Review Article

PREHOSPITAL POINT-OF-CARE ULTRASOUND (POCUS)

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ABSTRACT

POCUS is instrumental in improving patient outcomes and person-centered care. It is performed as a bedside test and it is interpreted by the attending physicians. It is highly important in emergency medicine to use as a rapid diagnostic tool. Training Requiremen Formal ultrasound training is a requirement for prehospital physicians. It is an added advantage if the paramedics and nurses can learn POCUS programs that include both practical and instructive training. After the formal training, it is necessary to get educated in various courses, unit- level in-services, and medical education. Applications of POCUS in Prehospital settings Several applications such as enhancing various medical and traumatic pathologies can be achieved through the correct administration of POCUS. POCUS plays a very important role in the termination of resuscitation (JEMS 2018). Quality Assurance of POCUS in Prehospital Settings For better quality assurance, skill retention is very important for a better application of prehospital ultrasound. Limitations of POCUS in Prehospital Settings There are a few limitations of POCUS such as the response time of the emergency care professionals. Conclusion Thus, the impact of the prehospital point-of-care of ultrasound is quite important to determine and identifying patient outcomes and patient-centered care. the technological advancements help to address several factors in education, quality assurance, and feasibility of POCUS. POCUS is standard care in several prehospital settings used to reduce morbidity and mortality.

Keywords: emergency medicine, diagnostic tool, resuscitation, ultrasound, quality assurance

INTRODUCTION

Prehospital point-of-care ultrasound (POCUS) is a requirement for the treatment of critically ill patients. It is an essential component for physicians not only in hospital settings but also in prehospital settings. Recent technical progress has helped POCUS to be integrated into various prehospital emergency settings [1]. Prehospital care refers to the emergency medical care setting at any scene of a catastrophe. Evaluation of the situation and the medical resources needed will be determined by the emergency medical services (EMS) [2]. There has been a great evolvement in the use of ultrasound in prehospital settings due to the growing evidence-based support and various technological advances. It is possible to identify life-threatening disorders if the POCUS and ultrasound examination are correctly perform

BACKGROUND

POCUS is instrumental in improving patient outcomes and person-centered care. It is performed as a bedside test and it is interpreted by the attending physicians. It is highly important in emergency medicine to use as a rapid diagnostic tool. Various diagnoses from appendicitis, respiratory failure, gallbladder stones, cardiac arrest, and traumatic injury can be performed through POCUS [3]. Sometimes, in emergencies. Radiological investigations delay the process of the diagnosis. So, the importance of POCUS in various radiological diagnoses is very important to deal with the increasing demands. It helps to incorporate sonographic findings with the clinical examination of the patients [4]. POCUS also helps to reduce the need for secondary clinicians and the need for a different ultrasound room. It is an economical approach helpful to diagnose a range of diseases [5].

Training Requirement

Formal ultrasound training is a requirement for prehospital physicians. It is an added advantage if the paramedics and nurses can learn POCUS programs that include both practical and instructive training. After the formal training, it is necessary to get educated in various courses, unit-level in-services, and medical education. In various pre-hospital settings, training range from vascular, abdominal, cardiac, and thoracic scan to critical care for POCUS [6]. Various assessments are undertaken such as the implementation of the knowledge in real-time situations to measure patient outcomes. When it. comes to POCUS, competency is a major factor in pre-hospital settings [7]. The standardization is analyzed by noting the minimum number of scans in the educational matrix. Some of the outcomes for measuring competency include a proper understanding of the basic principles of ultrasound, functioning of the controls for the ultrasound, anatomy of the normal and pathological ultrasound, expectations of the imaging during patient scanning, and optimizing the ultrasound images [8].

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Applications of POCUS in Prehospital settings

Several applications such as enhancing various medical and traumatic pathologies can be achieved through the correct administration of POCUS. POCUS plays a very important role in the termination of resuscitation[9]. The ability to identify the presence and absence of any cardiac activity helps to prepare paramedics to perform POCUS swiftly [10]. POCUS pulse checks can be performed in less than 5 seconds with the help of the ultrasound probe. POCUS also helps to identify the various reversible causes of cardiac arrest such as pneumothorax, cardiac tamponade, and pleural effusion. The focussed Assessment with sonography for Trauma (FAST) is a very important test to identify medical and traumatic pathologies (ITN 2019). The accuracy is more than 90% in POCUS to detect and diagnose pneumothorax. This helps to perform urgent interventions for the disease which prevents any further complications. During CPR, POCUS helps to provide and guide chest compressions and hand position. Implementation of POCUS helps to improve the circulation in Out-of-Hospital Cardiac Arrest (OHCA) and provides good neurological outcomes. POCUS also helps to determine the diagnosis of appendicitis accurately which ultimately reduces the length of stay in emergency care. In a prehospital care setting, ultrasonography is also used to determine the diagnosis of bowel obstruction which includes peristalsis and edema. A very recent use of POCUS is to determine early pregnancy, especially ectopic pregnancy. POCUS has a very high accuracy to determine the heart activity of the fetus, and in establishing abortions. Implementation of POCUS helps to ensure better radiological interventions and better results concerning trauma care and resource allocation [9].

Quality Assurance of POCUS in Prehospital Settings

For better quality assurance, skill retention is very important for a better application of prehospital ultrasound. In any prehospital setting, there is a high probability of several high risk procedures [5]. To perform such procedures in a risk-free environment, it is essential to provide continuous training and education to the care team. It is recommended to receive continuing education for 10 hours every 2 years [4]. The magnitude of knowledge regarding ultrasound and the frequency of use are important criteria to determine the efficiency of emergency physicians. Physicians should be able to perform and capture images to document all the findings. All the documentation should be stored securely to review and assess the results and determine any incidental findings.

Limitations of POCUS

in Prehospital Settings There are a few limitations of POCUS such as the response time of the emergency care professionals. Sometimes, the choice of the hospital may not be available which will increase the distance between patients and hospitals [3]. A few times, it is difficult to obtain the images of the ultrasound and even perform an incomplete evaluation of POCUS. Improper use of ultrasound and uncertain findings can cause detrimental effects on the patients (JUCM 2021). The severity of the disease is an important factor in determining the accuracy of POCUS. POCUS may also take additional time and cost to perform during every consultation (Hammadah et al. 2020).

CONCLUSION

Thus, the impact of the prehospital point-of-care of ultrasound is quite important to determine and identifying patient outcomes and patient- centered care. The technological advancements help to address several factors in education, quality assurance, and feasibility of POCUS. POCUS is standard care in several prehospital settings used to reduce morbidity and mortality. An accurate and safe diagnosis is a prerequisite that will determine the course of the treatments needed by the patient. POCUS has the potential to modify hospital management. For proper implementation of POCUS, many ground, and air medical critical care units are required. With the right training and education, it is possible to achieve appropriate ultrasound images. In summary, POCUS in a prehospital setting is instrumental for better diagnosis and management of critically ill patients.

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