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Study Of Ultrasonography Role In Abdominal Pain Cases In Adults At Tertiary Care Hospital.

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ABSTRACT

Our retrospective study aimed to assess the role of ultrasonography in the diagnosis of abdominal pain in adults by investigating demographic characteristics, clinical presentations, ultrasonography findings, common causes of abdominal pain, and the diagnostic accuracy of ultrasonography. A sample of 50 adult participants with abdominal pain was analyzed over a one-year period. Demographic data, clinical presentations, and ultrasonography findings were collected from electronic health records. Common causes of abdominal pain were identified, and the diagnostic accuracy of ultrasonography was evaluated using sensitivity, specificity, positive predictive value, negative predictive value, and overall accuracy. Ultrasonography revealed gallbladder pathologies (40%), liver abnormalities (30%), renal abnormalities (36%), and various gastrointestinal findings (24%). Gallstones were the most common cause of abdominal pain (36%). Ultrasonography demonstrated high sensitivity (85%) and specificity (90%), with an overall accuracy of 88%. Ultrasonography emerges as a valuable diagnostic tool for abdominal pain in adults, offering a comprehensive evaluation of multiple organ systems. The high diagnostic accuracy, particularly in identifying gallstones, supports its integration into routine clinical practice.
Keywords: Ultrasonography, abdominal pain, diagnostic accuracy, gallstones.

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INTRODUCTION

Abdominal pain is a common clinical symptom with diverse etiologies, presenting a diagnostic challenge for healthcare providers [1]. In view of accurate and non-invasive diagnostic modalities, ultrasonography has emerged as a valuable tool in the assessment of abdominal pain in adults [2]. This imaging technique utilizes high-frequency sound waves to produce real-time images of internal organs, providing detailed anatomical information without exposing patients to ionizing radiation. In recent years, the application of ultrasonography in abdominal pain cases has expanded, offering a dynamic and cost-effective means of evaluating organs such as the liver, gallbladder, kidneys, and gastrointestinal tract [3]. The versatility of ultrasonography makes it particularly useful for identifying common causes of abdominal pain, such as gallstones, appendicitis, and liver pathologies [4]. This research work explores the role of ultrasonography in enhancing diagnostic precision, guiding timely interventions, and ultimately improving patient outcomes in the context of abdominal pain in adults.

METHODOLOGY

This retrospective study, conducted over a one-year period, aimed to investigate the role of ultrasonography in adult patients presenting with abdominal pain. The study included a sample size of 50 patients, whose medical records and imaging reports were retrospectively analyzed to gather relevant data. The patient selection criteria encompassed individuals aged 18 years and above who had undergone ultrasonography for abdominal pain assessment during the specified one-year timeframe.

Data collection involved a thorough review of electronic health records, including patients' demographic information, clinical history, presenting symptoms, and ultrasonography findings. The ultrasonography reports were assessed for diagnostic outcomes related to various abdominal organs, with a focus on identifying common causes of abdominal pain. The retrospective nature of the study allowed for an in-depth examination of cases, offering insights into the effectiveness of ultrasonography as a diagnostic tool.

Statistical analysis was performed on the collected data to derive descriptive statistics, including frequencies and percentages, providing a comprehensive overview of the prevalence of different etiologies detected through ultrasonography. This retrospective methodology facilitated the exploration of trends and patterns in the utilization of ultrasonography for abdominal pain cases, contributing valuable insights into its diagnostic significance in the adult population.

RESULTS

Table 1: Demographic Characteristics of Study Participants

Demographic Variable	Total Participants (n=50)
Age (years)	37.5 ± 8.12
Gender	Male: 25 (50%)
	Female: 25 (50%)

Table 2: Clinical Presentation of Abdominal Pain

Clinical Variable	Total Participants (n=50)
Presenting Symptoms	Pain (100%)
Duration of Abdominal Pain	7.4 ± 3.2 days

Table 3: Ultrasonography Findings

Ultrasonography Variable	Total Participants (n=50)
Gallbladder Pathologies	20 (40%)
Liver Abnormalities	15 (30%)
Renal Abnormalities	18 (36%)
Gastrointestinal Findings	12 (24%)

Table 4: Common Causes of Abdominal Pain Identified Through Ultrasonography

Diagnosis	Frequency (%)
Gallstones	18 (36%)
Appendicitis	10 (20%)
Liver Cirrhosis	8 (16%)
Renal Calculi	12 (24%)
Gastrointestinal Disorders	5 (10%)

Table 5: Diagnostic Accuracy of Ultrasonography

Diagnostic Measure	Value
Sensitivity	85%
Specificity	90%
Positive Predictive Value	80%
Negative Predictive Value	92%
Accuracy	88%

DISCUSSION

The present study aimed to investigate the role of ultrasonography in assessing abdominal pain in adults, utilizing a retrospective approach with a sample size of 50 participants over a one-year duration.

The demographic profile of the study participants revealed a balanced distribution across gender, with an equal representation of males and females. The mean age of 37.5 ± 8.12years suggests that the study cohort is relatively young, reflecting the commonality of abdominal pain in the adult population. This demographic diversity enhances the generalizability of the study findings to a broader adult demographic [2-5].

The clinical presentation of abdominal pain is a critical aspect of patient assessment. In this study, all participants presented with abdominal pain as their primary symptom. The mean duration of pain was 7.4 days, indicating that patients sought medical attention within a relatively short timeframe. This finding underscores the significance of prompt evaluation and highlights the need for accurate diagnostic modalities to expedite appropriate interventions [6-8].

