



Showcase for Hopkins Inquiry and Nursing Excellence

SHINE

Conference

Initiation of a Comprehensive Carotid
Endarterectomy Care Pathway is Associated with
Lower ICU Admission Rates and a Significant
Reduction in Hospital Charges

Tim Madeira, DNP, ACNP-BC, CCNS, CCRN, PCCN



JOHNS HOPKINS
NURSING

Objectives

I hope that this presentation will make you feel more confident with...

- ***Utilizing*** the evidence in the literature and in your work setting to guide the creation of a standardized care pathway.
- ***Applying*** core concepts to clinical patient groups that may benefit from a standardized care pathway.
- ***Contrasting*** patient characteristics with system structures to formulate a plan to make system change.

Nurses thinking like a detective:



Who?

What?

When?

Where?

Why?

Set the scene.

What happens/ed from start to finish?

Look at the problem from all views.

Find out as much information as possible.

Look at all subjective and objective data.

Carotid Endarterectomy

What is it? Who needs this surgery?

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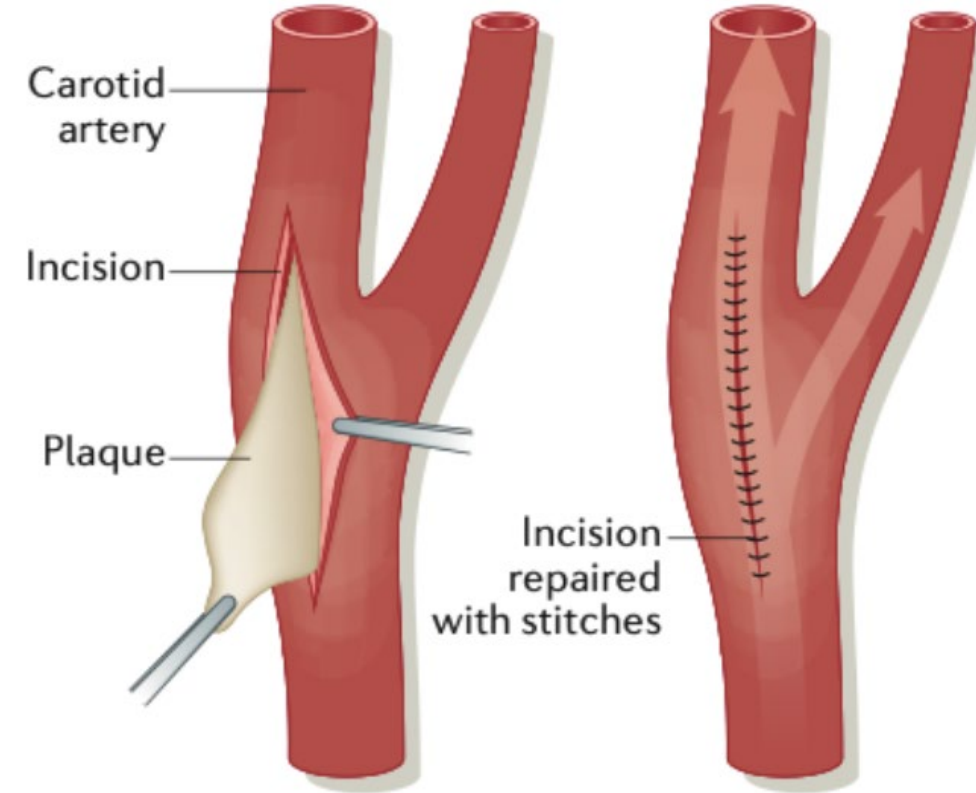
During a CEA, a vertical skin incision is made along the sternocleidomastoid border, down to the carotid sheath, which is opened longitudinally to expose the carotid arteries. The plaque is then removed, and the artery is closed using either sutures or a patch.

Anesthesia: General anesthesia

Pre Procedure: Carotid duplex ultrasound, CTA, MRA, or cerebral angiography for diagnosis

Post Procedure: No imaging required

Medications: Starting aspirin is recommended pre-procedure, and continued indefinitely afterwards.



Picture courtesy of Nature Reviews Cardiology

Intra-Operative & Post-Operative Care

What can happen in the OR? What are recovery concerns?

- Intra-Op:
 - **BP fluctuations:** Multifactorial
 - Prior history of HTN
 - Carotid manipulation
 - Pain-induced sympathetic nervous system stimulation
 - Anesthesia induction
 - **Treatment:**
 - **Hypotension (hypovolemia):** Cautious volume expansion with isotonic crystalloid, colloid, or blood
 - **Hypotension (normovolemia):** IV phenylephrine, norepinephrine
 - **Hypertension:** IV labetalol, nitroglycerine
- Post-Op:
 - **Most Common Complications:**
 - Cranial nerve injury
 - Neck hematoma or bleeding
 - Hypotension
 - Hypertension
 - Cerebral hyperperfusion syndrome:
 - 0.4%-7.7% incidence
 - Stroke: 2.3%
 - Infection: <1%
 - Anesthesia-related complications
 - Majority of complications arise within the first 8 hours of recovery.

Nursing Considerations

What are care expectations? Things to look for?

Neuro Assessments

- **Neuro checks** will be done q 1 hour with VS X 2, q 2 hr. X 2, and then q 4 hr.
- **During Neuro checks assess** for mental orientation and level of consciousness.
- **Assess Cranial Nerves:**
 - **Hypoglossal-** Midline tongue, swallow
 - **Facial-** Smile and puff cheeks
 - **Vagus-** Ability to speak
 - **Spinal Accessory-** Raise arms and sustain for 3 seconds
- **Assess pupillary reaction** during neuro checks.
- **Assess** all four extremities for equal strength, movement, and sensation.

Physical Assessments:

- Airway is intact
- Neck for edema, hematoma, tracheal deviation
- Respiratory distress (stridor)
- Drooling and/or problems swallowing.
- Assess heart & breath sounds.
- Incision – Approximation of edges, bleeding, drainage, or redness

Assess Vital Signs: Due to manipulation of baroreceptors close to the carotid artery, BP control is very important and must be within normal parameters.

