Echocardiography in Shock: How It Guides Care in Critical Patients

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1. INTRODUCTION

When a patient goes into shock, their organs do not receive adequate blood flow and oxygen, and without prompt intervention, this condition can quickly become life-threatening. Shock can arise from a variety of causes, such as cardiac dysfunction, severe hemorrhage, or infection. Each type necessitates a tailored treatment approach. Rapid identification of the underlying cause is therefore critical for guiding appropriate management.

Echocardiography is a bedside ultrasound of the heart. This procedure can provide real-time information about cardiac function, detect obstructions, and identify fluid-related issues contributing to shock.[1] It is non-invasive, rapid, and offers clinicians essential insights that can inform urgent treatment decisions. As such, international guidelines recommend the early use of echocardiography in patients presenting with shock.

Despite these recommendations, the extent to which echocardiography is utilized in intensive care units (ICUs), who performs the scans, the timeliness of imaging, and the impact of findings on clinical management remain unclear. This study addressed these questions by analyzing over 1,000 patients across 178 ICUs in the UK and surrounding territories, evaluating whether patients in shock received echocardiography, the type of scans performed, the personnel conducting them, and the influence of the findings on clinical decision-making.[2] Additionally, the study assessed adherence to guidelines regarding image storage and documentation of results.

2. PRIMARY FINDINGS

Despite guideline recommendations for routine use, only about half of patients (507 patients) in shock received an echocardiogram within the first three days of intensive care. When performed, echocardiography influenced clinical management in over half of cases, either by increasing diagnostic confidence or prompting changes in treatment, particularly in patients with shock due to cardiac dysfunction or obstructions. Most scans were conducted by critical care physicians rather than cardiologists, highlighting the established role of bedside imaging in the ICU. Simpler, rapid scans were typically performed earlier, while more comprehensive studies were conducted later. However, adherence to national standards for documentation and image storage was limited, with only one-quarter of echocardiograms meeting recommended requirements, underscoring ongoing challenges in ensuring safety and quality control.

3. HOW THIS IMPACTS PATIENT CARE

This study demonstrates that echocardiography is a powerful tool that can directly inform life-saving decisions, yet its use remains inconsistent. When utilized, it enables clinicians to select appropriate treatments more rapidly, avoid unnecessary or potentially harmful interventions, and identify dangerous but treatable causes of shock at an early stage. The findings indicate that broader, around-the-clock access to echocardiography could improve both the timeliness and equity of care for critically ill patients. Enhancing physician training and ensuring proper documentation and image storage could further promote patient safety and optimize outcomes. Overall, echocardiography significantly supports clinical decision-making in shock, but many patients still do not receive its benefits, highlighting an opportunity to save lives through expanded access.

REFERENCES

1. Cleveland Clinic. (2022, May 9). Echocardiogram: Procedure, preparation & duration. Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/16947-echocardiogram
2. Flower L, Waite A, Boulton A, Peck M, Akhtar W, Boyle AJ, Gudibande S, Ingram TE, Johnston B, Marsh S, Miller A, Nash A, Olusanya O, Parulekar P, Wagstaff D, Wilkinson J, Proudfoot AG; NEAT ECHO Collaborators. The use of echocardiography in the management of shock in critical care: a prospective, multi-centre, observational study. Intensive Care Med. 2024 Oct;50(10):1668-1680. doi: 10.1007/s00134-024-07590-6. Epub 2024 Aug 19. PMID: 39158704.

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Shirin is an undergraduate student at the University of Maryland studying chemical engineering. She joined RAP-EMCC to pursue her passion for medicine and patient experience. Outside of the hospital, she is a researcher at a lab exploring drug delivery methods to prevent pre-term birth. She is also a volunteer at America Reads. In her free time, she enjoys figure skating, crocheting, and visiting art museums.