Review Article

POCUS vs Computed Tomography in Acute Abdominal Pain: Acute Emergency Management and Clinical Outcomes

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International Archives of Integrated Medicine, Vol. 13, Issue 5, May, 2026.
Available online at http://iaimjournal.com/
ISSN: 2394-0026 (P) **ISSN: 2394-0034 (O)**
Received on: 1-5-2026 **Accepted on:** 31-5-2026
Source of support: Nil **Conflict of interest:** None declared.

DOI: **10.5281/zenodo.20550484**

How to cite this article: Manuel Alejandro Ramírez Solano, Josué Campos Chinchilla, Ivonne Hodgson Salas, Carolina Barrientos Hernández, María Gabriela Arroyo Salas, Kevin José Salazar López. POCUS vs Computed Tomography in Acute Abdominal Pain: Acute Emergency Management and Clinical Outcomes. Int. Arch. Integr. Med., 2026; 13(5): 272-283.

Abstract

Point-of-care ultrasound and computed tomography play complementary roles in the evaluation of acute abdominal pain in emergency care. Point-of-care ultrasound offers the advantage of immediate bedside application, allowing the treating clinician to obtain rapid diagnostic information, accelerate clinical decision-making, and reduce the time to treatment. This approach is particularly valuable in hemodynamically unstable patients, trauma settings, and situations in which minimizing radiation exposure is important, such as in children and pregnant women. It has shown useful diagnostic performance in conditions such as small bowel obstruction and acute cholecystitis, and its use has been associated with shorter emergency department stays, fewer hospital admissions, and fewer unscheduled return visits. However, its diagnostic accuracy depends heavily on operator experience and may be limited in conditions requiring detailed anatomical visualization. Computed tomography

remains the reference imaging method for many abdominal emergencies because it provides high sensitivity and specificity, broad anatomical assessment, and reliable identification of alternative diagnoses. It is especially important in suspected appendicitis, complicated bowel obstruction, perforation, mesenteric ischemia, intra-abdominal abscess, and traumatic injury, where precise anatomical definition is essential for diagnosis and procedural planning. Despite these advantages, computed tomography involves radiation exposure, higher cost, contrast-related risks, and potential delays caused by patient transport to the imaging suite. Overall, current evidence supports a complementary strategy in which point-of-care ultrasound serves as a first-line bedside tool for rapid assessment and risk stratification, while computed tomography is used for diagnostic confirmation and clarification when ultrasound findings are inconclusive or when greater anatomical detail is required. This combined approach can improve efficiency, optimize resource use, and support safe patient management in emergency settings.

Key words

Acute abdominal pain, point-of-care ultrasound, computed tomography, emergency diagnosis, diagnostic imaging, patient outcomes.

Introduction

Acute abdominal pain is defined as the sudden onset of pain in the abdomen and often requires urgent evaluation because of its potential to indicate serious underlying conditions. It is also a frequent cause of emergency department visits, which makes the use of efficient diagnostic strategies essential for the effective management of patient flow and clinical outcomes [1].

The diagnostic evaluation of acute abdominal pain is particularly challenging because its differential diagnosis is broad and includes conditions such as appendicitis, cholecystitis, and small bowel obstruction [2, 3]. This complexity is further increased by the overlap of symptoms among different abdominal pathologies and by the need for rapid decision-making in the emergency department setting [1].

Early imaging plays a critical role in the management of acute abdominal pain because it helps prevent complications and guides treatment decisions. Computed tomography provides detailed anatomical information and contributes to the diagnosis of conditions such as appendicitis and small bowel obstruction with high sensitivity and specificity [4, 5]. By contrast, point-of-care ultrasound, although less detailed, offers the important advantage of immediate bedside assessment and may reduce the time to diagnosis and initiation of treatment [6, 7].