Evaluate heart rhythm for any arrhythmias.

Evidence

“Don't reinvent the wheel”

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The screenshot shows the Welch Medical Library website. The browser address bar is `welch.jhmi.edu`. The page features a navigation menu on the left with links for Home, Get Help, Services, Featured, and About. On the right, there are links for LOCATIONS AND HOURS, CONTACT US, and LOGIN. A central search interface is visible, with a dropdown menu on the left containing 'Articles', 'Journals', 'Databases', 'Library and Research Guides', and 'Books, Journals and Media'. The 'Articles' option is selected, displaying a 'SEARCH SCOPUS' search box with a search bar containing 'Article title, Abstract, Keywords' and a search button. Below the search box is a text input field labeled 'Search Scopus for...'. A red circle highlights the 'Find Your Informationist' section in the 'Services' area, which contains a search bar for 'Informationists by name or depa...'. Other sections include 'Key Resources' with links to Clinical Tools, Literature Databases, and Research Tools; 'Welch Classes' with titles like 'Manipulating and Joining Data in R with dplyr'; and 'Reserves' with buttons for 'MY RESERVES' and 'SUBMIT RESERVES'.

Key Resources

Clinical Tools

Clinical Key Lexicomp
Clinical Key for Nursing UpToDate
DynaMedex

Literature Databases

PubMed Embase
CINAHL Plus PsycINFO
Cochrane Web of Science

Research Tools

Citation Management JH ORCID Registry
Covidence JH Research Expert Profiles
Dimensions Research Guides

Welch Classes

Manipulating and Joining Data in R with dplyr

Apr 11, 2024, 1:00pm-2:30pm

Interactive Data Visualization in R with Shiny

Apr 16, 2024, 1:00pm-4:00pm

PubMed: Getting Started at Johns Hopkins Online

Apr 17, 2024, 12:00pm-1:00pm

All About Sharing Data on the Johns Hopkins Research Data Repository

Apr 18, 2024, 12:00pm-1:00pm

Services

Find Your Informationist

Informationists by name or depa...

Reserves

For Students:

MY RESERVES >

For Instructors:

SUBMIT RESERVES >

Interlibrary Loan

REQUEST AN ITEM >

Evidence

What does the literature say? Here are some highlights...

- Not much evidence in the literature.
- Strength of the evidence: Majority of articles were non-experimental and quality improvement.
- There was evidence that care pathways lead to better outcomes, better patient satisfaction, & shorter LOS



Clinical Practice Guideline

Society for Vascular Nursing—Carotid endarterectomy (CEA) updated nursing clinical practice guideline



Kathleen Rich, PhD, RN, CCNS, CCRN-CSC, CNN, Diane Treat-Jacobson, PhD, RN, FAHA, FSVM, FAAN, Theresa DeVeaux, MSN, RN, ANCP, CV, CCRN, Karen Fitzgerald, MSN, RN, NP, CVN, Laura Kirk, PhD, RN, Lily Thomson, RN, BN, CPN(C), RNFA, Anne Foley, MSN, RN, AGACNP, CDE, Debbie Hill, RN, and For the Society for Vascular Nursing Practice and Research Committee

This guideline was endorsed by the Executive Committee of the Society for Vascular Surgery.

Evidence

Nursing Guideline (2017)

4. POSTOPERATIVE CARE

4.1. Assessments

After surgery, the patient is transferred to a specialized stepdown unit or the same unit after the procedure.

1. Obtain VSs (BP, apical heart rate, oxygen saturation, level of consciousness) at the specified intervals thereafter according to the patient's condition. PACU scoring system. Maintain the SBP >90 mmHg to avoid postoperative cerebral hematoma formation, hypotension syndrome.^{52,117} Respiratory effort, and syncope present, maintain systolic blood pressure policy. Pain and sedation using a standardized scale. Options include the Ramsay Sedation Scale, Motor Activity, Sedation-Agitation, or the Ramsay Sedation Scale.¹¹⁸ Pain is typically self-reported using a numeric or Faces scale.¹¹⁹ There is a lack of evidence

regarding the frequency in obtaining VSs during the immediate postprocedure period. A single controlled trial of 189 patients compared a protocol (VS every 1 hour for 4 hours then every 4 hours for 24 hours) to standard care (VS every 1 hour for 4 hours then every 4 hours for 24 hours) for postoperative patient monitoring. There were no significant differences observed between the two groups at 4 or 24 hours.¹²⁰ The authors recommend that clinician judgment should be used in determining VS frequency. The American Society of PeriAnesthesia Nurses (ASPAN) advises that VS frequency should be determined by each patient's condition and pain should be assessed frequently.

The ASPAN website reports that expert opinion states VS should be taken every 5-15 minutes during the initial stabilization and more frequently if clinically indicated.¹¹⁶

2. Perform a neurological assessment on unit arrival and at scheduled time intervals throughout the remaining hospital stay to monitor for the development of stroke. There is a lack of evidence-based research specific to the timing of neurological assessments after a CEA. A frequency option can be modified from the guidelines published in the American Heart Association nursing and interdisciplinary care of the acute ischemic stroke patient.¹¹⁷ In those stroke patients receiving thrombolytic therapy, the recommendation for neurological assessments includes q15 minutes for the first 2 hours then progress to q1h for 16 hours. Further progression can be according to the institutional protocol (typically every 4 hours until discharge). Minimally include orientation, the Glasgow Coma Scale, pupil reaction to light, level of consciousness as described above, and motor response. Other available stroke scales include the Hunt and Hess Scale, NIHSS, and Canadian Neurological Scale.¹²¹ The choice of stroke scale is dependent on the institution. Compare results with the preoperative assessments. Notify the physician of any decrease in these postoperative findings. This comparison allows for exposure of surgery-related neurologic sequelae.

What Are We Doing at JHH?

What is current practice? Does it align with the Guidelines?

