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Close-to-Bedside MRI Scanning in the Neurointensive Care Unit

Thorsteinn Gunnarsson¹, Per M. Karlsson¹, Anders Tisell^{1,2}, Jacob Engström¹, Marcelo Martins¹, Martin Nilsson¹, Jan Hillman^{1,2}

¹ Region Östergötland

² Linköpings universitet

Background

Multiple imaging and monitoring techniques exist for patients in neurointensive care (NICU). Bedside CT and MRI are however not readily available in most hospitals. In addition to our bedside CT scanning, we have developed a Close-to-Bedside MRI scanning technique for our NICU patients.

Material and Methods

The intraoperative MRI scanner is a 3T MAGNETOM Skyra (Siemens Healthcare, Erlangen, Germany) located in the NICU. All additional monitoring such as EVDs, EEG electrodes, microdialysis and laserprobes are MRI compatible. Patients are transferred from their NICU bed directly over to the MRI table and wheeled to the MRI scanner in the next room. All standard MR sequences are available along with quantitative blood flow using NOVA (Vassol inc.), perfusion using anterior spin labelling (ASL) and cerebral vascular reactivity using BOLD MRI.

Results

A total of 218 scans have been performed: 120 on neurosurgery inpatients, 53 on NICU patients, 23 intraoperative and 22 on COVID-19 patients (research project). One serious safety incident has occurred related to breach of protocol. We will discuss our updated clinical results and experience, demonstrate the technique, blueprints of the facilities and protocols implemented for the safe and effective execution of this technique.

Conclusion

By careful planning and training of personnel, Close-to-Bedside MRI scanning of NICU patients is possible, even during ongoing procedures in the MRI-OR-suite. This contributes to patient safety, minimizes staff workload and maximizes the returns of this big investment. With safe access to repeated scanning of unstable NICU patients this will enable us also to advance the field of neurointensive care.