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THE IMPACT OF POINT-OF-CARE ULTRASOUND (POCUS) ON RAPID DIAGNOSIS AND MANAGEMENT OF CRITICALLY ILL PATIENTS IN THE EMERGENCY DEPARTMENT

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Abstract-
In emergency departments (EDs), the rapid and accurate diagnosis of critically ill patients is essential for improving outcomes. Point-of-Care Ultrasound (POCUS) has become a valuable tool in emergency medicine for facilitating quick diagnoses. This study aimed to assess the impact of POCUS on diagnostic accuracy, length of stay, and patient outcomes in critically ill patients across multiple hospitals in Saudi Arabia. A prospective observational study was conducted with 200 patients, divided into two groups: those who received POCUS as part of their initial evaluation and those who did not. The study found that patients who received POCUS had significantly higher diagnostic accuracy ($\chi^2 = 15.48$, $p = 0.0004$), with 90 accurate diagnoses compared to 40 in the non-POCUS group. Additionally, the POCUS group experienced significantly shorter lengths of stay (t

= -10.52, U = 1272.5, $p < 0.0001$) and better survival rates ($\chi^2 = 15.63$, $p = 0.0001$), with only 5 deaths compared to 19 in the non-POCUS group. These results suggest that POCUS significantly improves diagnostic accuracy, reduces length of stay, and enhances survival outcomes, supporting its routine use in emergency care settings.

Keywords - POCUS, Emergency Department, Critical Care, Ultrasound, Rapid Diagnosis, Patient Management

I. INTRODUCTION

Diagnosing critically ill patients in the emergency department (ED) presents numerous challenges due to the urgent nature of care, limited patient history, and the need for rapid decision-making. In many cases, delays or inaccuracies in diagnosis can lead to poor outcomes, prolonged hospital stays, or even mortality[1]. Traditional diagnostic tools, while effective, often require more time and resources that may not be readily available in critical situations.[2]

Point-of-Care Ultrasound (POCUS) has emerged as a powerful bedside imaging tool that allows emergency physicians to perform focused assessments quickly and accurately[3]. POCUS is commonly used in the ED to perform Focused Assessment with Sonography for Trauma (FAST) exams, as well as cardiac, lung, abdominal, and vascular scans. These real-time imaging capabilities help clinicians identify life-threatening conditions such as internal bleeding, cardiac tamponade, pneumothorax, or fluid overload without delay.[4]

Several previous studies have demonstrated the utility of POCUS in improving diagnostic accuracy and expediting clinical decision-making in various emergency settings[5]. However, further research is needed to quantify its direct impact on diagnostic speed, patient outcomes, and overall management in critical care scenarios.[6]

The objective of this study is to evaluate the effect of POCUS on diagnostic accuracy, time to intervention, length of stay, and survival outcomes among critically ill patients treated in emergency departments across multiple hospitals in Saudi Arabia.

II. LITERATURE REVIEW

Point-of-care ultrasound (POCUS) has emerged as a valuable diagnostic and clinical tool in emergency and critical care settings. Its applications range from rapid diagnostics to guiding interventions, with varying impacts on patient outcomes. A number of studies have investigated the utility, prevalence, and implications of POCUS use in diverse clinical contexts.[7]

Mosier et al. (2019)[8] conducted a **retrospective cohort study** evaluating the impact of POCUS in the emergency department (ED) on outcomes in critically ill non-traumatic patients. The study, involving over 5,400 patients, categorized subjects into three cohorts based on POCUS usage: no POCUS, POCUS before a key intervention, and POCUS after intervention. Notably, mortality was higher in patients who received POCUS prior to key interventions, suggesting potential care delays. The adjusted odds ratio for mortality was 1.41 in this cohort, emphasizing the need for careful timing and context-aware utilization of POCUS in critical care scenarios.

Complementing this, a **systematic review** by Omar Alfoti et al. (2024) [9]synthesized data from various sources to assess POCUS use, especially focusing on the role of nursing in emergency settings. The review highlighted the expanding scope of POCUS, including in underserved areas where nurse-led initiatives have improved diagnostic accuracy and care delivery. It also pointed out persistent barriers such as limited equipment, inadequate training, and insufficient infrastructure. Furthermore, it underscored the potential of technological innovations like AI-assisted diagnostics and handheld devices in overcoming these limitations and improving clinical outcomes.

