MANAGEMENT OF CONCOMITANT CAROTID AND CORONARY ARTERY DISEASE

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KEY CONCEPTS

- Stroke is a major complication of cardiac surgery (2.1 - 5.2%)
  - usually present within first 3 days after CABG

- Diagnosis of CAD assures some degree of carotid pathology and vice versa
  - 22% of CABG candidates have significant carotid disease

- Procedures to address each condition were developed separately and evaluated using different metrics
  - benefits of CABG measured as
    - decrease MI rates
    - reintervention
    - decrease mortality rates
  - benefits of CEA measured as
    - decrease stroke & mortality

- Majority of patients are ASYMPTOMATIC

CAROTID DISEASE IN CABG PATIENTS

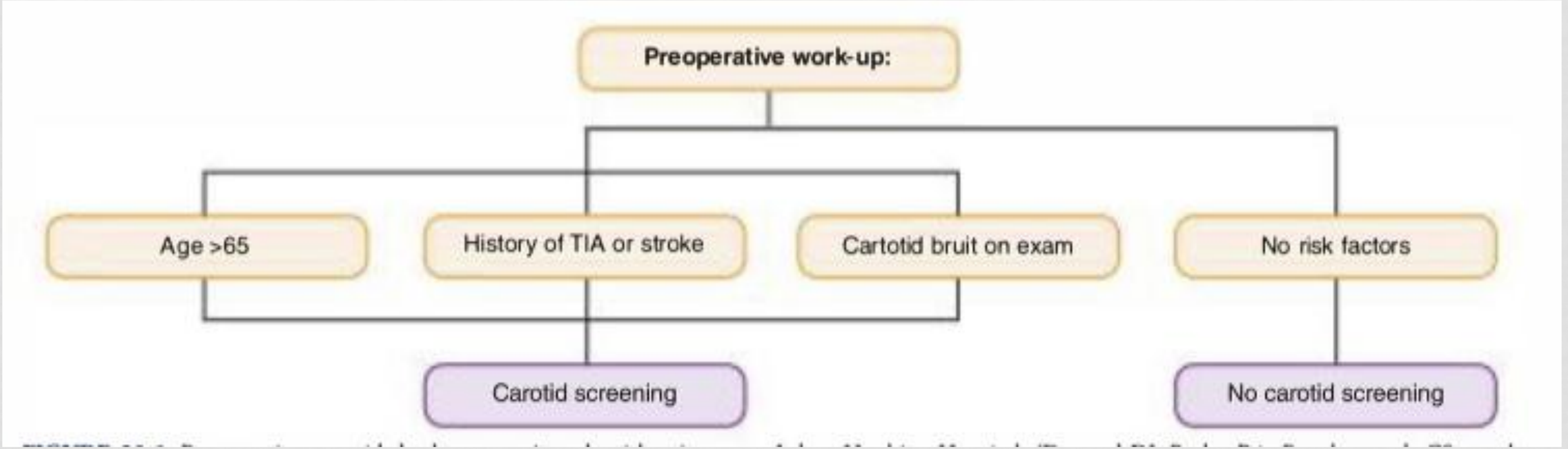
- Carotid disease in CABG patients = 2 - 22%
  - wide range because definition of “significant” disease varies between centers
    - Asymptomatic Carotid Artheriosclerosis Study (ACAS) = 60% stenosis
    - The North American Symptomatic Carotid Endarterectomy Trial (NASCET) = 70%
    - European Carotid Surgery Trial (ECST) = 80%

TABLE 30-3: Risk Factors for Carotid Disease in Coronary Bypass Patients

Highly Significant (p <0.01)	Significant (p <0.05)
Prior CVA	Tobacco use[a]
Prior CVD (CVA or TIA)[a]	Left main disease >50
Carotid bruit[a]	Hypertension[a]
Peripheral vascular disease	Prior CEA
Age >65[a]	

CAD INCREASES WITH UNDERLYING SEVERITY OF CAD

Severity of CAD	Prevalence of Significant Carotid Artery Disease
1 vessel	5.3%
2 vessels	13.5%
3 vessels	24.5%
LM disease	40%