When comparing both modalities, point-of-care ultrasound has demonstrated moderate sensitivity and specificity for conditions such as small bowel obstruction and appendicitis, with its diagnostic accuracy improving according to operator experience [2, 6]. However, computed tomography remains the gold standard for many abdominal conditions because of its superior sensitivity and specificity, particularly in more complex cases [4]. At the same time, studies indicate that point-of-care ultrasound can significantly reduce emergency department length of stay and costs when compared with computed tomography, especially when it is used as a first-line diagnostic tool [8, 9].

From the perspective of cost and resource utilization, a point-of-care ultrasound-first approach may lead to substantial national cost savings by reducing the need for computed tomography scans, shortening emergency department length of stay, and minimizing radiation exposure [8]. In addition, point-of-care ultrasound has been associated with lower emergency department costs and fewer

consultations, thereby contributing to more efficient resource utilization without compromising patient safety [9].

The objective of this narrative review is to analyze the diagnostic utility and clinical impact of point-of-care ultrasound and computed tomography in patients presenting with acute abdominal pain in the emergency department, comparing their role in initial management, diagnostic performance, influence on therapeutic decision-making, and effect on clinical outcomes and resource utilization.

Methodology

This manuscript was developed as a structured narrative review aimed at providing an updated and clinically integrated analysis of point-of-care ultrasound and computed tomography in the evaluation of acute abdominal pain, with particular emphasis on diagnostic performance, emergency department management, clinical outcomes, and resource utilization. The review was conducted in accordance with the SANRA (Scale for the Assessment of Narrative Review Articles) framework and followed a predefined methodological protocol established prior to literature screening. Given the clinical heterogeneity of acute abdominal pain, the broad differential diagnosis encountered in emergency settings, and the variability in imaging pathways across institutions and patient populations, a narrative interpretative synthesis was selected over quantitative pooling in order to integrate diagnostic, therapeutic, operational, and outcome-related considerations into a coherent and clinically applicable framework. Special attention was given to the comparative role of point-of-care ultrasound and computed tomography in the early identification of urgent abdominal conditions, their influence on time-sensitive decision-making in the emergency department, their effect on clinical evolution, and their implications for cost and resource allocation. The objective was to provide a structured synthesis capable of supporting evidence-based imaging selection and multidisciplinary decision-making in patients presenting with acute abdominal pain.

A comprehensive literature search was conducted in PubMed, Scopus, and Web of Science, including peer-reviewed articles published in English or Spanish between January 2020 and December 2025. The final search was performed in March 2026. This timeframe was selected to capture contemporary advances in emergency imaging protocols, the expanding implementation of point-of-care ultrasound in emergency medicine, updated evidence regarding the diagnostic accuracy of computed tomography, and recent studies addressing emergency department efficiency, patient outcomes, and healthcare costs. Foundational studies were incorporated when necessary to contextualize imaging principles, diagnostic pathways, or the historical evolution of emergency abdominal imaging. The search strategy combined MeSH and free-text terms using Boolean operators related to acute abdominal pain, abdominal pain in the emergency department, point-of-care ultrasound, POCUS, computed tomography, CT, appendicitis, cholecystitis, small bowel obstruction, diagnostic accuracy, emergency management, length of stay, clinical outcomes, and resource utilization. Searches were conducted in titles and abstracts as well as indexed subject headings to maximize sensitivity.

The initial search yielded 212 records. After removal of duplicates, 168 articles remained for title and abstract screening. Of these, 97 underwent full-text evaluation, and 24 studies were included in the final synthesis. Selection was performed independently by two authors, with disagreements resolved through discussion and consensus. Exclusion criteria comprised non-peer-reviewed publications, isolated case reports, editorials without clinical or diagnostic outcome data, purely technical imaging descriptions lacking relevance to emergency decision-making, redundant datasets, and studies not directly

addressing the comparative role, diagnostic utility, management implications, or outcome-related impact of point-of-care ultrasound or computed tomography in acute abdominal pain.