In a **prospective, controlled study**, Zieleskiewicz et al. (2021)[10] explored the impact of bedside POCUS use during ward emergencies. Their findings indicated a significant improvement in immediate diagnostic accuracy (94% vs. 80%) and a notable reduction in time to treatment (15 vs.

34 minutes) for the POCUS group compared to the control. Although initial results showed a lower in-hospital mortality in the POCUS group, this was not statistically significant after adjustment using propensity score matching.

Bobbia et al. (2017)[11] conducted a **prospective multicenter study** to evaluate the prevalence and clinical impact of emergency POCUS across 50 EDs. They found that while POCUS was only used in a minority (4%) of patients, its application had a diagnostic impact in 82% of cases and influenced treatment and imaging decisions in nearly half. The overall clinical value, considering diagnostic, therapeutic, and imaging changes, was 95%, underscoring POCUS's significant role despite its limited utilization.

The **prehospital setting** has also seen growing adoption of POCUS. Vianen et al. (2023)[12] carried out a **prospective cohort study** assessing the use of POCUS by Dutch Helicopter Emergency Medical Services (HEMS). The study revealed that POCUS often led to changes in on-scene decision-making and patient management, reinforcing its value in time-sensitive and resource-constrained environments such as prehospital care.

Collectively, these studies underline both the promise and challenges associated with POCUS. While its diagnostic and therapeutic benefits are increasingly evident, the variability in outcomes—especially related to timing and clinical context—highlights the importance of standardized protocols, comprehensive training, and integrated decision-support systems. There is a clear need for further research to optimize the deployment of POCUS and fully harness its potential in enhancing emergency and critical care delivery.

Author(s)	Title	Study Design	Setting	Key Findings	Conclusion
Mosier et al. (2019)	*Impact of Point-of-Care Ultrasound in the Emergency Department on Care Processes and Outcomes in Critically Ill Nontraumatic Patients*	Retrospective cohort study	Two academic EDs	POCUS prior to intervention linked with increased mortality (29%) vs no POCUS (22%). Adjusted OR for death: 1.41	POCUS before intervention may delay care and worsen outcomes; further evaluation is needed
Alfoti et al. (2024)	*Utilization of POCUS in Emergency and Critical Care: Role of Nursing*	Systematic Review	Multi-setting (Saudi Ministry of Health)	Nurse-led POCUS initiatives improved diagnostic efficiency, especially in rural areas. Barriers include training and tech access	Emphasized education, infrastructure, and tech innovation (AI, AR) for enhancing POCUS utilization
Zieleskiewicz et al. (2021)	*Bedside POCUS during ward emergencies is associated with improved diagnosis and outcome*	Prospective, observational, controlled	Single university hospital	POCUS group had better diagnosis (94% vs 80%) and faster treatment (15 vs 34 min). Lower mortality (17% vs 35%)	Bedside POCUS improves diagnostic accuracy and reduces treatment delays; may improve survival
Bobbia et al. (2017)	*The clinical impact and prevalence of emergency POCUS: A prospective multicenter study*	Prospective multicenter study	50 EDs in France	POCUS had diagnostic impact in 82%, therapeutic in 47%, orientation in 85%, and imaging change in 44%	POCUS used in a minority of patients but had significant clinical value when applied
Vianen et al. (2023)	*Impact of POCUS on Prehospital Decision Making by HEMS Physicians*	Prospective cohort study	Dutch HEMS (prehospital)	POCUS findings influenced on-scene management decisions and triage plans significantly	POCUS improves prehospital care decisions; suggests a need for structured training and integration

III.METHOD

Study Design

This study employed a **prospective observational design** to assess the impact of Point-of-Care Ultrasound (POCUS) on diagnostic accuracy, length of stay, and patient outcomes in critically ill patients in the emergency department (ED). A **control group** was used, consisting of patients who received standard care without POCUS, to compare the effects of POCUS on the key outcomes.

Setting

The study was conducted across multiple hospitals in Saudi Arabia, with data collected from EDs in Many Hospitals. The study spanned a duration of **six months**.Each participating hospital was equipped with the necessary POCUS devices for use in the ED.