Current Patient Flow Units

- Vascular Surgery:
 - Patient is inpatient or outpatient → OR for CEA → Recovers in SICU → d/c to home
 - Rationale: Frequent neuro checks & frequent VS
 - Mostly involves SICU nursing staff, with overflow going to WICU, CVSICU
- Neurosurgery:
 - Patient is inpatient or outpatient → OR for CEA → Recovers in NCCU → d/c to home
 - Rationale: Frequent neuro checks & frequent VS
 - Mostly involves NCCU nursing staff

Proposed Patient Flow Units

- ICU Track
 - SICU (overflow in WICU, CVSICU)
 - NCCU
- IMC Track #1
 - PACU
 - CVPCU
 - Zayed 11W
 - Neuro IMC
- IMC Track #2
 - ICU
 - CVPCU
 - Zayed 11W
 - Neuro IMC

What Are We Doing at JHH?

Same procedure, different standards

Neuro Critical Care Unit (NCCU)

- Vital Signs
 - q15"
 - Q1h
- Neuro check
 - GCS ii



Surgical Intensive Care Unit (SICU)

ours
(4 hours)

• hours

What Do Our Policies Say?

Do our current policies and unit criteria meet the needs of the patient?

Appendix B: Vasoactive Infusions, IMC and Telemetry

- More than 2 upward titrations in a 24-hour period warrants evaluation for a higher level of care (exclusions: nitroglycerin and nicardipine, see below for more information)
- During medical emergencies (activation of code team or rapid response team), patients in non-designated areas may be initiated on vasoactive infusions if planning to transfer to an appropriate designated area in the immediate future.

For preparation and concentration information see [PAT031 Standard Concentrations for Intravenous \(IV\) Infusions](#)

See [DOM IV infusion Fast Facts](#)

Vasoactive IV Infusion	Starting dose, suggested	RN Titration Guidelines	Vasoactive IV Infusion	Starting dose, suggested	RN Titration Guidelines	Max dose	Comments
Diltiazem (Cardizem)	5 mg/hr	RN may not titrate	Labetalol (Trandate)	0.25-0.5 mg/min	RN may not titrate	6 mg/min	<ul style="list-style-type: none"> • Cardiac monitoring required • IMC only
Dobutamine (Dobutrex)	1-5 mcg/kg/min	RN may not titrate	Milrinone (Primacor)	0.125 mcg/kg/min	RN may not titrate	0.5 mcg/kg/min	<ul style="list-style-type: none"> • Cardiac monitoring required • Medicine telemetry, 11W (IMC), CTU (IMC): May initiate with max allowable rate of 0.25 mcg/kg/min. May accept higher rates if patients have been stable for 48 hours at a higher level of care. • PCCU (IMC and telemetry), MPCU and CVPCU (IMC and telemetry): May initiate with max allowable rate of 0.5 mcg/kg/min. • Exemptions: may not be used on BRU or NIMC
Dopamine (Intropin)	1-5 mcg/kg/min	RN may not titrate	Nicardipine (Cardene)	2.5 mg/hr	RN may not titrate	15 mg/hr	<ul style="list-style-type: none"> • IMC only • If BP goal is not met within 4 hours of initiation, an evaluation for a higher level of care is warranted.
Esmolol (Brevibloc)	50 mcg/kg/min	RN may not titrate	Nitroglycerin (Tridil)	5-10 mcg/min	RN may increase by 5-20 mcg/min every 3 minutes until chest pain free or to achieve MAP goal. May decrease by 5-20 mcg/min every 5 minutes until MAP goal is reached.	400 mcg/min	<ul style="list-style-type: none"> • No titration limitations EXCEPT if ischemic symptoms are not relieved within 30 minutes then ICU evaluation warranted • For BP control, if parameter identified by provider is not met within one hour, consider ICU/IMC evaluation • CTU-IMC: Infusion allowed, but RN may not titrate • Exemptions: not allowed in NIMC or BRU
Isoproterenol (Isuprel)	0.02 mcg/kg/min	RN may not titrate					

Stakeholders

Who should weigh in? Who will be influenced by changes?

- Physicians
 - Vascular surgeons
 - Neurosurgeons
- Dept & JHH Leadership
 - DON
 - Stroke Team
 - Nurse managers/CNSs/Educators from
 - Zayed 5 PACU (Vascular surgery)
 - ICUs: SICU, WICU, CVSICU, NCCU
 - IMCs: CVPCU, Zayed 11W, NIMC

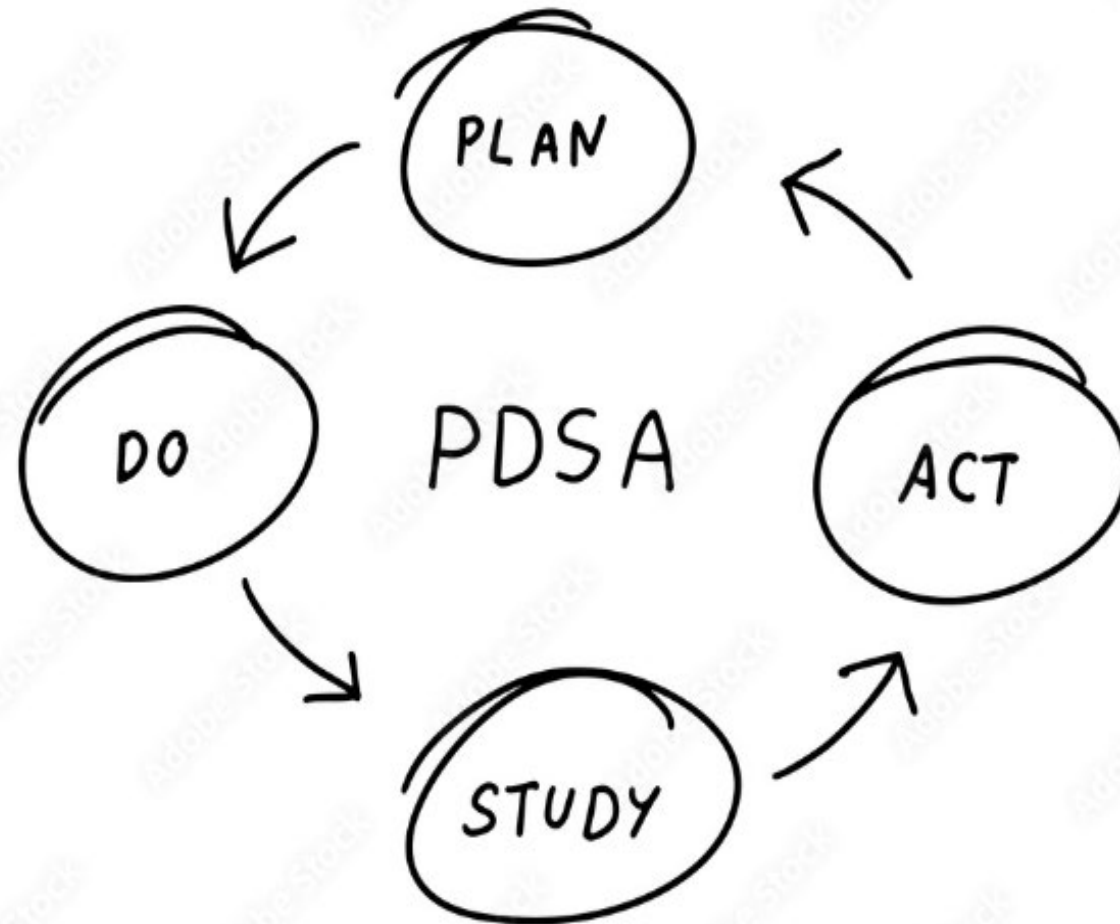
That's a lot of people!

