Decreasing Time To Ventriculostomy Placement In The Emergency Room Via Process Map Analysis And Implementation Of EVD Supply Cart

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Introduction

• For critically-ill patients requiring CSF diversion, minimizing time to EVD placement is of utmost importance. EVDs are most commonly placed in the emergency department. Successful and efficient EVD placement require seamless coordination among several teams – neurosurgery residents, emergency medicine physicians, nursing staff, pharmacy, core lab, and others.

• We sought to understand factors affecting time to EVD placement via a quality improvement initiative. Use of process mapping, root cause analyses, and interviews of staff involved in the EVD placement process revealed several potential sources of EVD placement delays.
Process Map

- Process map was generated and root cause analysis was performed.

- We identified decentralized supply storage as a major contributor to delays in EVD placement. We sought to develop an “EVD Cart” as a potential solution to this problem.
EVD Crash Cart

• On 1/19/2018 an EVD “crash cart” was established in the center of ER

• Time to EVD tracked prospectively using the EMR time-stamps

• Educational in-service sessions were scheduled with the day and night shift nurses and patient care technicians in ER
Results

• In total, 15 pre-cart and 23 post-cart EVD procedures performed between October 2015 and October 2019 met our inclusion criteria and were included in our analysis.

• Using the time elapsed from patient arrival to nursing time-out for EVD placement, we calculated time-to-EVD for each of these patients.
Results

Mean time-to-EVD for the pre-cart cohort was 153.07 +/- 67.03 min compared to 96.47 +/- 31.22 min ($p = 0.103$). Median time-to-EVD was 122 min (pre-cart) compared to 72 (post-cart) ($p = 0.147$).
Conclusions

• Many factors affecting the time required to place an EVD in critical patients were identified utilizing a quality improvement framework. Placement of a fully-stocked EVD cart in the ED resulted in a large reduction of mean time-to-EVD placement, but did not achieve statistical significance likely due to the heterogeneity of factors that affect the time until this procedure can be safely performed.
Summary Points

• Minimizing time to EVD placement in the emergency department is of utmost important for patients with acute hydrocephalus
• After performing a root cause analysis, we identified supply availability to be a common source of delays
• We developed an implemented an EVD cart with all supplies necessary for EVD placement
• We observed a decrease in time to EVD placement after initiating the EVD cart protocol