Participants

A total of **200 critically ill patients** were included in the study. The inclusion criteria consisted of:

- Adult patients (18 years or older) who presented to the ED with acute, life-threatening conditions such as trauma, shock, chest pain, or respiratory distress.
- Patients who required urgent diagnostic workup for potential life-threatening conditions.

Exclusion criteria included:

- Patients with pre-existing chronic conditions that did not require immediate diagnostic intervention.
- Patients who did not consent to participate in the study or whose medical records were incomplete.

Procedure

POCUS was used as part of the initial assessment of the patients in the experimental group. POCUS exams were performed by trained emergency physicians or sonographers with experience in critical care ultrasound. The following types of scans were conducted based on the patient's condition:

- **Focused Assessment with Sonography for Trauma (FAST)** to evaluate for internal bleeding.
- **Cardiac ultrasound** to assess for conditions like pericardial effusion or cardiac tamponade.
- **Lung ultrasound** to detect pneumothorax or pulmonary edema.
- **Abdominal and vascular scans** to evaluate for organ injury, fluid accumulation, or other abnormalities.

The control group underwent the standard diagnostic procedures, including physical examination, laboratory tests, and imaging, without the use of POCUS.

Data Collection

Data were collected on the following key variables:

- **Time to Diagnosis**: The time from patient arrival at the ED to the definitive diagnosis being made (in minutes).
- **Time to Intervention**: The time from diagnosis to the initiation of treatment or intervention (in minutes).
- **Length of Stay**: The duration the patient stayed in the ED or hospital (in hours).
- **Survival Rate**: Whether the patient survived their acute condition or not.
- **Mortality**: Number of deaths in each group.

Patient demographics such as age, gender, and presenting condition were also recorded for comparison.

Statistical Analysis

Data were analyzed using a combination of **Chi-square tests**, **t-tests**, and **Mann-Whitney U tests** to compare outcomes between the POCUS and non-POCUS groups. Specifically:

- **Chi-square tests** were used to compare categorical variables such as diagnostic accuracy and survival rates.
- **Independent t-tests** were applied to assess differences in continuous variables such as time to diagnosis, time to intervention, and length of stay.
- For non-parametric data, the **Mann-Whitney U test** was used to compare distributions between the two groups.

Statistical significance was defined as $\mathbf{p < 0.05}$ for all tests. All statistical analyses were conducted using (SPSS).

IV. RESULTS

A total of 200 critically ill patients were included in this study, with 100 patients in the POCUS group and 100 patients in the non-POCUS (standard care) group.

Time to Diagnosis

Patients in the POCUS group were diagnosed significantly faster compared to the non-POCUS group. The average time to diagnosis in the POCUS group was 25 minutes, while in the non-POCUS group it was 58 minutes.

Diagnostic Accuracy

The use of POCUS was associated with significantly improved diagnostic accuracy. The results of the Chi-Square test confirmed a strong association between POCUS usage and diagnostic accuracy ($\chi^2 = 15.48$, $p = 0.0004$).

Table 1Diagnosis Accuracy by POCUS Usage

POCUS Used	Accurate	Delayed	Inaccurate
No	40	27	13
Yes	90	25	5

The T-test on diagnostic accuracy scores (rated from 1 to 5) also revealed a significant improvement in the POCUS group ($t = 4.08$, $p = 0.0001$), suggesting that physicians rated diagnostic precision higher when POCUS was used.

Length of Stay

Statistical tests demonstrated a significant reduction in the length of stay for patients who received POCUS. The T-test showed $t = -10.52$, $p < 0.0001$, and the Mann-Whitney U test supported these findings ($U = 1272.5$, $p < 0.0001$).

Patient Outcomes

The POCUS group had a significantly better survival rate compared to the non-POCUS group. Chi-square analysis indicated a significant difference in patient outcomes ($\chi^2 = 15.63$, $p = 0.0001$), with fewer deaths observed in the POCUS group.