Is there anyone else that I'm forgetting?

How am I going to convince them all?

Creation of a Proposal

Propose the change, then elicit feedback to improve the proposal!



Creation of a Proposal

Sell it to the stakeholders

Situation: Carotid artery endarterectomy (CEA) is the most frequently performed surgical procedure to prevent to occurrence of stroke. However, there is little evidence in regards to post-operative nursing care best practices. Studies have shown that there are no changes in outcomes with q4hr monitoring as opposed to q1hr monitoring, and that the majority of patients can be discharged to home the next day. There is evidence that resource utilization can be improved with training intermediate care nurses (IMC) to care for this population, reducing costs, and opening more critical care beds, especially during the COVID-19 pandemic.

Objective / Goal: Train IMC nurses from Zayed 10W, 11W, 12W to care for CEA patients at the IMC level by CY2021

Metric: ≥50% of post-operative CEA cases will be placed in an IMC bed by CY2020.

Core Team: Dr. Bruce Perler, Dr. Caitlin Hicks, Holly Grunebach, Tim Madeira, Sharon Owens, Liz Lins, Heather Sauerwald, Dauryne Shaffer, Brenda Johnson, Lisa Klein, Betsy Zink, Kathy DeCarlo

Objectives:

1. Discuss proposal with Vascular Surgery and Neuro Surgery faculty and nursing leadership to harmonize post-operative care.
 - a. Discuss with the Comprehensive Stroke group to assess for stroke certification compliance metrics.
2. EPIC for re-formatting carotid endarterectomy order set and “neuro interventions” flowsheet.
3. Devise nursing education plan for IMC units discussing post-op care considerations and patient placement.
4. Devise nursing education plan for PACU.

Metrics to Consider:

- Number of total CEA cases
- The number of ICU beds utilized before and after the change in patient placement
- OR holds
- PACU holds
- Post-operative complications (stroke, MI, mortality)
- Readmissions to the ICU
- 30-day readmission to the hospital

Creation of a Proposal

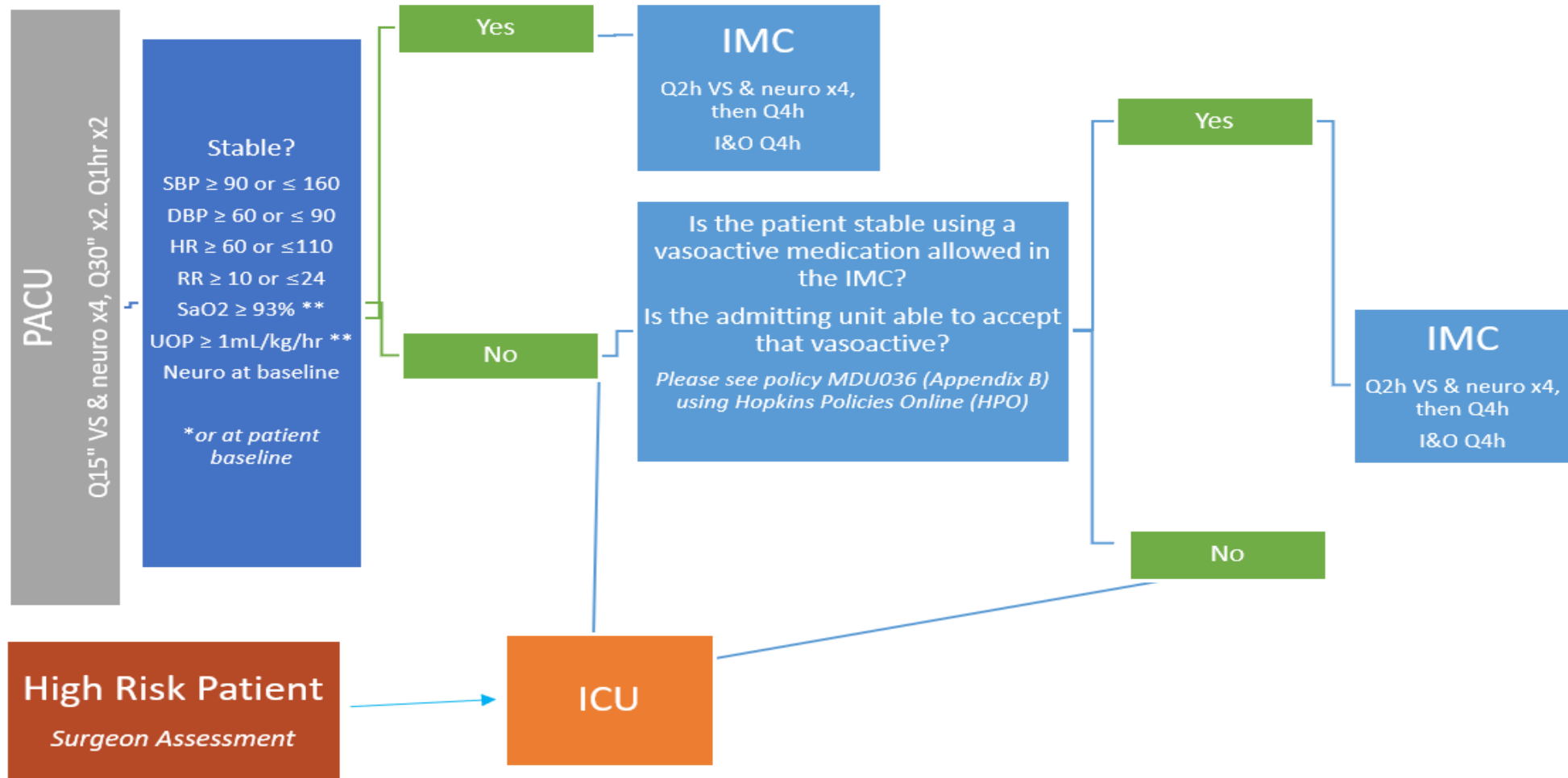
Keep it objective. Use the evidence. The beginnings of a Care Pathway.