Ultrasonography, a non-invasive imaging technique, played a role in elucidating the etiology of abdominal pain in the study cohort. The most prevalent ultrasonography findings included gallbladder pathologies, liver abnormalities, renal abnormalities, and various gastrointestinal findings. Notably, gallbladder pathologies were identified in 40% of the participants, signifying the importance of assessing this organ in the context of abdominal pain. Liver abnormalities and renal abnormalities were also notable, emphasizing the comprehensive nature of ultrasonography in evaluating multiple organ systems simultaneously.

The identification of common causes of abdominal pain through ultrasonography provided valuable insights into the diagnostic utility of this imaging modality. Gallstones emerged as the leading cause, affecting 36% of the participants. This finding aligns with the known association between gallstones and abdominal pain, emphasizing the sensitivity of ultrasonography in detecting such pathologies. Appendicitis, liver cirrhosis, renal calculi, and gastrointestinal disorders were also identified, showcasing the diverse range of conditions contributing to abdominal pain in the adult population [9].

The diagnostic accuracy of ultrasonography was assessed through sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy. The sensitivity of 85% indicates that ultrasonography successfully identified 85% of true positive cases among those with abdominal pain. Specificity, at 90%, highlights the ability of ultrasonography to correctly exclude individuals without the condition, minimizing false positives. The PPV of 80% and NPV of 92% provide insights into the likelihood of a positive or negative ultrasonography result accurately predicting the

presence or absence of the identified conditions. The overall accuracy of 88% reinforces the reliability of ultrasonography as a diagnostic tool for abdominal pain in adults [10, 11].

These findings underscore the significance of ultrasonography in the diagnostic algorithm for abdominal pain in adults. The high sensitivity and specificity values indicate the efficacy of ultrasonography in both detecting and ruling out common causes of abdominal pain. The identification of gallstones as a predominant cause aligns with existing literature, emphasizing the clinical relevance of ultrasonography in gallbladder assessment. The ability to concurrently evaluate multiple organ systems, such as the liver, kidneys, and gastrointestinal tract, further enhances the efficiency of ultrasonography in comprehensive abdominal pain assessments [12-15].

CONCLUSION

In conclusion, this study contributes valuable insights into the role of ultrasonography in the assessment of abdominal pain in adults. The comprehensive analysis of demographic characteristics, clinical presentations, ultrasonography findings, common causes of abdominal pain, and diagnostic accuracy collectively underscores the significance of ultrasonography as a reliable and non-invasive imaging modality.

REFERENCES

[1]   Diethelem AG. The acute abdomen. In: Sabiston DC jr. (ed.) Sabiston Textbook of surgery. Philadelphia: Saunders;1986. p.790-809.
[2]   Mulmi S, Vaidya Shrestha M, Pradhan S. Abnormal Ultrasonographic Findings among Referred Patients with Pain Abdomen in the Radiology Department of a Tertiary Care Center: A Descriptive Cross-sectional Study. J Nepal Med Assoc 2021;59(243):1102-1105.
[3]   Miranda A. In: Abdominal Pain [Internet]. Elsevier Kliegman RM, Lye PS, Bordini BJ, Toth H, Basel D, editors. Amsterdam (US): Elsevier; 2018. [2021 Jun 10;]. pp. 161–81
[4]   Lameris W, van Randen A, van Es HW, van Heesewijk JP, van Ramshorst B, et al. Imaging strategies for detection of urgent conditions in patients with acute abdominal pain: diagnostic accuracy study. BMJ 2009;338:b2431.
[5]   Stoker J, Randen AV, Lameris W, Boermeester MA. Imaging patients with acute abdominal pain. Radiology 2009;253(1):31-46.
[6]   Puylaert JB, Rutgers PH, Lalisang RI, de Vries VC, Van der Werf SD, Dorr JP, et al. A prospective study of ultrasonography in the diagnosis of appendicitis. N Engl J Med 1987;317(11):666– 9.
[7]   Prasad H, Rodrigues G, Shenoy R. Role of ultrasonography in nontraumatic acute abdomen. The Internet Journal of Radiology 2007;5(2):1-2.
[8]   Allemann F, Cassina P, Rothlin M, Largiader F. Ultrasound scans done by surgeons for patients with acute abdominal pain: a prospective study. Eur J Surg 1999;165(10):966– 70.
[9]   KC S, De A, Pathak M, Sathian B. Diagnostic Role of Ultrasonography in Acute Appendicitis: A Study at a Tertiary Care Hospital. American Journal of Public Health Research 2015;3(5A):23–8.
[10]   Tauro LF, Premananda TS, Aithala PS, George C, Suresh HB, Acharya D. Ultrasonography is still a useful diagnostic tool in acute appendicitis. Journal of Clinical and Diagnostic Research 2009;3(5):1731-36.
[11]   Poudel M, Bhandari R, Giri R, Ghimire A, Uprety S. Pattern of abdominal pain. Health Renaissance 2011;9(1):31–4.
[12]   Rozycki GS, Cava RA, Tchorz KM. Surgeon-performed ultrasound imaging in acute surgical disorders. Curr Probl Surg 2001;38(3):141–212.
[13]   Garba ES, Chom ND. Ultrasound in the diagnosis of appendicitis: A plea for caution. Niger Journal of Surgical Research 2006;8(3-4):132–4.
[14]   Puylaert JB. Ultrasonography of the acute abdomen: gastrointestinal conditions. Radiol Clin North Am 2003;41(6):1227–42.
[15]   Pinto A, Reginelli A, Cagini L, Coppolino F, Stabile Ianora AA, Bracale R, et al. Accuracy of ultrasonography in the diagnosis of acute calculous cholecystitis: review of the literature. Crit Ultrasound J 2013;5(Suppl 1): S11.