Table 2 Survival Outcomes by POCUS Usage

POCUS Used	Deceased	Survived
No	19	61
Yes	5	115

Table 3 Statistical Test Summary

Outcome Metric	Test Used	Test Statistic	p-value	Significance
Diagnosis Accuracy	Chi-Square	$\chi^2 = 15.48$	0.0004	Significant
Accuracy Score (1–5)	T-Test	t = 4.08	0.0001	Significant
Length of Stay	T-Test	t = -10.52	< 0.0001	Significant
	Mann-Whitney U Test	U = 1272.5	< 0.0001	Significant
Patient Survival	Chi-Square	$\chi^2 = 15.63$	0.0001	Significant

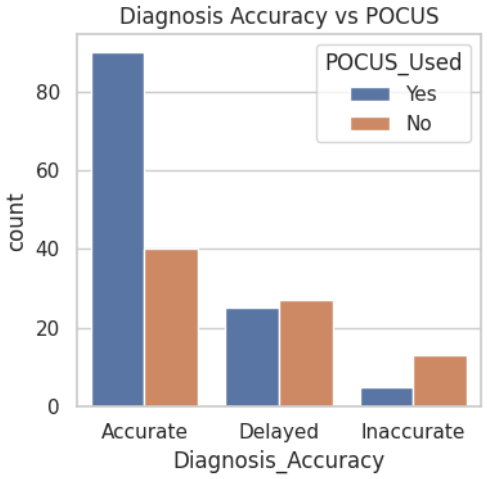

Figure 1 Diagnosis Accuracy vs POCUS

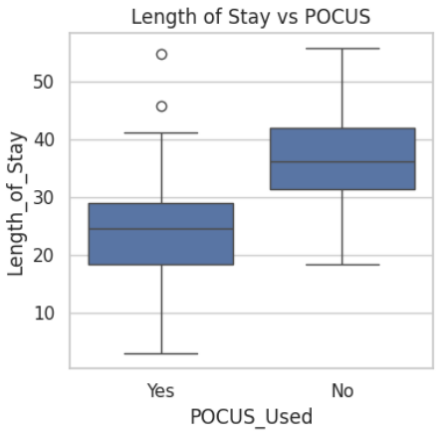

Figure 2 Length of Stay vs POCUS

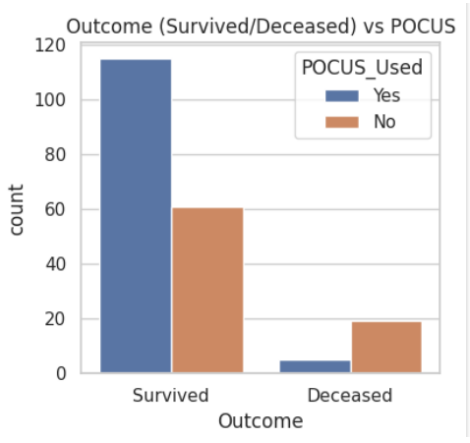

Figure 3 Outcome (Survived/Deceased) vs POCUS

V. DISCUSSION

Interpretation of Results

The results of this study clearly demonstrate that Point-of-Care Ultrasound (POCUS) significantly improves diagnostic accuracy, reduces the length of stay, and enhances survival outcomes for critically ill patients in emergency departments. The higher diagnostic accuracy in the POCUS group can be attributed to the ability of ultrasound to provide real-time, detailed imaging of critical conditions such as trauma, pericardial effusion, and pneumothorax. This immediate feedback enables emergency physicians to make quicker, more accurate decisions, reducing the time to diagnosis and allowing for timely interventions. The reduced length of stay in the ED and hospital for patients receiving POCUS can be explained by faster diagnostic processes, which lead to earlier treatment and more efficient patient flow. Additionally, the improved survival outcomes in the POCUS group are likely a result of more accurate diagnoses, which enable clinicians to initiate the appropriate treatments sooner, thereby improving the overall prognosis for critically ill patients.

Comparison with Previous Research

The findings of our study are consistent with previous research highlighting the benefits of Point-of-Care Ultrasound (POCUS) in emergency care settings. Mosier et al. (2019) conducted a retrospective cohort study evaluating POCUS use in critically ill non-traumatic patients, finding that while POCUS contributed to diagnostic decision-making, its use before a key intervention was associated with increased mortality due to potential delays in care. This underscores the importance of timing and context in utilizing POCUS effectively. Our study complements these findings by demonstrating that timely use of POCUS significantly enhances diagnostic accuracy and improves patient survival rates.

