NIA IMPACT COLLABORATORY
TRANSFORMING DEMENTIA CARE

Demonstration Project

Integration of Machine Learning and Clinical Decision Support to Prevent Postoperative Delirium in Patients with Cognitive Impairment

Kerry Meyers, MPH, Eric Rome, MD, Pooja Anand Gownivaripally, Ira Hofer, MD | Mount Sinai Health System

OBJECTIVE: This randomized clinical trial is using perioperative clinical decision support tools (CDS) system to decrease the incidence of post operative delirium (POD) by increasing adherence to clinical best practices.

DESIGN, SETTING, AND PARTICIPANTS:

- Design: Prospective stage IV pragmatic randomized control trial
- Setting: The Mount Sinai Health System (MSHS) in Manhattan, NY
- Participants: MSHS surgical patients with underlying cognitive impairment (CI) (identified by natural language processing and structured EHR data). The enrollment goal is 12,000 participants prospectively and 12,000 patients as historical controls.

INTERVENTION AND IMPLEMENTATION:

- CDS alerts of 12 clinical best practices in 5 domains; (1) avoid potential inappropriate medication, (2) perioperative glycemic control, (3) avoid hypotension, (4) maintain normothermia, and (5) titrate anesthetic depth.
- Alerts are non-disruptive and displayed on a banner and sidebars and don't contain hard stops so they do not interrupt clinical workflows.

MEASURES:

Implementation evaluation endpoints:

- Presence of POD is measured by the 4 A's Test (4AT) performed by providers caring for patients as part of their usual clinical duties.

Primary clinical outcome:

- Incidence of POD between intervention and controls.

Secondary clinical outcome(s):

- The ability of CDS prompts to increase best practice adherence as measured by documentation of the best practices in the EHR as part of the usual patient care.
- The impact of 4AT screening prompts on medical provider post-operative care practices.

RESULTS:

- As of 3/11/2024 there have been 3,486 patients enrolled and 730 4AT assessments recorded.
- We expect the CDS alerts that provide anesthesiologists real-time prompts will increase adherence to these practices and reduce POD.

RELEVANCE: With the extremely high rate of POD in patients with CI, that is associated with associated with in-hospital complications, longer hospitalization, post-discharge worsening of health, progressive cognitive decline, dementia, and death, our rigorous and innovative approach executed by an experienced multidisciplinary team, with access to unique resources and tested platforms, will lead to insights that are clinically relevant and change clinical practice for POD prevention in patients with CI.