Current Standard of Care	Proposed Standard of Care	Rationale with Evidence
<p>Vital signs with neuro checks: PACU or SICU</p> <ul style="list-style-type: none"> • q15min x 4 • q30minX 2 • q1hr x 12 • q2hr x6 (for 14 hours) <p>Intake & Output: q1-2hrs Drain Assessment: q4hrs</p> <p>Documentation:</p> <ul style="list-style-type: none"> • Expanded neurological assessment <ul style="list-style-type: none"> ○ q15min x4 ○ q30min x2 ○ q1hr for 12 hours ○ q2hr 	<p>Vital Signs with neuro checks: Minimum Standard</p> <ul style="list-style-type: none"> • q15min x4 (PACU or ICU) • q30 min x2 (PACU or ICU) • q1hr x2 (PACU or ICU) • q2h x4 (IMC) • q4h until discharge (IMC) <p>PACU: Vital signs with neuro checks (4hrs):</p> <ul style="list-style-type: none"> • q15min x 4 • q30min x 2 • q1hr x 2 <p><i>Use PACU decision tree to place in an IMC or ICU bed (Interdisciplinary Clinical Practice Manual, 2019)</i></p> <p>Option 1: Intermediate Level of Care (IMC)</p> <p>Vital signs & neuro checks:</p> <ul style="list-style-type: none"> • Q2hrs x 4 • then go to q4hrs until d/c • Intake & output q4hrs • Drain assessment q4hrs <p>Documentation expectation:</p> <ul style="list-style-type: none"> • Expanded neurological assessment <ul style="list-style-type: none"> ○ Q2hrs x 4 ○ then go to q4hrs until d/c 	<p>There is a lack of evidence-based research specific to the timing of neurological assessments after a CEA (Society for Vascular Nursing, June 2017).</p> <p>A single randomized control trial of 189 patients compared an experimental protocol (VS every 1 hour for 2 hours then every 4 hours for 24 hours) to standard practice (VS every 1 hour for 4 hours then every 4 hours for 24 hours) for postoperative monitoring. There were no significant differences observed between the 2 groups (Fernandez & Griffiths, 2005).</p> <p>A study from Maine Medical Center showed that 402 (86%) of the 467 cases performed in 1 year were able to go to a non-surgical telemetry bed after a 4-hour stay in PACU. This equated to a savings of \$1025/night, per patient (or ~ \$412,050 that year). 92% were able to discharge home by POD 1 and 98% by POD 2 (Knutson, et al., 2013).</p> <p>An Australian study published in 2016 showed that creating a CEA recovery protocol, which included a 4-hour PACU recovery, diverted 91% of CEA patients from the ICU. Post-operative management</p>

Creation of a Proposal

Creation of Decision Support Diagram

Proposed Bed Management Decision Tree for Carotid Surgery Patients



Creation of a Proposal

Patient-Centered, Simplified Neuro Assessments

Neuro assessments: Current Situation with Proposed IMC Admissions (all units harmonized to NCCU/NIMC standards)

NCCU	initial check (GCS) w/in 30 min	q1h x8	q2h thereafter	
SICU/CVSICU/WICU	initial check (GCS) w/in 30 min	q1h x8	q2h thereafter	
PACU → CVPCU/11W	initial check (GCS) w/in 30 min PACU	Q1h x4 PACU	q2h x4 CVPCU/11W	Then q4h CVPCU/11W
PACU → NIMC/BRU	initial check (GCS) w/in 30 min PACU	Q1h x4 PACU	q2h x4 NIMC/BRU	Then q4h NIMC/BRU

Creation of a Proposal

Patient-Centered, Simplified Vital Signs

Vital signs: Current Situation with Proposed IMC Admissions (all units harmonized)

NCCU	q15min x4	q30" x2	q1h x6	q2h thereafter	
SICU/CVSICU/WICU	q15min x4	q30" x2	q1h x6	q2h thereafter	
PACU → CVPCU/11W	q15min x4 PACU	q30" x2 PACU	q1h x2 PACU	q2h x4 CVPCU/11W	Then q4h CVPCU/11W
PACU → NIMC/BRU	q15min x4 PACU	q30" x2 PACU	q1h x2 PACU	q2h x4 NIMC/BRU	Then q4h NIMC/BRU

Planning

What will nursing need to do to make this work?

- Creation of goals
 - What are the goals of the Joint Commission? Goals of the Stroke team? Goals of the nursing staff? Goals of the medical team?
- Creation of a timeline
 - What are milestones for the project? How long will things take?
- Engage new units, get them excited
 - Speak with leadership, elicit feedback from the bedside
- *Get to the Roots*: Harmonize EMR order-set
 - What are current units using for orders? Who is impacted? How can we streamline?