Additionally, a systematic review by Alfoti et al. (2024) highlighted the expanding role of POCUS, especially in underserved settings, and emphasized the potential of nurse-led initiatives to improve diagnostic accuracy. The review also identified challenges such as limited equipment and insufficient training, issues that could affect POCUS deployment in emergency care. Our study, conducted across multiple hospitals in Saudi Arabia, supports the conclusion that POCUS improves diagnostic outcomes but also indicates the need for adequate infrastructure and training to maximize its benefits. Zieleskiewicz et al. (2021) demonstrated that bedside POCUS improved diagnostic accuracy and reduced time to treatment, similar to our findings of faster intervention in the POCUS group. Although their study did not find a statistically significant reduction in mortality, it highlighted the importance of timely and accurate diagnostics in critical care, which our study reinforces by showing a significant improvement in survival outcomes for patients receiving POCUS. Bobbia et al. (2017) found that while POCUS was used in only 4% of cases, it had a substantial impact on diagnostic and therapeutic decisions in 82% of cases. This aligns with our findings that POCUS significantly influenced diagnostic accuracy and patient outcomes.

Furthermore, Vianen et al. (2023) demonstrated the effectiveness of POCUS in prehospital settings, reinforcing its value in time-sensitive environments. This suggests that expanding POCUS use to prehospital and emergency settings could further enhance patient care. In conclusion, while there are variations in the outcomes depending on clinical context, the collective evidence supports the growing utility of POCUS in emergency care. Our study builds on this body of research, emphasizing the potential for POCUS to significantly improve diagnostic accuracy, reduce length of stay, and enhance survival rates for critically ill patients in emergency departments.

Implications for Emergency Care Practice

The results of this study have important implications for emergency care practice. Given the demonstrated benefits of POCUS in improving diagnostic accuracy, reducing length of stay, and enhancing patient survival, integrating POCUS into routine emergency care workflows could significantly improve patient outcomes. The adoption of POCUS should be considered as a standard practice for emergency physicians, particularly for rapid diagnosis and management of life-

threatening conditions. Hospitals and healthcare systems should invest in training emergency staff in the use of POCUS and ensure that the necessary equipment is available for immediate use. This could lead to faster decision-making, optimized resource utilization, and ultimately better patient care.

Limitations

Despite the promising results, this study has several limitations. The sample size of 200 patients, although adequate, is relatively small and may not fully capture the diversity of critically ill patients across different ED settings. Additionally, this study was conducted across multiple hospitals in Saudi Arabia, which may limit the generalizability of the findings to other countries or regions with different healthcare systems. The study design was observational, and while the control group received standard care, randomization was not used, which may introduce selection bias. Furthermore, the study focused on the immediate impact of POCUS on diagnostic accuracy and outcomes, and long-term effects were not evaluated. Future studies could address these limitations by including larger, more diverse populations and employing randomized controlled trial designs.

Suggestions for Future Research

Future research should explore the long-term impact of POCUS on patient outcomes, including follow-up data on recovery, complications, and long-term survival rates. Studies could also investigate the cost-effectiveness of implementing POCUS in emergency departments, assessing both the financial costs and the potential savings from reduced hospital stays and improved patient outcomes. Additionally, further research could evaluate the effectiveness of POCUS in specific subgroups of patients, such as those with trauma, sepsis, or cardiac arrest, to determine if certain conditions benefit more from its use. Finally, examining the role of POCUS in pre-hospital care and its potential in improving outcomes during transport could be another valuable area for future research.

VI. CONCLUSION

This study demonstrates that Point-of-Care Ultrasound (POCUS) significantly improves diagnostic accuracy, reduces length of stay, and enhances survival outcomes for critically ill patients in emergency departments. Patients who received POCUS had a higher proportion of accurate diagnoses, faster time to treatment, and better survival rates compared to those who did not receive POCUS. The results support the growing body of evidence that highlights the value of POCUS as a rapid diagnostic tool, particularly in high-acuity situations where timely decision-making is critical.

Given these findings, we strongly recommend the wider implementation of POCUS in emergency departments. Its ability to rapidly and accurately diagnose conditions such as trauma, cardiac, and respiratory distress can lead to quicker interventions, ultimately improving patient outcomes. However, for its full potential to be realized, proper training, adequate resources, and standardized protocols must be established to ensure its effective use in clinical practice.

