Applications of portable magnetic resonance imaging in neuroimaging of critically ill patients: A systematic review

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ABSTRACT

Introduction: Magnetic resonance imaging (MRI) is one of the preferred imaging modalities in neuroimaging. However, the use of conventional MRI is often associated with the risk of adverse events during intrahospital transport (IHT) and MRI-related accidents for patients in the intensive care unit (ICU) or emergency department (ED). Portable MRI (pMRI) has been proposed to be a safer approach than conventional MRI for neuroimaging critically ill patients in the ICU or ED. **Materials and Methods:** This review identifies the type of brain abnormalities that can be diagnosed by pMRI for critically ill patients in the ICU or ED and evaluates its feasibility features. A systematic review was performed through a comprehensive literature search in PubMed, Scopus, and the Hyperfine website. Two reviewers independently reviewed relevant articles based on the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines. **Results:** Nine studies were included, compromising 410 adults and 14 neonates from ICU and ED. Of these numbers, 386 had brain abnormalities or were suspected of having them, and 38 were healthy controls. The types of brain abnormalities diagnosed using pMRI during neuroimaging of critically ill patients in ICU and ED were brain haemorrhage, stroke, infections, injury, neoplasms, and neonatal brain abnormalities. The feasibility features of pMRI include shorter scanning duration, patient and staff safety, mobility, and requirements in neuroimaging critically ill patients. **Conclusion:** Notably, pMRI can diagnose multiple brain abnormalities and is feasible for use on critically ill patients in ICU and ED. Nevertheless, more work is warranted to explore further the deployment of pMRI in emergency and neonatal examinations.