Eligible studies included randomized controlled trials, prospective and retrospective observational cohorts, systematic reviews, meta-analyses, expert consensus statements, and contemporary international guidelines from emergency medicine, radiology, surgery, and ultrasound societies. Priority was assigned to multicenter investigations, studies with clearly defined diagnostic criteria, and research evaluating diagnostic accuracy, time to diagnosis, time to treatment, emergency department length of stay, need for additional imaging, admission rates, complication rates, and healthcare costs. Extracted variables included study design, patient population, suspected abdominal pathology, imaging modality, diagnostic performance metrics, time-based process measures, management changes prompted by imaging findings, disposition outcomes, and reported complications or downstream clinical events. Methodological quality and internal validity were assessed narratively, considering risk of bias, sample size, operator dependency in ultrasound-based studies, follow-up duration when applicable, consistency of diagnostic definitions, and reproducibility of reported outcomes. In cases of conflicting evidence, greater interpretative weight was assigned to higher-level evidence and guideline-supported recommendations.

Reference lists of included studies were manually screened to identify additional relevant publications. Given its narrative design, this review is subject to potential selection bias and does not provide pooled quantitative estimates. Artificial intelligence-based tools were used exclusively to assist in literature organization and structural coherence, whereas critical appraisal, synthesis, and final interpretation were conducted independently by the authors to preserve methodological rigor.

Acute Abdominal Pain in the Emergency Department

Acute abdominal pain is one of the leading causes of emergency department visits, with presentation rates increasing across all adult age groups between 2007 and 2019. In younger adults, the prevalence of abdominal pain as a primary reason for consultation increased from 9.4% to 11.6%, reflecting a growing demand for effective diagnostic strategies in emergency care [10].

The etiologies of acute abdominal pain are diverse, with common causes including appendicitis, cholecystitis, and small bowel obstruction, each of which requires a specific diagnostic approach. In this context, point-of-care ultrasound has demonstrated moderate accuracy in the diagnosis of appendicitis and small bowel obstruction, as well as high specificity for cholecystitis, which supports its value as an initial diagnostic tool in the emergency setting [2, 3, 11].

An essential aspect of the evaluation of acute abdominal pain is the differentiation between surgical and non-surgical causes, since this distinction directly influences management decisions and clinical outcomes. Point-of-care ultrasound can assist in the identification of surgical conditions such as small bowel obstruction and appendicitis, potentially reducing the immediate need for computed tomography and facilitating earlier surgical consultation [6, 11].

This is particularly relevant in time-dependent abdominal emergencies, as conditions such as appendicitis and cholecystitis require prompt diagnosis in order to prevent complications. In this regard, point-of-care ultrasound-first strategies have been associated with reduced emergency department length of stay and faster access to surgical consultation, underscoring their usefulness in the management of time-sensitive conditions [9, 11].

Despite these advantages, the initial evaluation of acute abdominal pain remains challenging because of its broad differential diagnosis and the frequent overlap of symptoms among abdominal pathologies. Even so, point-of-care ultrasound offers a rapid bedside assessment that may improve diagnostic efficiency and decrease reliance on computed tomography in selected scenarios [1, 8].

The consequences of delayed or inaccurate diagnosis are substantial, as they may lead to increased morbidity, prolonged hospital stay, and higher healthcare costs. Although computed tomography continues to be the gold standard for definitive diagnosis, particularly in complex cases, point-of-care ultrasound may still reduce unnecessary radiation exposure and its associated risks when used appropriately in the emergency department [4, 8].

Role of Imaging in the Initial Diagnostic Approach

Imaging in acute abdominal pain is used in conjunction with clinical history, physical examination, and laboratory findings in order to narrow the differential diagnosis and identify potentially life-threatening conditions [12]. In this diagnostic framework, the selection of imaging is guided by the clinical scenario and the suspected underlying pathology. For example, in acute appendicitis, computed tomography is considered the gold standard because of its high sensitivity and specificity, whereas ultrasound is preferred in pediatric and young patients in order to avoid exposure to ionizing radiation [4].