Planning

What will nursing need to do to make this work?

- Admission criteria, policies, patient education
 - Any revisions or updating needed? How can we get Vascular Surgery & Neurosurgery to align?
 - Creation of a standardized patient care plan & discharge education plan
 - Updating the EMR flowsheet to encompass “PACU/IMC” and programming the “Work List” reminders appropriately
- Harmonize Education
 - How am I going to educate so many people? What do I need to teach them?
 - MyLearning creation
 - Instructional videos
 - Skills Days/Annual Reviews
 - In-services
 - 1:1 education/feedback
- Assessment & Reassessment
 - What metrics should we follow, pre & post implementation?
 - Morbidity, mortality, LOS, documentation audits, HERO events, etc.

Imple Standard

Orders

JHH-BMC Adult Surgery Care TCAR Post-op Admission

General

Transfer

Please make sure you select the appropriate option.

Patient Returning to Same Unit
Case Request/ADT

Patient going to a different unit
Case Request/ADT

Code Status

Continuing care

Provider Care Team, Update
Routine, Once, today at 1430, For
Are they the primary team? Yes
First Call: STEWART, EMILY A
Post-op (floor orders), Sign and Hold

Vital Signs

Vital Signs - ICU

Vital Signs - IMC

Notify Authorized Prescriber/Ho

Notify Prescriber/House Officer
Routine. Until discontinued. Starting t
Temperature greater than (C): 38.4
Systolic BP less than (mmHg): 90
Systolic BP greater than (mmHg): 160
Diastolic BP less than (mmHg): 60
Diastolic BP greater than (mmHg): 90
Heart rate less than (bpm): 60
Heart rate greater than (bpm): 110
Respiratory rate less than (rpm): 10
Respiratory rate greater than (rpm): 2
SaO2 less than (%): 93
Urine Output < (mL): 240
in (hrs): 8
Perform bladder scan and NHO with
Blood Glucose less than (mg/dL): 61

Medications

Antiplatelets (Post-Op)

- clopidogrel (PLAVIX) tablet - Loading Dose
300 mg, Oral, Once, Post-op (floor orders)
- clopidogrel (PLAVIX) tablet
75 mg, Oral, Daily, Starting 4/14/24, Post-op (floor orders)
- aspirin EC tablet
81 mg, Oral, Daily, Post-op (floor orders)
- aspirin EC tablet
325 mg, Oral, Daily, Post-op (floor orders)

Dextran (Post-Op)

- dextran 40 10% infusion
20 mL/hr, Intravenous, Continuous, for 24 hours, Post-op (floor orders)

Blood Pressure (Post-Op)

- labetalol (NORMODYNE) 5 mg/mL injection 10 mg**
10 mg, Intravenous, Every 10 min PRN, High Blood Pressure with HR \geq 60, Starting today at 1429, For 6 doses
First Line if HR \geq 60. Administer only if SBP $>$ *** or DBP $>$ *** after 3 consecutive blood pressure readings, 1 minute apart. NHO if SBP or DBP is not controlled after 6 doses.
Hold for HR $<$ 60 bpm.
IV Push Policy. Refer to MDUP017.
Level of care: Monitored, Procedure and Emergent Use
! Max IV push dose: 80 mg
Preparation: Dilution not required.
Administration rate: Do not exceed 10 mg/min.
Monitoring/comments: Monitor HR and BP every 15 minutes x 2 for initial dose.
If patient has tolerated initial dose, subsequent administrations of the same doses only need BP monitored prior to administration.
Post-op (floor orders), Sign and Hold
- hydrALAZINE (APRESOLINE) 20 mg/mL injection 5 mg**
5 mg, Intravenous, Every 30 min PRN, High Blood Pressure with HR $<$ 60, Starting today at 1429, For 4 doses
First Line if HR \leq 59. Administer only if SBP *** or DBP *** after 3 consecutive blood pressure readings, 1 minute apart. NHO if SBP or DBP is not controlled after 4 doses.
IV Push Policy. Refer to MDUP017.
Level of care: Monitored, Procedure and Emergent Use
Max IV push dose: 40 mg
! Preparation: Do not dilute
Administration rate: Do not exceed 20 mg/minute
Monitoring/comments: Monitor HR and BP at 30 minutes for 1 hour following initial dose and with each dose increase (due to delayed peak effect). May have significant drop in BP following first dose. If patient has tolerated initial dose, subsequent administrations of the same doses only need BP monitored 30 minutes post-dose.
For hypertensive emergency in pregnancy or postpartum patients, refer to algorithm in (OBGYN002) Emergent Anti-hypertensive Drugs (IV and Oral), Management in the Obstetric Patient.
Post-op (floor orders), Sign and Hold

Staff Education

“Say it 6 different times, 6 different ways”

The screenshot shows a web browser window displaying a OneDrive page. A search bar at the top contains the text "Find Microsoft 365 apps". Below the search bar is a grid of application icons. The "Stream" icon, which is a purple play button, is circled in red. Other visible icons include Microsoft 365, OneDrive, Word, Excel, PowerPoint, OneNote, SharePoint, Teams, Sway, Forms, Partner, Calendar, Outlook, Insights, To Do, and More apps. At the bottom of the page, there is a taskbar with several open applications, including "Advanced Practice", "Epic Training Dropbox D...", "Surgical Advanced Practic...", "Copy of JH zayed SE CVSICU My Files", and "CEA Manuscript (DRAFT 1) - CWH-SB My Files".

Staff Education


Educating nurses using technology

Showcase for Hopkins Inquiry and Nursing Excellence

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PowerPoint



Carotid Artery Stenosis

What's changing and why?
Evidence shows that the majority of patients undergoing carotid endarterectomy (CEA), carotid artery stenting (CAS) do not need ICU level of care. Studies show that with appropriate training. Placing appropriate patients in the PACU can reduce the cost, improve ICU bed utilization, and improve patient outcomes.

What does this look like?
The first 8 hours of recovery are the most critical. High-risk patients will still recover in the ICU. Low-risk patients can recover at the IMC level of care. If the patient is high risk, they will go to the ICU for care.

