



ROLE OF NON CONTRAST COMPUTER TOMOGRAPHY IN EVALUATION OF ABDOMINAL PATHOLOGY

Medical Science

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KEYWORDS

INTRODUCTION

Abdominal non-contrast computed tomography (NCCT) is a vital diagnostic imaging tool that provides cross-sectional images of abdominal organs and structures without the use of intravenous contrast media. This modality plays a pivotal role in evaluating a wide range of acute and chronic abdominal conditions, particularly in scenarios where contrast use is contraindicated.

1. Trauma Evaluation:

NCCT is widely used in the initial assessment of abdominal trauma. It allows for rapid identification of solid organ injuries (e.g., liver, spleen, kidneys) and detection of retroperitoneal haemorrhage, free fluid, or pneumoperitoneum.

2. Urological and Nephrological Disorders:

- o Renal Colic and Urolithiasis: NCCT is the gold standard for detecting urinary tract calculi due to its high sensitivity and specificity, even for radiolucent stones.
- o Renal Impairment Cases: Since contrast media can worsen renal function, NCCT provides a safe alternative for imaging patients with existing renal insufficiency.

3. Acute Abdominal Pain:

NCCT can help diagnose causes of acute abdomen such as appendicitis, diverticulitis, bowel obstruction, or perforation when contrast cannot be administered. It is particularly useful when a quick, initial assessment is required.

4. Oncology and Postoperative Evaluation:

Although contrast-enhanced CT is generally preferred for tumor delineation and vascular assessment, NCCT may still be used for detecting masses, assessing postoperative complications, or follow-up when contrast is contraindicated.

5. Allergy to Contrast Agents:

NCCT is a safe alternative for patients with documented contrast allergies, helping avoid potentially life-threatening reactions.

Advantages of NCCT Abdomen:

- **Non-invasive and Rapid:** Typically completed within minutes.
- **No Need for Contrast:** Minimizes risk in sensitive populations.
- **Widely Available:** Accessible in most emergency and radiology departments.
- **Cost-effective:** Generally, less expensive than contrast-enhanced studies.

Limitations

- **Reduced Soft Tissue Contrast:** Less effective at distinguishing vascular or inflammatory changes.
- **Limited Vascular Visualization:** Vessels and ischemic conditions may be missed without contrast.
- **Not Ideal for Tumor Staging:** May not clearly define tumor margins or involvement.

While contrast-enhanced CT remains superior for detailed vascular and soft tissue imaging, abdominal NCCT holds a crucial role in emergency medicine, nephrology, and situations requiring rapid, contrast-free imaging. It continues to be an indispensable tool in

frontline diagnostics, especially where safety and speed are paramount.

Aim

- Role of NCCT in the evaluation of abdominal pathologies

Objectives:

- Diagnosing ACUTE Conditions such as appendicitis, pancreatitis, and bowel obstructions.
- Detecting Kidney Stones (precisely locating and determining the size of kidney stones).
- Monitoring Chronic Diseases (such as tracking changes in abdominal organs and detecting complications).¹

Methodology

Study Design: Descriptive and cross-sectional type of study.

- **Study Place:** The proposed study will be carried out in the Radiology Department.
- **Subjects Investigated:** 50 patients undergo CT with suspected abdominal pathologies will be included.

Procedure of Measurement: Data collection will be analysed and described by using descriptive statistical tools, frequencies, mean and percentage.

Methods of Data Collection:

- **Study Design** – A prospective co-relation study will be conducted over a period of 6 months on 50 patients with abdominal pathologies.
- **Sensitivity and Specificity**– Research hypothesis and statistical methods will be framed in consultation with biostatistician.

Sampling Method:

1. The data will be collected by observing radiological procedures of the patients.
2. An informed consent form will be filled from each patient prior to the examination for research purpose.

Study Variables: Demographic –according to age group, sex, types of abdominal pathologies, CT characteristic features.

Duration of Study: 6 months

Inclusion Criteria: In this study following category patients will be included:

- OPD
- IPD
- Abdominal Pathologies
- Patients Of Different Age Groups
- Co-operative Patients.

