07	07%
	TOTAL	100	100

Acute Appendicitis and Appendicular Lump: Total of 41 patients had appendicular inflammation as the cause of RLQ pain. Most common sonographic feature were (a) probe tenderness (100%), (b) non-

compressible, aperistaltic tubular blind gut loop with thickness more than 6 mm (85%), (c) periappendiceal fat inflammation (80%). 4/41 patients (10%) elicited only probe tenderness in RIF and appendix was not visualized. MDCT could diagnose inflamed appendix in all the patients (100%) as thickened enhancing blind gut loop. Rest of the findings noted on MDCT were periappendiceal stranding (89%), appendicolith (57%), thickened caecum & terminal ileum (54%), of which 16 had appendicular lump formation, and focal perforation (14%). MDCT also was helpful in 2 patients (5%) who were given ultrasound diagnosis of hemorrhagic cyst as cause of pain, but had mild acute appendicitis on MDCT.

Ileocecal tuberculosis: 15 of 100 patients with right lower quadrant pain had features of ileocecal tuberculosis. Ultrasound findings included ascites (100%), mesenteric lymphadenopathy (93%) and ileocecal thickening (60%). MDCT findings in these patients included enhancing mural ileocecal thickening and surrounding fat stranding (100%), ascites (100%) and peripherally enhancing mesenteric lymph nodes (93%).

Urolithiasis: 11% of the patients had lower ureteric calculi and upstream hydronephrosis as the cause for their pain. Ultrasound could demonstrate hydronephrosis (100%) and ureteric calculus (8/11, 72%), while MDCT easily revealed hyperdense calculus with proximal hydronephrosis in all the patients. 3 (27%) patients also had mild associated pyelonephritis with ureteritis, which was picked up on MDCT only.

Right colitis and diverticulitis: 10% of the patients had right-sided colitis and diverticulitis with 6 of them having RIF abscesses. Ultrasound demonstrated cecal and ascending colonic wall thickening and fat inflammation (100%) and localized collection in RIF (4/6 patients, 67%). MDCT could easily differentiate these cases from appendicular inflammation, which was difficult with ultrasound. Enhancing mural thickening with surrounding fat stranding was noted in all (100%), with 2 of these patients having diverticular disease and diverticulitis and 6 had a peripherally enhancing localized collection. 2 of the collections had air-fluid levels and these were missed on ultrasound due to poor sonographic evaluation beyond the air.

Mesenteric lymphadenitis: 5% patients with mesenteric lymphadenitis presented with RLQ pain. Ultrasound revealed enlarged ileocecal mesenteric nodes with no signs of appendicitis (100%) and mild circumferential thickening of terminal ileum (40%). MDCT also revealed similar findings i.e. enlarged mesenteric nodes with normal appendix (100%) and mild circumferential thickening of terminal ileum (60%).

Intussusception: Only 3 patients had intussusception that was easily demonstrated as target like lesion with internal crescent of hyperechoic mesentery on ultrasound. MDCT also revealed intussusceptum with an accompanying complex of mesenteric fat and blood vessels surrounded by thick walled intussusciptions. Both ultrasound and MDCT could easily pick the Payer's patches in one of the patients, no leading cause was identified in rest two.

Gynaecological causes: Gynecological causes of RLQ pain in our study group included ovarian torsion (7%), hemorrhagic cyst (3%), endometriotic cyst (3%) and ovarian dermoid with torsion (2%). In cases of ovarian torsion, ultrasound showed enlarged, edematous ovary with peripherally arranged cystic areas, minimal surrounding free fluid, deviation of uterus and no colour flow on color Doppler. Additionally CT could pick up 2 cases of torsion with dermoid cyst as the cause. Hemorrhagic cysts and endometriotic cysts were also easily diagnosed on ultrasound. MDCT was performed in these to rule out mild acute appendicitis that was picked up on 2 patients with coexistent hemorrhagic cyst.