Expanded Neuro Assessments:

ICU	initial check (GCS) w/in 30 min
PACU→IMC	initial check (GCS) w/in 30 min PACU

Vital Signs:

ICU	q15 min x4
PACU→IMC	q15 min x4 PACU

Stream Carotid Surgery_Stent EPIC Documentation-20... Search

Record Upload Favorite Playlist Move to Copy to Preview Share

WB

Beard, Wren-MASTERY
Male, 68 y.o., 12/20/1957
MRN: 87022421
Unit/Room/Bed: JHH ZAYED 10W-Medley Training Post Room 04-Medley Training
Car Location: JHH ZAYED 10E
Code: No CPR, Intubate
POLST: On file
HCDIA: Active
Capacity: Incapacitated
PC: Jones,Harriet, 608-555-7972
Patient Reminders: None

Sam Stethoscope, MD
Attending

Allergies: Penicillins
Active Pylx: None

ADMITTED: TODAY
No active principal problem

Ht: 175.3 cm (5' 9.02")
Last Wt: 65.8 kg (145 lb 1 oz)
BMI: 21.41 kg/m²
Dox Wt: 65.8 kg (145 lb 1 oz)

ACKNOWLEDGE ORDERS (10+)

NEW RESULTS, LAST 16H

ACTIVE MEDS (10)

Scheduled (7)
Continuous (1)
PRN (2)

Flowsheets

Vital Signs/Pain Assessment Abbrev I/O IV Assessment Daily Care/Safety Stroke / Neuro Interv... Pre-op Checklist VS Complex *OLD PACU

Stroke / Neuro Interv...
Admission (Current) from 9/14/2021 in JHH Zayed 10W

	1m	5m	10m	15m	30m	1h	2h	4h	8h	24h	Interval Start: 0700	Reset	Now
1046											1600		

Stroke / Neuro Interventions Protocols

- Start Stroke / Neuro Interventions Protocol(s)

Neurological Assessment

- Neuro Assessment (Standard or Expanded)

Vitals

- Temp
- Temp src
- Heart Rate
- Heart Rate Source
- Heart Rate
- Heart Rate Source
- Cardiac Rhythm
- ST Segment - Lead V5

Respiration

- Resp
- MAP (mmHg)
- BP Location
- BP Method
- Arterial Line 1 BP
- Arterial Line 1 MAP
- Patient Position
- SpO2
- SpO2 (%) While Ambulating
- O2 Device

Infusions

- Dose (mg/ht) Fentanyl

Sedation / Delirium

- RASS Score
- Moderate Se...
- Moderate Se...

Neurological

- Neuro (WDL)
- Within Defi...

Pulses

- R Radial Pulse
- L Radial Pulse
- R Dorsalis Pedis Pulse
- Palpable
- Palpable
- Weak palpable

Make a Selection
Left click a value to select it.
Right click or press the Next Row button to move to the next row.
Single-select rows advance to the next row automatically upon selection.
Got It Show Me Later

3:04 / 12:37

Interactivity
Comments
Video settings
Analytics
Help

Carotid Surgery/Stent EPIC Documentation

Staff Education

Standardized Education Using “MyLearning”

Showcase for Hopkins Inquiry and Nursing Excellence

SHINE


Conference

JOHNS HOPKINS UNIVERSITY & MEDICINE

HOME QUICK LINKS HELP

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JHH Nursing | Surgery & Perioperative



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Delivery Type	OnLine
Duration	
Provider	JHH Nursing

Nursing Care of the CEA/CAS/TCAR Vascular Surgery Patient

This course will cover nursing care for CEA, CAS, and TCAR patients.

Start

Harmonized Care Plan

Standardizing to Improve Patient Care

Showcase for Hopkins Inquiry and Nursing Excellence

SHINE

Conference

The screenshot displays a web-based interface for managing care plans. At the top, the title 'Care Plan' is shown in purple. Below it, a navigation bar includes 'Overview', 'Manage Plan & Document Progress' (highlighted), and 'Summary and Note'. A green button labeled 'Manage Plan & Document Progress' is also visible. On the left, a sidebar shows a tree view of documents under 'Last documents', with 'Manage Plan' selected. The main content area is a modal window titled 'Add Care Plan'. It features a 'Back' button, a search bar containing 'JHM POST-CEA/CAS/TCAR CARE PLAN', and three buttons: 'Expand All', 'Collapse All', and 'Collapse all by default'. Below these is a 'Select Items' section with a list of care plan items, each with a checkbox and an information icon.

Care Plan

Overview **Manage Plan & Document Progress** Summary and Note

Manage Plan & Document Progress

Last documents

Manage Plan

▼ Adult

▼ Post

▼ Adult

Add Care Plan

← Back | Care plan: JHM POST-CEA/CAS/TCAR CARE PLAN

Expand All Collapse All Collapse all by default

Select Items

- Post-CEA/CAS/TCAR
 - ▼ Potential for bleeding or infection ⓘ
 - Maintain skin integrity and monitor for infection ⓘ
 - ▼ Potential neurological changes or cranial nerve injury ⓘ
 - Assessment and rapid identification of neurological changes ⓘ
 - ▼ Blood pressure instability ⓘ
 - Establish/maintain blood pressure stability ⓘ

Harmonized Discharge Education

Making sure our patients all receive the same education

The screenshot displays a software interface for managing patient education. It features a main window with a search bar containing 'POST-CEA/CAS/TCAR' and a sidebar with a tree view of educational topics. A secondary window is overlaid, showing a detailed view of the 'Teaching Plan: Post-CEA/CAS/TCAR' with a list of topics and sub-topics, each with a checkbox and a radio button. The interface includes 'Accept' and 'Cancel' buttons at the bottom.

Education

Assessment **Education**

Teaching Plan: Adult Patie...