Exclusion Criteria: Following category patients will be excluded:

- Uncooperative patients (psychological illness)
- Pregnant patients
- MLC

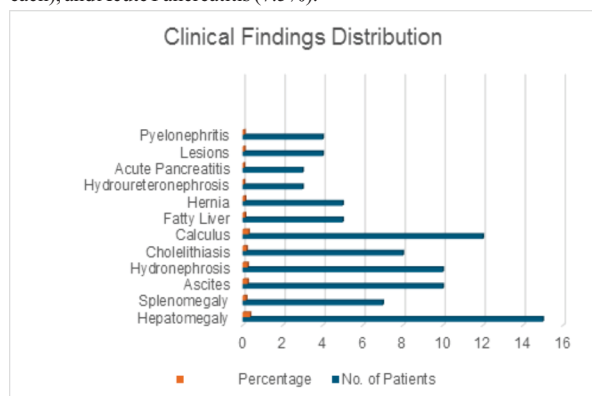
According to the study, more than half of the patients (40%) are over 60 years, suggesting that the frequency is higher in the elderly. Significantly more instances (32.5%) occur in adult categories (41-60

years), whereas a lesser number (27.5%) occur in shorter age groups (10-40 years). In the 10-20 years group, the fewest cases are found (2.5%).

Table – 1.1 Distribution Of Patients According To Clinical Indications

CLINICAL INDICATIONS	No. OF CASES	PERCENTAGE
Abdominal Pain	39	97.5%
Nausea	26	65%
Vomiting	13	32.5%
Fever	12	30%
Flank Pain	23	57.5%
Fatigue	6	15%

With 97.5% of cases, abdominal pain was the most prevalent symptom of the patient's illness. Fatigue, fever, nausea, vomiting, and flank discomfort were among the other typical symptoms. Fatigue was the least common, but flank pain and nausea were more prevalent. This clinical data outlines the prevalence of various medical conditions among patients. Hepatomegaly is the most common, affecting 37.5% of cases, followed by conditions like Ascites (25%) and Calculus (30%). Less frequent findings include Fatty Liver, Hernia (12.5% each), and Acute Pancreatitis (7.5%).



Figure–1.1 Bar Diagram Showing Patients Distributed According To Clinical Findings

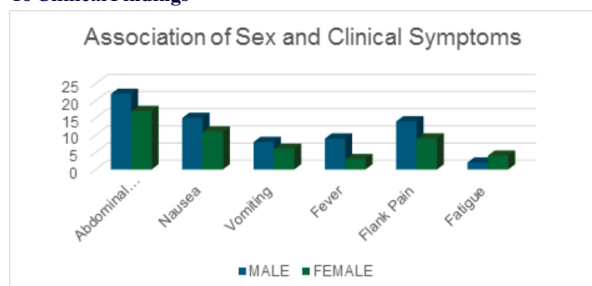


Figure – 1.2 Column Showing Association Of Sex And Clinical Symptoms

Figure 1.2 represents the prevalence of clinical symptoms by gender. Abdominal pain is the most common symptom in both males (55%) and females (42.5%). Nausea, vomiting, and fever are more frequent in males, while fatigue is slightly more common in females (10% vs. 5%). Flank pain is reported more by males (35%) than females (22.5%). Overall, symptoms tend to be more prevalent in males.

RESULT

The study shows abdominal pathologies are more common in older adults, with 40% of cases in those over 60. Males have a slightly higher prevalence (1.22:1). Abdominal pain is the most frequent symptom (97.5%), followed by nausea, vomiting, and flank pain. Hepatomegaly (37.5%), ascites (25%), and renal calculi (30%) are most common. Middle-aged individuals (31-60 years) have higher rates of cholelithiasis, lesions, and hydronephrosis, while younger patients are more prone to hydronephrosis. Gender differences exist, with males experiencing more hepatomegaly and hydronephrosis, while females have higher cases of cholelithiasis and fatty liver. These findings reinforce NCCT's role in efficient abdominal diagnosis.

DISCUSSION

Our study confirms non-contrast computed tomography (NCCT) as a reliable tool for diagnosing various abdominal conditions with high accuracy and minimal radiation exposure. Consistent with previous research, NCCT effectively detects hepatomegaly, ascites, renal calculi, and early-stage cancers. It also plays a crucial role in identifying unexpected abnormalities, gender-specific trends, and emergency cases. Findings from studies like the Yorkshire Kidney Screening Trial, Parida, Cullen, Kravchick, and Gavrielli further reinforce NCCT's diagnostic value. Its rapid, non-invasive nature makes it indispensable in both routine and emergency assessments.

CONCLUSION

Our study confirms non-contrast computed tomography (NCCT) as a reliable, low-radiation tool for diagnosing abdominal conditions, including hepatomegaly, ascites, and renal calculi. It aligns with previous research, supporting NCCT's role in early cancer detection, nephrolithiasis diagnosis, and identifying incidental findings. Additionally, our findings highlight gender-specific trends and its effectiveness in emergency cases. Overall, NCCT is a rapid, precise, and indispensable imaging technique for both routine and urgent medical evaluations.

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