Preoperative work-up:
Age >65
History of TIA or stroke
Cartotid bruit on exam
No risk factors
Carotid screening
No carotid screening

DIAGNOSIS

- Duplex U/S
- MRA
- CT angiography
- Conventional angiography rarely required for determining degree of stenosis

CAROTID INTERVENTION

- Medical management antiplatelet therapy + cholesterol lowering agents + managing risk factors
  - HTN
    - each 10pt rise in BP increased risk (30 - 45%)
    - each 10pt drop in BP decreases risk (33%)
    - BP goal <140/90 and <130/80 with DM & CKD
  - DM
    - only risk factor independently associated w/ severe progression of stenosi
    - glycemic control is necessary, but intensive glucose control did not reduce stroke risk
  - Dyslipidemia
    - death was 2.5x higher in pets with high cholesterol levels
    - every 10% reduction in LDL = 15.6% reduction in stroke
  - Smoking
    - 50% increase risk
    - past smokers have 25% increase risk

REVASCULARIZATION :

- Revascularization depends on:
  - presence / absence of symptoms
  - degree of stenosis
  - urgency of CABG

- ACC & AHA
  - 50 - 99% with / without hx of stroke / TIA
  - 70 - 99% bilateral disease
  - 70 - 99% unilateral w/ contralateral occlusion

CEA VS. MEDICAL THERAPY

- CASANOVA found no significant benefit for CEA in asymptomatic patients
- CEA indicated for SYMPTOMATIC + STENOSIS > 70%
- CEA not recommended for asymptomatic patients w/ stenosis < 90%

CEA VS. CAS

- CEA better short-term outcomes
- No difference in intermediate-term outcomes
- Long-term outcomes for CAS, promising
  - decrease need of revascularization
- Carotid Revascularization Endarterectomy vs. Stenting Trial (CREST)
  - higher risk of stroke during periprocedural period w/stenting
  - higher risk of MI with CEA

SURGICAL & INTERVENTIONAL TREATMENT OF COMBINED CORONARY AND CAROTID DISEASE

Staged CEA - CABG

- carotid lesion is addressed first by CEA
- followed by CABG sometime after
  - time interval varies from literature (days - months)
- most appropriate in patients whose carotid disease is equally / more advanced than their coronary disease
- NOT appropriate with critical stenosis / severe multiple vessel disease
  - higher rates of MI (6.5%)

Reversed Staged CABG - CEA

- appropriate in patients whose coronary disease more critical than carotid disease
- MI most common complication
- patients undergone CABG have reduced risk of perioperative MI
  - higher rates of stroke (6.3%)

Combined CEA - CABG

- patients with symptoms of both coronary + carotid diseases
- advantageous to operate on both simultaneously
  - address both of their complications
- various techniques
  - CEA prior to opening thorax
  - CEA after opening thorax, before cannulation
  - CEA while on CPB
- incidence of stoke & MI 3.6 - 4.6%

Staged CAS - CABG

- being used in place of CEA
  - comparable rates of perioperative complications
- less invasive than CEA
- need to balance pre- and post procedural dual antiplatelet therapy
  - major bleeding complications (0.9%)
- CABG usually performed 4 weeks later

CEA – OFF Pump CABG

- no aortic cross clamping
- lower rates of perioperative complications
  - indirect relationship of carotid disease & aortic arch disease
- low rates of complications due to lack of aortic cross clamping rather than CEA itself

TABLE 30-4: Complication Rates for Patients Undergoing Combined Procedures

	Stroke	MI	Stroke/MI/Death
Synchronous CEA/CABG	4.6 (3.9–5.4)	3.6 (3.0–4.2)	11.5 (10.1–12.9)
CEA + "Off-pump" CABG	NA	NA	3.5 (1.6–5.5)
CEA–CABG (staged)	2.7 (1.6–3.9)	6.5 (3.2–9.7)	10.2 (7.4–13.1)
CABG–CEA (reverse-staged)	6.3 (1.0–11.7)	0.9 (0.5–1.4)	5.0 (0.0–10.6)
CAS–CABG	4.2 (2.4–6.1)	1.8 (0.5–3.0)	9.4 (7.0–11.8)