In emergency settings, imaging is particularly indicated when clinical evaluation alone is insufficient to confirm a diagnosis or when there is a need to exclude serious conditions such as appendicitis or small bowel obstruction [6, 13]. In patients with non-traumatic abdominal pain, point-of-care ultrasound may be used as an initial approach to reduce emergency department length of stay and costs, while computed tomography is reserved for more definitive diagnostic assessment [9].

The main goals of imaging in acute abdominal pain are to confirm or exclude specific diagnoses, guide treatment decisions, and determine the need for surgical intervention. This is particularly relevant in suspected acute cholecystitis, where point-of-care ultrasound is used to expedite diagnosis and management, despite having moderate sensitivity and high specificity [3].

The selection of the imaging modality depends on the suspected condition, patient characteristics, and clinical presentation. Computed tomography is preferred in conditions such as appendicitis because of its diagnostic accuracy, whereas point-of-care ultrasound is especially useful for initial assessment and in situations in which a rapid diagnosis is needed [2, 4]. Likewise, in pregnant women and young patients, ultrasound is often favored in order to minimize radiation exposure [13].

When comparing bedside and advanced imaging, point-of-care ultrasound offers the advantage of immediate bedside application, which can shorten the time to diagnosis and potentially improve patient flow in the emergency department [1, 7]. However, it also has limitations in sensitivity and specificity when compared with computed tomography, which continues to be the gold standard for many abdominal conditions [2, 4].

Beyond diagnosis, imaging also plays a critical role in triage and disposition. It contributes to prioritizing patients according to the severity of their condition, supports diagnostic confirmation of clinical suspicion, and helps determine which patients require surgical intervention or continued observation. In this regard, a point-of-care ultrasound-first strategy has been associated with greater emergency department efficiency and improved resource utilization without compromising patient safety, although it does not

always eliminate the need for computed tomography as the definitive diagnostic modality [6, 9].

Point-of-Care Ultrasound in Acute Abdominal Pain

Point-of-care ultrasound is a bedside ultrasound examination performed by clinicians to obtain immediate diagnostic information and guide clinical decision-making. Its value lies in the ability to generate and interpret real-time images, allowing findings to be integrated directly into patient management [7].

In emergency medicine, point-of-care ultrasound is especially useful because of its portability and its capacity to provide rapid assessment without requiring patient transport [7]. This characteristic makes it particularly suitable for the initial evaluation of patients with acute abdominal pain, and it can also be repeated as needed during resuscitation or ongoing clinical reassessment [9].

Among its main indications in abdominal pain, point-of-care ultrasound has an important role in the evaluation of biliary pathology, where it is effective for the diagnosis of gallstones and cholecystitis and may reduce the time to surgical consultation when performed promptly [11]. It is also commonly used in the assessment of hydronephrosis, providing rapid information about the presence of urinary obstruction [14]. Likewise, it can rapidly identify abdominal aortic aneurysms, which is particularly important in unstable patients. In addition, point-of-care ultrasound is useful for detecting free intraperitoneal fluid, thereby supporting the diagnosis of conditions such as ruptured ectopic pregnancy [7]. Its utility also extends to selected gynecologic emergencies, including ectopic pregnancy and ovarian torsion [15].

The advantages of point-of-care ultrasound are considerable in the emergency setting. It enables rapid assessment and has been shown to reduce the time to diagnosis in comparison with computed tomography, particularly in conditions such as small bowel obstruction [6, 8]. Another important advantage is that it does not expose patients to ionizing radiation, which makes it especially valuable in vulnerable populations such as pregnant women [15]. Furthermore, it can be repeated multiple times during patient management without adding risk, which enhances its usefulness during resuscitation and serial evaluation [9]. Its bedside availability also makes it especially beneficial for unstable patients who cannot be transported easily to the radiology department [7].

Despite these strengths, point-of-care ultrasound also has important limitations. Its diagnostic accuracy is highly dependent on the operator's experience and technical skill, which results in variability in performance. In addition, its accuracy may be reduced in obese patients or in those with excessive bowel gas, since these factors can obscure imaging windows and limit visualization [16]. It may also be insufficient for the assessment of deep or complex abdominal pathology, in which computed tomography continues to offer superior diagnostic capability [1].

