Brain Pro-TCT: Quality improvement of delirium detection on a cardiothoracic surgical ward

Miarca ten Broeke, MANP¹, Dr. Frank R. Halfwerk¹,², Wim P.R. Henckens, MANP¹
Anna Weierink, MSC³, Dr. Ab G. Hensens¹, Prof. Dr. Job van der Palen⁴,⁵
¹ Thoraxcentrum Twente, Medisch Spectrum Twente (MST), ² Dept. of Biomechanical Engineering, University of Twente, ³ Psychiatry, MST, ⁴ Dept of Epidemiology, MST, ⁵ Section cognition, data and education, University of Twente, Enschede, the Netherlands

LESSONS LEARNED
✓ Delirium is perceived as a problem for others
✓ It is a problem for all stakeholders!
✓ Involve all stakeholders early in the innovation project
✓ Objective screening of delirium changes nurses’ perspective to the individual patient
✓ Measure change as objective as possible
✓ Interim analysis: decrease in length of hospital stay

1. CONTEXT AND PROBLEM
Delirium:
• is a syndrome of acute brain failure
• presents as hypo-active, hyper-active or mixed
• associated with adverse long-term outcomes, more readmissions to hospital, decreased cognitive and functional outcomes

DOSS (Delirium Observation Scale Score):
• Incidence of delirium of 13 to 17% in elective patients aged ≥45 years (Koster, 2012, Ten Broeke, 2018)
• Subjective: hypo-active delirium is often missed

DeltaScan® (a new medical device):
• Single-channel electroencephalography (EEG) to screen delirium based on detection of delta waves
• Objective: finds delirium more often and earlier?

Hypotheses:
Early delirium detection allows early treatment of underlying causes and shorter hospital stay for patients ≥70 years following cardiac surgery
1) Delirium incidence increases from 15% to 30%
2) Length of stay reduction with at least 1.5 days

2. INTERVENTION AND STRATEGY FOR CHANGE
Quality improvement project on thoracic surgery ward:
• Education on the importance of delirium screening
• Training to nurses, nurse practitioners and physicians
• Working group with nurses and nurse practitioners

First cohort:
• Using DOSS as standard care
• 3 times a day post-operative on the ward

Second cohort:
• Using DeltaScan® as standard care
• 2 times a day post-operative on the ward

3. EFFECTS OF CHANGES (INTERIM ANALYSIS)
Delirium incidence increased significantly from 15% (67/444) to 21% (58/276), p = 0.041

Length of delirium decreased not significantly from 77 (51 to 132) hours (DOSS cohort) to 69 (47 to 96) hours (DeltaScan® cohort), p = 0.19

Length of hospital stay decreased significantly from 9 (6 to 16) days (DOSS cohort) to 6 (5 to 10) days (DeltaScan® cohort), p = 0.007

4. QUALITY VS COSTS (INTERIM ANALYSIS)
Quality improvement?
• Length of stay ↓
• Delirium duration did not change

Costs?
• Screening costs (device and disposables) ↑
• Length of stay ↓

Cost-effectiveness: at end of study

5. SETTING AND FUNDING
Cardiothoracic surgery ward, Thoraxcentrum Twente Medisch Spectrum Twente, Enschede, the Netherlands, non-academic teaching hospital

Inclusion period and number of patients
• DOSS from April 2021 till May 2022 n = 444
• DeltaScan® from May 2022 ongoing n = 276

Funding
• Part of the costs are covered by Hartcentrum Twente Foundation
• Prolira provided training and DeltaScan® devices during the study period free of charge and applied a discount to the disposable patch costs

CONTACT
m.tenbroeke@mst.nl
Miarca ten Broeke, MANP