Anticipated Problems/Concerns

- Latex allergy
- Hypothermia
- Prolonged recovery time
- Postop N/V (worse with opiates)
- Postop muscle spasms
- Retention of secretions and postop chest infection

Cerebrovascular Transient Ischemic Attack

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Risk

- Overall incidence in USA: Approximately 1.1 per 1000.
- Risk related to demographic factors: Age, gender, and race.
- Estimated prevalence of TIA in men is 2.7% versus 1.6% in women ages 65–69 y, and 3.6% in men versus 4.1% in women ages 75–79 y. The overall prevalence is estimated to be 0.4% among adults 45–64 y.
- African Americans and Hispanics at higher risk than Caucasians.

Perioperative Risk

- Pts with Hx of TIAs at increased risk of postop stroke.
- Risk of periop stroke increased in pts with medical Hx of cerebral vascular disease, peripheral vascular disease, hypertension, diabetes, chronic renal insufficiency, COPD, and atrial fibrillation.
- Pts with CAD for CABG have a high incidence of carotid stenosis (50% with some; 20% with stenosis >50%).
- Likewise, pts with carotid stenosis have high incidence of CAD (over 50%).
- Risk of periop stroke increased in pts with planned surgery: CABG (3–6%), vascular (1%).
- Pts with Hx of stroke 9 mo or less ago at increased risk of major adverse cardiac events and mortality after elective, noncardiac surgery (even low- and intermediate-risk surgeries).

Worry About

- Crescendo TIAs
- Duration of symptoms >1 h
- Symptomatic or critical internal carotid artery stenosis
- Known cardiac source of embolus, such as atrial fibrillation
- Known hypercoagulable state

Overview

- TIA: Transient episode of neuro dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction. The end is biologic (tissue injury) rather than arbitrary (24 h).
- Risk of hospitalization for major cardiac event after TIA is 2.6% for first 90 days.
- ABCDD score for assessing risk of stroke after TIA.
  - A = Age (> 60 y = 1 point)
  - B = Blood pressure elevation when first assessed after TIA (systolic ≥140 mm Hg or diastolic ≥90 mm Hg = 1 point)
  - C = Clinical features (unilateral weakness = 2 points; isolated speech disturbance = 1 point; other = 0 points)
  - D = Duration of TIA symptoms (≥60 min = 2 points; 10 to 59 min = 1 point; <10 min = 0 points)
  - Diabetes (present = 1 point)
- Score interpretation:
  - Score 6 to 7: High 2-day stroke risk (8.1%)
  - Score 4 to 5: Moderate 2-day stroke risk (4.1%)
  - Score 0 to 3: Low 2-day stroke risk (1%)

Etiology

- Cerebral vessel disease: atherosclerosis, lipohyalinosis, inflammation, amyloid deposition, arterial dissection, developmental malformation, aneurysmal dilation, or venous thrombosis
- Remote disease: embolus formed from the heart or other circulation, which lodges in a cerebral vessel
- Blood flow–related: related: Inadequate cerebral blood flow due to decreased perfusion pressure or increased blood viscosity (hypotension, trauma, surgical compression, steal, and coagulopathy)

Usual Treatment

- Determine causing factor.
- For cerebral vessel disease: Antiplatelet therapy, anticoagulation, and revascularization (carotid endarterectomy, carotid stent, vertebral artery stent).
- In remote disease, investigate and treat causing factor (e.g., atrial fibrillation, valvular disease), and use antiplatelet therapy and anticoagulation.
- If blood flow–related, treat underlying cause and use antiplatelet therapy and anticoagulation.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Neck trauma Compression			
CNS	Cerebrovascular disease Transient focal neuro deficit	Vision changes, language changes, weakness, sensory changes, ataxia Previous stroke	Carotid bruit Retinal exam (for ischemia)	Carotid Doppler Angiography: Carotid and vertebral artery CT/MRI
CV	CAD disease Atrial fibrillation Possible valvular disease	MI Angina Decreased exercise tolerance Risk factors for atherosclerosis	Irregular heart rate/rhythm Murmur	ECG Stress test Holter, TEE/ TTE
GI		N/V		

Key References: Easton JD, Saver JL, Albers GW, et al: Definition and evaluation of transient ischemic attack: a scientific statement for healthcare professionals from the American Heart Association/American Stroke Association Stroke Council; Council on Cardiovascular Surgery and Anesthesia; Council on Cardiovascular Radiology and Intervention; Council on Cardiovascular Nursing; and the Interdisciplinary Council on Peripheral Vascular Disease. The American Academy of Neurology affirms the value of this statement as an educational tool for neurologists, *Stroke* 40(6):2276–2293, 2009; Anastasian ZH: Anesthetic management for acute ischaemic stroke, *Br J Anaesth* 113 (Suppl 2):ii9–ii16, 2014.

Perioperative Implications

Perioperative Preparation

- Determine blood pressure range that the pt normally experiences.
- Manage blood pressure with both cerebral perfusion and CAD in mind.
- Perform preop cardiac workup and medical stabilization and consider postponing surgery if nonemergency surgery.
- Conduct preop neuro exam to identify any baseline deficits.
- Avoid excessive premedication (pt can be more sensitive).
- Avoid long-acting intraop agents that can obscure postop neuro exam.

Monitoring

- Use ECG monitoring for ischemia and arrhythmia.
- Consider arterial line and central line/PA catheter if extensive CV disease is present.

Airway

- Avoid extreme neck manipulation and pressure on the carotid artery during ventilation and intubation.

Preinduction/Induction

- Maintain pressure to allow for sufficient cerebral perfusion (rightward shift in cerebral autoregulation in Htn).
- Titrate medication because patient requirements can decrease.

Maintenance

- Pts can be more sensitive to medications.
- Avoid long-acting agents if neuro exam is to be performed postop.
- Isoflurane theoretically neuroprotective allows lowest cerebral blood flow before EEG symptoms of ischemia.

Extubation

- Ensure pt is awake, following commands, and able to protect the airway.
- Ensure pt does not have a large neuro deficit that would lead to swelling and respiratory insufficiency postop.

Postoperative Period

- Period of greatest risk for stroke is after general surgery.
- Resume antiplatelet therapy and anticoagulation as soon as possible.