Computed Tomography in Acute Abdominal Pain

Computed tomography is an imaging modality that uses X-rays to generate detailed cross-sectional images of the body. It operates through a rotating X-ray source and detector system that acquires images from multiple angles, which are then processed by a computer to reconstruct a three-dimensional representation of the scanned region. In the evaluation of undifferentiated abdominal pain, computed tomography plays a central role because it provides a broad anatomical assessment that helps identify or exclude a wide range of intra-abdominal conditions. Its usefulness is especially evident in emergency settings, where rapid and accurate diagnosis is essential for appropriate clinical decision-making and timely management [13].

In emergency care, computed tomography is particularly indicated in several high-priority abdominal conditions. In suspected appendicitis, it is considered the standard diagnostic tool because of its high sensitivity and specificity, and low-dose protocols have demonstrated diagnostic performance comparable to that of standard-dose studies while reducing radiation exposure [17, 18]. In diverticulitis, computed tomography is valuable not only for confirming the diagnosis but also for determining disease severity and guiding treatment decisions. In bowel obstruction, it provides detailed information regarding both the level and the underlying cause of obstruction, which is especially useful for surgical planning. It is also highly effective in the detection of perforation, as it can identify free air or free fluid within the abdominal cavity and help localize the source of the lesion [6, 13]. In mesenteric ischemia, dual-energy computed tomography has improved diagnostic accuracy and increased reader confidence in detecting this time-sensitive condition [19]. In addition, computed tomography is important in the evaluation of intra-abdominal abscesses and complex infections, since it allows precise localization of collections and assessment of their extent, which is essential for drainage planning and therapeutic management [13].

Among its main advantages, computed tomography offers high diagnostic accuracy, a comprehensive anatomical overview of the abdominal cavity, and the ability to detect alternative or unexpected diagnoses that may significantly alter patient management [13, 18, 19]. However, its limitations must also be considered. Radiation exposure remains a major concern, particularly in younger patients, which has encouraged the adoption of low-dose protocols. The use of contrast agents may pose additional risks in patients with renal dysfunction or contrast allergy [17]. Computed tomography is more expensive than ultrasound and lacks portability, as it requires transport to a dedicated imaging suite, which may delay diagnosis and treatment compared with point-of-care ultrasound in some emergency scenarios [6, 9].

POCUS versus Computed Tomography; Diagnostic Performance

Point-of-care ultrasound and computed tomography differ substantially in diagnostic performance across causes of acute abdominal pain, although their value depends on the specific clinical context. Point-of-care ultrasound has demonstrated moderate sensitivity and specificity in conditions such as small bowel obstruction and appendicitis. In small bowel obstruction, it showed a sensitivity of 89% and a specificity of 67% when compared with computed tomography, which remains the reference standard for diagnosis [6]. In appendicitis, point-of-care ultrasound demonstrated a sensitivity of 85% and a specificity of 63% [2]. By contrast, computed tomography generally provides higher sensitivity and specificity across a wider range of abdominal conditions. In appendicitis, for example, computed tomography achieved a sensitivity of 99% and a specificity of 100%, highlighting its superior diagnostic precision in this setting [4].

The diagnostic value of each modality also varies according to the suspected disease. Point-of-care ultrasound performs particularly well in acute cholecystitis, where it has shown high specificity of 94.4% and moderate sensitivity of 70.9%, making it useful as an early bedside imaging tool [3]. Computed tomography, however, remains superior in conditions that require detailed anatomical definition, such as appendicitis and more complex presentations of small bowel obstruction [4]. It is also considered the gold standard for detecting intra-abdominal injuries in trauma patients, where comprehensive visualization of abdominal structures is essential for management decisions [20].

