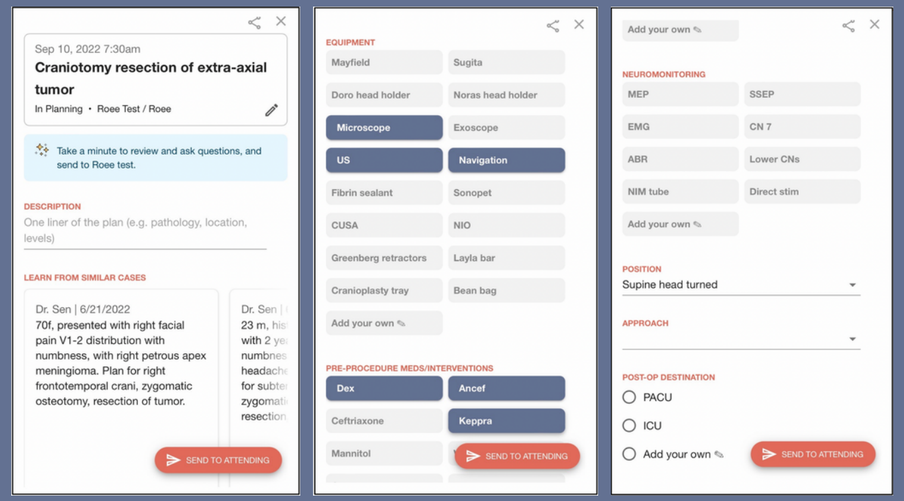
Streamlining Perioperative Workflows through a Multi-disciplinary Communication Mobile App in Neurosurgical Cases: A Quality Improvement Study

Introduction

Complexity and nuance surrounding neurosurgical cases make this service vulnerable to operational inefficiencies, complications and adverse events, and exceeding costs. By incorporating sustainable basic team communication practices/huddles, we can significantly improve quality and efficiency outcomes in such a dynamic environment. In this project, we evaluated the effects of a preoperative "digital huddle" through a multi-disciplinary mobile application that was succinct, readily accessible, easy to use, and linked nursing to surgical and anesthesia staff on a pre-operative discussion, ranging from positioning equipment to anesthesia medication administration.



Methodology

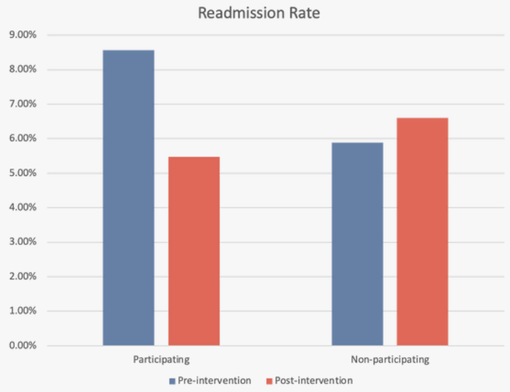
Objective and subjective data were gathered on various aspects of the perioperative workflow from March 2021 to February 2022 before the implementation of a "digital huddle" through a mobile app. Case details in the app were shared among nursing staff, surgical techs, surgeons, anesthesiologists, device coordinators, and intraoperative monitoring personnel involved in the case. During the post-implementation analysis, non-participating surgeons served as controls and were compared to participating surgeons using objective and subjective data from March 2022 to August 2022.

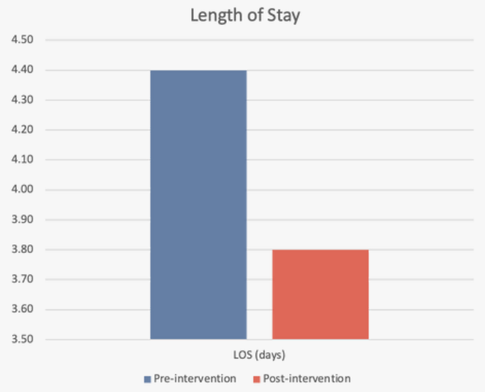
Primary objective quality outcomes included morbidity and mortality, length of stay, and 30-day readmission rates. Primary objective efficiency outcomes included differences in time to incision, delays in case starts, cases overrun by >30min., and case time prediction accuracy. Secondary subjective outcomes included surveys filled out by anesthesia and nursing staff on their personal observations.

Results/Findings

985 and 409 cases performed by non-participating surgeons in the pre- and post-intervention periods respectively. 1554 and 689 cases performed by participating surgeons in the pre- and post-intervention periods respectively with a compliance rate of 77%.

For participating surgeons, a decrease was observed in 30-day admission rates (8.16% to 5.48%, p=0.028), average length of stay (4.4 to 3.8 days, p=0.019), time to incision (66 to 63 minutes, p=0.02), and overrun cases (41% to 36.22%, p=0.2), and an increase in case time accuracy (34.6% to 43.1%, p=0.0005). For non-participating surgeons, no significant change was observed in any of these categories. Improvements across numerous domains of quality and efficiency were reported in surveys among nursing and anesthesia staff, including the ease of use of the application. An unexpected result was the opportunity for nursing to be a part of the teaching provided by attending surgeons to residents related to case needs, approach, incision, and case length.





Conclusion

Through the integration of a "digital huddle" by use of this mobile app, we can significantly reduce readmission rates, length of stay, and improve communication and efficiency in our perioperative workflow within 5 months. Moreover, this simple and easy to use application offered a platform that fostered nursing engagement in surgical planning practices where nursing plays a crucial role in orchestrating OR processes. This demonstrates that technology is key to scalable and sustainable solutions that can positively impact current practices, patient outcomes, and nurse/doctor relationships.

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