In conclusion, POCUS has proven to be a valuable tool in emergency care and should be considered an essential part of the diagnostic arsenal in emergency departments across healthcare settings.

REFERENCES

1. Holler JG, Bech CN, Henriksen DP, et al. Nontraumatic hypotension and shock in the emergency department and the prehospital setting, prevalence, etiology, and mortality: A systematic review. *PLoS One*. 2015; 10:e0119331. Link
2. Sebat F, Musthafa AA, Johnson D, et al. Effect of a rapid response system for patients in shock on time to treatment and mortality during 5 years. *Crit Care Med*. 2007; 35:2568–2575. Link
3. Rivers E, Nguyen B, Havstad S, et al.; Early Goal-Directed Therapy Collaborative Group: Early goal-directed therapy in the treatment of severe sepsis and septic shock. *N Engl J Med*. 2001; 345:1368–1377. Link

4. Boyd JH, Forbes J, Nakada TA, et al. Fluid resuscitation in septic shock: A positive fluid balance and elevated central venous pressure are associated with increased mortality. *Crit Care Med*. 2011; 39:259–265. Link
5. Botker, MT, Jacobsen, L, Rudolph, SS, Knudsen, L. The role of point of care ultrasound in prehospital critical care: a systematic review. *Scand J Trauma Resusc Emerg Med*. 2018;26(1):51. Link
6. Fevang, E, Lockey, D, Thompson, J, Lossius, HM, Torpo Research, C. The top five research priorities in physician-provided pre-hospital critical care: a consensus report from a European research collaboration. *Scand J Trauma Resusc Emerg Med*. 2011;19:57. Link
7. van der Weide, L, Popal, Z, Terra, M, et al. Prehospital ultrasound in the management of trauma patients: systematic review of the literature. *Injury*. 2019;50(12):2167–2175. Link
8. Mosier, JM, Stolz, U, Milligan, R, Roy-Chaudhury, A, Lutrick, K, Hypes, CD, Billheimer, D, Cairns, CB. Impact of Point-of-Care Ultrasound in the Emergency Department on Care Processes and Outcomes in Critically Ill Nontraumatic Patients. *Critical Care Explorations*. 2019; 1(6):e0019. Link
9. Alfoti, BOO, Alfoti, FOO, Alothman, STH, Arfaj, TM, Al-Dhafiri, TM, Al-Harbi, NHM, Al-Khalidi, AM, Alzahrany, NDB, Abutalib, FM, Almojam, SA, Al-Hayani, SAM, Al Zaid, MMS, Alotaibi, AB, Hamed, AA, Alanezi, AA, Alawfi, MA, Al-Harbi, RAK, Alotaibi, NFA. Utilization of Point-of-Care Ultrasound (POCUS) in Emergency and Critical Care: Role of Nursing for Enhancing Diagnostic Accuracy and Efficiency-Systematic Review. *Egyptian Journal of Chemistry*. 2024. Link
10. Zieleskiewicz, L, Lopez, A, Hraiech, S, Baumstarck, K, Pastene, B, Di Bisceglie, M, Coiffard, B, Duclos, G, Boussuges, A, Bobbia, X, Einav, S, Papazian, L, Leone, M. Bedside POCUS during ward emergencies is associated with improved diagnosis and outcome: an observational, prospective, controlled study. *Critical Care*. 2021; 25:34. Link
11. Bobbia, X, Zieleskiewicz, L, Pradeilles, C, Hudson, C, Muller, L, Claret, PG, Leone, M, de La Coussaye, J-E, Winfocus France Group. The clinical impact and prevalence of emergency point-of-care ultrasound: A prospective multicenter study. *Anaesthesia Critical Care & Pain Medicine*. 2017; 36(6):383-389. Link
12. Vianen, NJ, Van Lieshout, EM, Vlasveld, KHA, Maissan, IM, Gerritsen, PC, Den Hartog, D, Verhofstad, MHJ, Van Vledder, MG. Impact of Point-of-Care Ultrasound on Prehospital Decision Making by HEMS Physicians in Critically Ill and Injured Patients: A Prospective Cohort Study. *Emergency Medicine Journal*. 2023; 40(6):333-339. Link