Stroke Codes in the Post-Anesthesia Care Unit (PACU): Streamlining Hyper-acute Care

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Introduction

Surgical procedures put selected patients at an increased risk for stroke. Many surgical patients have underlying co-morbid stroke risk factors such as hypertension, heart disease, diabetes and dyslipidemia. Stroke risk is further complicated by the subsequent hypercoagulable state and inflammatory response from surgery, as well as by holding anti-thrombotic and anti-coagulation medications prior to surgery. As such, Post-Anesthesia Care Unit (PACU) staff include a neurological assessment as part of their post-operative care and are educated in the stroke code activation process if they suspect a patient may be experiencing symptoms of a stroke.

A collaborative initiative with the stroke team and the PACU staff aimed to optimize the management of peri-operative patients at risk for stroke with a standardized rapid assessment and incorporating safe peri-anesthesia transitions of care.

Background

The post-anesthesia care unit (PACU) on the main campus of this institution is a level one trauma surgical center that specializes in surgical procedures across the fields of neurology, oncology, gynecology, cardiothoracic and gastroenterology. The PACU is a 24-hour care area consisting of a combined Phase I and Phase II assessments.

In 2022 the organization performed 23,678 surgical cases; 11,342 surgical patients were considered "outpatient," and therefore discharged the same day as their surgery. The remaining patients had been admitted and were transferred back to their inpatient units following their surgery.

Historically when an acute neurological change was identified in an "outpatient", a rapid transfer to the Emergency Department (ED) was necessary for evaluation and management. This work-flow was warranted as there were barriers that limited the team's ability to replicate the "inpatient" stroke code workflow.

Gap Analysis/Methods

An interdisciplinary committee was formed to identify workflow gaps that caused evaluation and treatment delays. The collaborative committee, consisting of PACU nursing and medical leadership, and stroke program nursing leadership, reviewed current state including volume and processes of stroke codes during the prior year. The committee aimed to streamline the diagnostic and intervention phases of acute stroke care, regardless of "inpatient" or "outpatient" status.

Deltas of previous workflow:

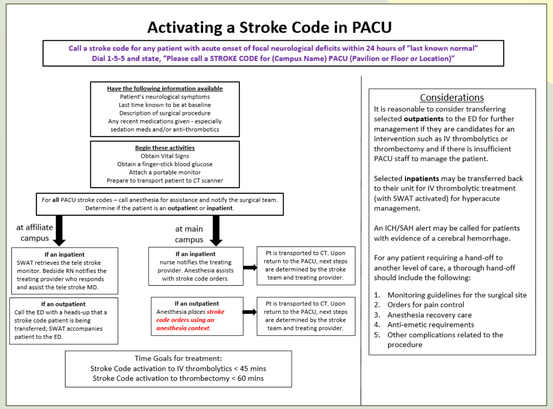
- Delays in transport to CT scan, imaging acquisition, and treatment decisions
- Patients were at increased risk for anesthesia and surgical recovery complications in the ED due to lack of specialty training

Barriers to an efficient workflow process:

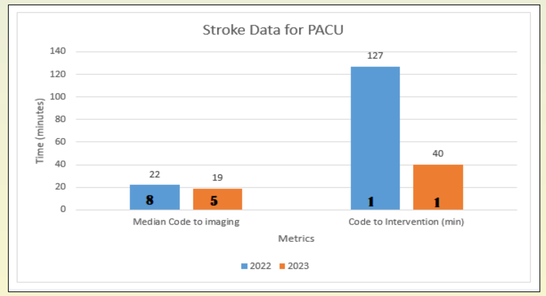
- As a consulting team, the stroke code team requires a readily available covering provider to co-manage the code process.
  - Inpatients had an assigned covering provider that could respond to stroke codes to co-manage the patient; outpatients did not.
- A rapid non-contrast brain CT is required as part of the initial hyper-acute evaluation
  - Inpatient orders were easily identified in the Electronic medical record (EMR) CT scanning queue; but outpatients orders were diverted to the larger EMR outpatient CT scanning queue (and not identified as "stat") thereby causing delays in acquisition.
  - The outpatients were directed to the ED – bypassing the opportunity to obtain a stat CT brain at a nearby scanning location

Solutions

- A PACU anesthesia resident is now assigned exclusively to the recovery room and available during the patient's PACU stay. The anesthesia team committed to a resident responding to the stroke code and serving as the covering provider to help manage the initial stroke code process, regardless of "inpatient" or "outpatient" status.
- Nursing management committed to supporting the workflow and keeping the "outpatient" procedure patients in the PACU during the initial stages of the evaluation with a plan to assess the resources needed if an acute intervention was considered.
- Stroke code orders in the EMR were revised to allow for the brain imaging orders to be properly flagged by the CT technologist as "stat".
- All patients would be rapidly directed to the nearby CT scanner to undergo a brain CT and to then return to the PACU for further care.
- A revised algorithm was developed to account for the actions, roles and "decision tree" at each of the hospital campuses. It proposed to the interdisciplinary team leadership for approval.



Data/ Discussion



We compared time targets in 8 cases in 2022 and 5 cases in 2023; we noted a trend in reduced times to imaging acquisition and there was improved (faster) time 127 to 40 mins when comparing 2022 to 2023 interventions. Further data abstraction will better characterize the potential for reducing evaluation and treatment times for all PACU inpatients and outpatients.

Interdisciplinary committee continues to guide practice through printed algorithms on the unit, providing screenshots of how to place the orders for residents, continuous education to anesthesia, PACU staff and stroke response team.

References and Acknowledgements

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