Regional versus General versus MAC: Does anesthetic choice impact outcomes?

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Medical therapy of carotid atherosclerosis has advanced to embrace anti-platelet therapy and better control of blood pressure, cholesterol, diabetes, and inflammation. Despite this, the need for mechanical correction of obstructive lesions persists.

In recent years, carotid angioplasty and stenting (CAS) has increased. Carotid endarterectomy (CEA), however, remains the gold standard for repair. Randomized trials have recently compared CAS to CEA. The AHA/ACC Perioperative Guidelines consider CEA to be an “intermediate” level procedure. Erickson and Cole have just published an excellent review of these considerations.

CAS generally trades off shorter periods of potential cerebral ischemia for increased likelihood of thromboembolism, compared to CEA. However most strokes after CEA are still related to thromboembolism and not cerebral ischemia from carotid artery temporary occlusion.

CAS:
Concerns during CAS include profound bradcardia +/- hypotension. These procedures are often performed with modest sedation, with neurologic assessment of the awake patient. The involvement of anesthesiologists in the peri-procedural care of these patients tends to vary with the institution and the specialty of the interventionalist (less with cardiologists, more with vascular surgeons).
CEA:
Many anesthetic techniques have been reported for CEA. A basic taxonomy follows; other combinations are no doubt possible.

- General anesthesia
  - Routine shunting
  - Shunting guided by monitoring:
    - Neurophysiology (EEG, BIS, SSEP, etc)
    - Oxygenation (jugular bulb sO2, lactate; cerebral oximetry)
    - Pressure (stump pressure)
    - Awake patient (asleep for dissection, closure; awake for clamping)
  - Putative pharmacologic protection
    - Silence EEG with propofol, barbiturates
- Regional anesthesia
  - Superficial cervical plexus block
  - Deep cervical plexus block
  - Combined superficial and deep blocks
  - Generally, the awake patient serves as the monitor of adequacy of cerebral circulation.

General anesthesia allows control of the airway, facilitates the supine position and ventilation in those with obesity, sleep apnea, and/or CHF. It facilitates the approach to lesions high in the neck, or in patients with a “hostile” neck (e.g., s/p irradiation).

Regional anesthesia +/- sedation generally provides more stable hemodynamics. A personal preference is to combine regional (superficial cervical plexus block) with a “light” general anesthetic; EEG monitoring may limit awareness in such a setting.

At the end of the day, we can be grateful for the large GALA study published in Lancet in 2008:

“METHODS: We undertook a parallel group, multicentre, randomised controlled trial of 3526 patients with symptomatic or asymptomatic carotid stenosis from 95 centres in 24 countries. Participants were randomly assigned to surgery under general (n=1753) or local (n=1773) anaesthesia between June, 1999 and October, 2007...
FINDINGS: A primary outcome occurred in 84 (4.8%) patients assigned to surgery under general anaesthesia and 80 (4.5%) of those assigned to surgery under local anaesthesia...

INTERPRETATION: We have not shown a definite difference in outcomes between general and local anaesthesia for carotid surgery. The anaesthetist and surgeon, in consultation with the patient, should decide which anaesthetic technique to use on an individual basis.”

On the basis of the GALA study, an anesthetic technique should be chosen based on the skills and comforts of all parties involved. Having said that, given the minimal need for external monitoring devices and generally shorter induction and emergence times for RA, it is not surprising that a secondary analysis of the GALA data has shown RA to be more cost-effective. In today’s environment, that is an advantage that cannot be ignored.