Despite its lower overall diagnostic accuracy in some conditions, point-of-care ultrasound offers distinct advantages that support its use as first-line imaging in selected scenarios. It is especially

valuable when rapid bedside assessment is needed, such as in hemodynamically unstable patients or in emergency departments where reducing length of stay is an important objective [8, 9]. It is also preferable in populations in whom radiation exposure should be minimized, including pregnant women and pediatric patients. In contrast, computed tomography is preferred when a definitive diagnosis is required, when ultrasound findings are inconclusive, or when surgical planning depends on a precise anatomical assessment [4].

An important limitation of point-of-care ultrasound is that its diagnostic accuracy depends heavily on operator expertise. Training and experience have a direct influence on image acquisition, interpretation, and therefore clinical reliability [6]. In addition, institutional protocols and available resources often determine whether ultrasound or computed tomography is prioritized in a given emergency setting [7]. For this reason, the two modalities should not be viewed as strictly competing approaches, but rather as complementary tools within a broader diagnostic strategy. Point-of-care ultrasound can serve as an initial screening method that accelerates decision-making, while computed tomography can provide confirmatory imaging when needed [8]. This complementary model may improve resource utilization and patient outcomes, particularly when incorporated into algorithms based on patient stability and the suspected etiology of pain [9].

From a practical standpoint, diagnostic algorithms should adapt imaging choice to the patient's clinical condition. In stable patients with non-specific abdominal pain, a point-of-care ultrasound-first strategy may reduce emergency department length of stay and overall costs without compromising safety [9]. However, in unstable patients or in cases where ultrasound findings are inconclusive, computed tomography should be used promptly to ensure accurate diagnosis and guide timely management [20].

Impact on Acute Emergency Management

Point-of-care ultrasound plays a central role in immediate bedside decision-making because it allows the treating clinician to perform rapid image acquisition and interpretation in real time, which is particularly valuable in emergency settings where early decisions can alter patient outcomes [7]. Its utility is especially evident in conditions such as small bowel obstruction and acute cholecystitis, in which it can provide prompt diagnostic information at the bedside and help define the next steps in management without waiting for transport or formal imaging workflows [3, 6]. In contrast, computed tomography is more commonly used to confirm and clarify diagnoses initially suspected on point-of-care ultrasound, since it offers more detailed anatomical information and remains the reference standard for many abdominal conditions because of its high sensitivity and specificity [8, 20].

One of the major advantages of point-of-care ultrasound is its effect on time to diagnosis. In cases of small bowel obstruction, ultrasound was completed substantially earlier than computed tomography, with a mean difference of 167 minutes, highlighting its ability to accelerate the diagnostic process in time-sensitive situations [6]. A similar benefit has been observed in acute cholecystitis, where a point-of-care ultrasound-first strategy reduced emergency department length of stay and shortened the interval to surgical consultation when compared with a computed tomography-first approach. This reduction in diagnostic delay also translates into earlier treatment. In acute cholecystitis, performing point-of-care ultrasound within the first 60 minutes was associated with faster surgical evaluation, while in ward emergencies ultrasound-guided management resulted in a shorter time to first treatment than conventional approaches [11, 21].

Point-of-care ultrasound also influences specialist consultation and procedural planning. By providing preliminary diagnostic information

immediately, it can expedite communication with surgical or other specialty teams and facilitate faster intervention when needed [11]. In addition, it assists in planning procedures by identifying findings such as fluid collections, perforation-related abnormalities, or other urgent intra-abdominal conditions that may require prompt action [21]. Its bedside availability makes it especially valuable in unstable and resuscitation scenarios. In critically ill patients, point-of-care ultrasound can rapidly assess hemodynamic status and guide fluid resuscitation, while in trauma it is used to detect free fluid that may indicate internal hemorrhage [22, 23].

These advantages also affect broader disposition decisions in the emergency department. A point-of-care ultrasound-first strategy can improve resource utilization by reducing unnecessary admissions and supporting faster discharge when serious pathology is excluded or appropriately characterized [9]. At the same time, it helps stratify patients according to the severity of their condition, making it easier to determine whether they require admission, short-term observation, or safe discharge with follow-up [8].