DISCUSSION

Acute right lower quadrant (RLQ) abdominal pain is a common chief complain in clinical practice and the differential diagnosis of acute RLQ pain includes a broad spectrum of clinical entities that range from benign self-limited disorders to illnesses associated with high morbidity, requiring the clinician to make an urgent therapeutic decision. Prompt diagnosis is essential to minimize morbidity, which remains substantial if a complication occurs.

A total of hundred patients presenting with acute right lower quadrant

abdominal pain were subjected to USG and MDCT after making a detailed examination, seeing laboratory and clinical diagnosis.

Most common cause for acute pain in our study group was appendicular inflammation. Most common associated symptoms with RLQ pain were vomiting and fever. In our study, USG could pick up thickened appendix in 85% cases and periappendiceal fat inflammation in 80% cases which were consistent with studies by various authors (3-5). MDCT scored over USG in detecting acute appendicitis in 6 patients, 4 of which had normal sonography and 2 of which were diagnosed with right hemorrhagic cyst. MDCT in our study could diagnose all the patients with thickened appendix or lump formation which was in accordance to study by Rao PM et al. (6) which shows 91% to 100% sensitivity for CT in the diagnosis of appendicitis. In our study group, small bowel thickening due to ileocecal tuberculosis was accurately picked up on MDCT in all patients, however USG could pick up bowel wall thickening in only 60% of these cases. Similar disparity has been reported by many authors (7), however, associated ascites was easily seen on both USG and MDCT.

In 11 patients with urolithiasis, hydronephrosis was noted on both USG and MDCT, but USG missed lower ureteric calculi in 3 patients which were easily diagnosed on MDCT. Also associated mild pyelonephritis was noted in 3 of these patients in MDCT which was again missed on USG. Advantage of MDCT over USG to diagnose small calculi is well known in literature (8) and some authors have also proposed thin slices image reconstruction to identify even sub-millimetre calculi⁽⁹⁾.

Bowel pathologies like right-sided colitis, diverticulitis and associated abscess formation, mesenteric adenitis and intussusception. Large bowel inflammation and associated abscesses were better diagnosed on MDCT than USG which in our study missed 2 air containing abscess collection. In our study there were 3 cases of mesenteric lymphadenitis, homogeneously enhancing and clustered in the right lower quadrant small bowel mesentery or ventral to psoas muscle seen on USG and MDCT consistent with known literature (10). 3 patients in our study were easily diagnosed with intussusception on both MDCT & USG and were surgically confirmed. Payers patches as leading point could be picked up on both modalities, features consistent with studies⁽¹¹⁻¹²⁾.

Gynaecological conditions contributed to 28 (28%) cases in our study. In our study the most common appendicitis mimic was ovarian torsion accounting to 14/100 (14%). This was correctly diagnosed on USG in all the patients, however MDCT only helped in 2 of these patients to detect associated dermoid cysts. This advantage of MDCT to even small foci of fat (i.e. a consistent feature of ovarian dermoid) is well known⁽¹³⁾.

Other gynaecological causes in our study group were hemorrhagic cysts and endometriotic cysts which were easily diagnosed on USG alone with no additional information on MDCT. This also emphasizes the importance of undertaking an extended abdominal and pelvic sonographic study in female patients of reproductive age group who present with acute RLQ pain, to rule these gynaecological causes.

In conclusion, USG and MDCT has significant role in evaluation of right iliac fossa pathologies, supplementing and adding to clinical diagnosis and lab investigations. MDCT has diagnostic advantages in bowel pathologies like appendicular inflammation, ileocecal tuberculosis, right-sided colitis with or without abscess formation, pathologies and ureteric stones. USG is equally good to MDCT in diagnosing mesenteric lymphadenitis, intussusceptions and various gynecological causes of RLQ pain. MDCT however is associated with hazardous radiation exposure and may be reserved for patients with non-diagnostic USG results, making USG the first line investigation.

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