- Hospital Orientation
 - Orientation to Room
 - Unit routines
 - Patient care practices
 - Video: Healthcare Hero
- Plan of Care
 - Daily plan of care
- Patient Safety
 - Patient identification
 - Being a Partner in Your C...
 - Bleeding Precautions
 - Fall prevention
 - Patients role in preventin...
 - VTE Prophylaxis
 - Video: Clots Kill
 - Pressure injury prevention
 - Keeping you safe during ...
- Nutrition Management
 - Nutrition management
- Mobility and Activities
 - Activities of Daily Living
 - Mobility
 - Video: Staying Active Duri...
- Preparing For Transition/Dis...
 - Discharge Planning
 - Post Hospital Care
 - Care Partner/Health Buddy
- Additional Education Materia...
 - Printed Materials
 - Miscellaneous Materials

POST-CEA/CAS/TCAR

Teaching Plan: Post-CEA/CAS/TCAR

- Reason for Procedure
 - Review atherosclerotic process
- Post-operative care
 - Signs and symptoms of infection
- Warning Signs & Symptoms of Stroke
 - Warning Signs & Symptoms of Stro...
- Patient Specific Risk Factors for Stroke
 - Coronary artery disease
 - Atrial fibrillation
 - Other artery disease
 - Diabetes
 - High cholesterol
 - Hypertension
 - Overweight/Obesity
 - Physical inactivity
 - Sleep apnea
 - Substance abuse: alcohol
 - Substance abuse: tobacco
 - Substance abuse: illegal drugs
 - Non-modifiable: prior stroke, age, ge...
 - No Known Risk Factors
- Family Risk Factors Reviewed
 - Family Risk Factors Reviewed
 - Risk Factors for Stroke - Select To A...
- Activation of EMS
 - Activation of EMS
- Review of Prescribed/Discharge Antihypertensives
 - Amlodipine

Teaching Plan: Adult Patie...

- Hospital Orientation
 - Orientation to Room
 - Unit routines
 - Patient care practices
 - Video: Healthcare Hero
- Plan of Care
 - Daily plan of care
- Patient Safety
 - Patient identification
 - Being a Partner in Your C...
 - Bleeding Precautions
 - Fall prevention
 - Patients role in preventin...

POST-CEA/CAS/TCAR

Teaching Plan: Post-CEA/CAS/TCAR

- Reason for Procedure
 - Review atherosclerotic process
- Post-operative care
 - Signs and symptoms of infection
- Warning Signs & Symptoms of Stroke
 - Warning Signs & Symptoms of Stroke
- Patient Specific Risk Factors for Stroke
 - Coronary artery disease
 - Atrial fibrillation
 - Other artery disease
 - Diabetes

Accept Cancel

The Results

Did it work?

Study Population

Methods

- Retrospective review
- Patients who underwent a CEA for carotid artery stenosis at JHH between November 2019 and November 2022.
 - Pre: *November 2019-April 2021*
 - Post: *May 2021 – November 2022*
- For patients who underwent multiple carotid procedures, only the first carotid endarterectomy was included.
- Did not include carotid artery stenting or trans-carotid artery revascularization (TCAR) were not included in the analysis.
- Study approval was obtained from the Johns Hopkins Medicine Institutional Review Board.

- In total, 149 patients (70.2±10.9 years old, 60.4% male, 75.7% non-Hispanic white) underwent a CEA during the study period.
- Of these, 83 (55.7%) were treated during the pre-initiative period and 66 (44.3%) were treated during the post-initiative period.
- Overall, patient characteristics were relatively similar between the two groups, with one exception:
 - there were significantly fewer patients requiring urgent/emergent procedures in the post-initiative period compared to the pre-initiative period (30.0% vs. 11.0%; $P < 0.001$).

- There was a significant reduction in ICU admissions (46.2% vs. 90.4%; $P < 0.001$).
- The median total hospital charges per patient per day were **\$13,364** (IQR \$11,506-\$14,673) in the post-initiative group compared to **\$14,037** (IQR \$12,218-\$16,038) in the pre-initiative group ($P = 0.03$).
- *Difference*: **-\$1,631** per patient day, equivalent to total savings of **\$102,753** in post-initiative period.
- There were no significant changes in the frequency of in-hospital stroke, death, or hospital length of stay between groups (all, $P > 0.05$).

Outcome	Pre-Initiative (N=83)	Post-Initiative (N=66)	P-value
Postoperative Level of Care			<0.001
<i>Intermediate Care</i>	30 (46.2)	75 (90.4)	
<i>Intensive Care Unit</i>	35 (53.9)	8 (9.6)	
In-hospital Stroke	3 (3.6)	0 (0.0)	0.12
In-hospital Death	0 (0.0)	0 (0.0)	—
Median Length of Stay (IQR)	1 (1,1)	1 (1,1)	0.43
Median Total Hospital Charges Per Patient Per Day (USD, IQR)	14,037.94 (12,218.34, 16,038.68)	13,364.67 (11,506.14, 14,673.06)	0.03

- A single institution study, which may limit the generalizability of the study results.
- Limited our analysis to patients undergoing CEA only, because we had a pre-existing care paradigm to admit carotid stenting patients & TCAR patients to the IMC unit.
- We have subsequently expanded our standardized care paradigm to include patients who undergo carotid artery stenting & TCAR, so we are unclear how it has impacted these populations.
- Finally, the number of postoperative adverse events (stroke, death) was very low, which limited our ability to perform risk-adjusted comparisons of these outcomes between groups.

Next Steps

How can we improve?

- Improve documentation
 - PACU→IMC documentation using the “Neuro Intervention” flowsheet
 - Care Plans
 - Discharge teaching
 - Making sure orders are appropriate
- Track IMC→ICU downgrades and ICU→IMC upgrades better
- Staff training (provider & nursing), continuing education, float staff
- Continue PDSA cycles – assess and reassess
 - Can we fast track these patients even more?
 - Can we simplify vital signs/neuro assessments further?

Conclusions

The big picture

- By using the evidence, we were able to:
 - Create a standardized, comprehensive care pathway
 - Decreased ICU admission rates, opening beds for other patients
 - Reduced hospital charges without compromising patient outcomes

Acknowledgements

No EBP project is done successfully by yourself

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Questions?