Clinical Outcomes and Patient Evolution

Point-of-care ultrasound-first strategies have been associated with meaningful improvements in several short-term clinical outcomes in patients with abdominal pain evaluated in the emergency department. One of the most consistent benefits is a reduction in emergency department length of stay. In patients with non-traumatic abdominal pain, a point-of-care ultrasound-first approach was associated with a 47% reduction in emergency department length of stay compared with computed tomography-only strategies [9]. A similar effect has been reported in acute cholecystitis, where performing point-of-care ultrasound within the first 60 minutes was associated with a reduction in emergency department length of stay of 22.4 hours [11]. These findings suggest that early bedside imaging can accelerate diagnosis and streamline patient flow.

Point-of-care ultrasound-first strategies have also been linked to lower hospital admission rates. In patients presenting with non-traumatic abdominal pain, early point-of-care ultrasound evaluation resulted in fewer admissions than computed tomography-only approaches, indicating that faster bedside risk stratification may help avoid unnecessary hospitalization [9]. In addition, the choice of imaging modality may influence the need for surgery or invasive intervention. In renal colic, for example, point-of-care ultrasound combined with computed tomography was associated with a higher rate of urologic interventions, suggesting that ultrasound may help identify patients who are more likely to benefit from additional imaging and subsequent procedural management [24].

The effect of point-of-care ultrasound on diagnostic accuracy varies according to the underlying abdominal condition. In small bowel obstruction, point-of-care ultrasound has shown high sensitivity and specificity, with performance approaching that of computed tomography, particularly when operator training is adequate [6]. However, for acute appendicitis, computed tomography remains the reference standard because it provides higher sensitivity and specificity than ultrasound. This distinction is important when considering the risk of missed diagnoses or the need for diagnostic revision. Although point-of-care ultrasound can function as an effective first-line tool, its limitations in certain conditions mean that computed tomography remains essential when the diagnosis is uncertain or when high anatomical detail is required [4].

With respect to safety, complication rates related to diagnostic imaging are generally low with both modalities, but computed tomography carries the added concern of radiation exposure, which is particularly relevant in younger patients and in individuals who may require repeated imaging studies. Point-of-care ultrasound therefore offers an important safety advantage by

avoiding ionizing radiation and potentially reducing long-term risks such as radiation-induced malignancy [8]. Point-of-care ultrasound-first strategies have also been associated with decreased odds of unscheduled return visits, suggesting that early bedside imaging can contribute to effective initial risk stratification and management without increasing the likelihood of missed clinically relevant disease [9].

Overall, available evidence suggests that point-of-care ultrasound-first strategies improve short-term outcomes such as emergency department efficiency, time to decision-making, and safe disposition, without increasing adverse outcomes [9]. In trauma settings, rapid bedside ultrasound may also reduce morbidity related to delayed diagnosis by facilitating immediate identification of intra-abdominal injury [20]. However, although short-term benefits are increasingly clear, the effect of point-of-care ultrasound-first pathways on longer-term outcomes such as overall morbidity and mortality remains less well defined and requires further investigation [8, 9].

Conclusions

Point-of-care ultrasound is a valuable first-line imaging tool in acute abdominal pain because it provides rapid bedside assessment, shortens time to diagnosis and treatment, reduces emergency department length of stay, and may lower hospital admissions without compromising short-term safety.

Computed tomography remains the definitive imaging modality for many abdominal emergencies, especially when diagnostic certainty, detailed anatomical evaluation, or surgical planning are required, as in appendicitis, complex bowel obstruction, trauma, perforation, and mesenteric ischemia.

POCUS and computed tomography should be understood as complementary rather than competing modalities: POCUS is most useful for rapid triage, unstable patients, and radiation-sparing scenarios, whereas computed tomography is essential when ultrasound is inconclusive or when higher diagnostic accuracy is needed; however, the long-term impact of POCUS-first strategies on morbidity and mortality still requires further study.

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