Background

• The continuous, simultaneous evaluation of cerebral function and vital signs (multimodal monitoring) has become standard of care in many neurocritical ICUs.
• There are many perceived benefits to data interoperability in the context of multimodal monitoring, for example;
  • Clinical decision support
  • Automated event detection
  • Smart alarms
  • Personalized medicine

• However a standardized, integrated information architecture does not exist yet to take advantage of these benefits. Data is collected from disparate sources and extraction of real-time actionable information is still limited, to the disadvantage of patient care.

Methods

We identified interoperability challenges and benefits in two large studies using the Moberg CNS Monitor as data collection platform.

<table>
<thead>
<tr>
<th>TRACK-TBI</th>
<th>CENTER-TBI</th>
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</thead>
<tbody>
<tr>
<td>7 of 11 U.S. sites</td>
<td>13 of 28 European sites</td>
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<tr>
<td>40 patients</td>
<td>62 patients</td>
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Results

1. The variability and availability of measurements from devices across sites remains a barrier to uniform data collection but was minimized by our device connectivity solution.
2. We found a need for annotation standards, regarding clinical events.
3. Data transfer was hindered where systems were not networked, requiring resources and dedicated encrypted hard drives.
4. The lack of a sharable archive format for high-resolution data has delayed data aggregation.
5. The cost (time and resources) for successful data collection was greatly underestimated.
6. Harmonization of neuromonitoring data across domains with clinical, imaging, biomarker and outcome data requires significant IT resources.

Discussion

• We presented the neurocritical care needs that still need to be addressed in terms of data collection and management.
• The Moberg CNS Monitor facilitated uniform data collection of multimodal monitoring data across sites.
• Efforts are still needed to optimize archiving and sharing of data through a high-resolution data management system, in order to take full advantage of the collected data beyond EMRs.

Next goals:

• Optimize the archiving and sharing of high-resolution data in order to maximize the potential of collected information to answer scientific questions.
• Provide user-based recommendations to professional organizations and industry to accelerate translation of trial results into field-deployable solutions.

Acknowledgement

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