Non-Selective Carotid Artery Ultrasound Screening in Patients Undergoing Coronary Artery Bypass Grafting: Is It Necessary?

Disclosures

All authors: none
Routine Carotid Screening

Performed in many institutions

Assumed benefit

• Altering management to decrease perioperative stroke
Don’t initiate routine evaluation of carotid artery disease prior to cardiac surgery in the absence of symptoms or other high-risk criteria.
Patient

72-year-old man presenting for CABG with 3-system disease

Comorbidities

- Hypertension
- Hyperlipidemia
Findings

Preoperative carotid ultrasound

- Right ICA  40% – 59% stenosis
- Left ICA  80% – 99% stenosis
Decision-Making

Proceed with CABG?
  • No carotid revascularization

Alter management?
  • Staged carotid revascularization
  • Concomitant carotid revascularization
Questions

In patients undergoing CABG, does preoperative non-selective carotid screening

• Alter management?
• Affect neurologic outcomes?
Patients

3/2011 to 9/2013

Isolated CABG and combined CABG–carotid revascularization

n = 1,382

Non-selective carotid screening

n = 1,236 (89%)
Definitions

No or Mild Stenosis
  • Bilateral 0%–59% stenosis

Moderate Stenosis
  • Unilateral 60%–79% stenosis

Severe Stenosis
  • Bilateral 60%–79% stenosis
  • Unilateral 80%–100% stenosis
Screened Patients
n = 1,236

< moderate CAS

87%

moderate CAS

7%

severe CAS

6%
Screening Results
< Moderate Stenosis
n = 1,069

Confirmatory testing
• 0 (0%)

Combined CABG – CEA
• 0 (0%)

Isolated CABG
• 1,069 (100%)

Off-pump CABG
• 75 (7%)
Screening Results
Moderate Stenosis
n = 90

Confirmatory testing
• 4 (4%): CTA=4

Combined CABG – CEA
• 1 (1%)

Isolated CABG
• 89 (99%)

Off-pump CABG
• 11 (12%)
Screening Results
Severe Stenosis
n = 77

Confirmatory testing
• 18 (23%): CTA=16, MRA=1, angio=1

Combined CABG – CEA
• 18 (23%)

Isolated CABG
• 59 (77%)

Off-pump CABG
• 6 (8%)
On-pump vs Off-pump

% 

< moderate  moderate  severe

On-pump  Off-pump
Stroke: By Stenosis Severity

% patients with stroke

- <moderate: 1.3%
- moderate: 2.3%
- severe: 2.6%

P = .3
Stroke: By Management < Moderate Stenosis

Isolated CABG
• 1.3% (14/1,069)

On-pump CABG
• 1.3% (13/994)

Off-pump CABG
• 1.3% (1/75)
Stroke: By Management
Moderate Stenosis

Isolated CABG
• 2.2% (2/89)

On-pump CABG
• 1.3% (1/79)

Off-pump CABG
• 9.1% (1/11)

Combined CABG – CEA
• 0% (0/1)
Stroke: By Management
Severe Stenosis

Isolated CABG
  • 1.7% (1/59)

On-pump CABG
  • 1.4% (1/71)

Off-pump CABG
  • 17% (1/6)

Combined CABG – CEA
  • 5.6% (1/18)
On-pump vs Off-pump

- % stroke with On-pump
- % stroke with Off-pump

Categories:
- < moderate
- moderate
- severe

The bar chart shows a comparison of stroke percentages with On-pump and Off-pump conditions across different severity levels.
Timing of Stroke
All Stroke Patients (n=19)

Postoperative

79%

Intraoperative

21%
# Timing and Location

≥ moderate stenosis undergoing CABG

<table>
<thead>
<tr>
<th>Laterality</th>
<th>Timing (days after surgery)</th>
<th>Right ICA (%)</th>
<th>Left ICA (%)</th>
<th>Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>2</td>
<td>100</td>
<td>20-39</td>
<td>Patient 1</td>
</tr>
<tr>
<td>Bilateral</td>
<td>Intraoperative</td>
<td>60-79</td>
<td>40-59</td>
<td>Patient 2</td>
</tr>
<tr>
<td>Bilateral</td>
<td>3</td>
<td>60-79</td>
<td>40-59</td>
<td>Patient 3</td>
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# Timing and Location

≥ moderate stenosis undergoing CABG

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<td>100</td>
<td>20-39</td>
<td>Right</td>
</tr>
<tr>
<td>Patient 2</td>
<td>60-79</td>
<td>40-59</td>
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# Timing and Location

≥ moderate stenosis undergoing CABG-CEA

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<tr>
<td>20-39</td>
<td>80-99</td>
<td>Right</td>
<td>4</td>
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</table>

Patient 1
Routine carotid screening

- Altered management in minority of patients
- Did not prevent perioperative stroke
On-pump vs off-pump CABG

• Not influenced by severity of carotid disease

• Stroke was similar in patients undergoing on-pump or off-pump surgery
Laterality of stroke

- Ipsilateral to carotid stenosis in only 1
- Cause of perioperative stroke is unlikely to be related to carotid disease
Clinical Inferences

Routine carotid artery screening
  • Questionable

Other strategies should be used to reduce perioperative stroke
  • Intraoperative epiaortic scanning
  • Avoid extremes of blood pressure
  • Postoperative anti-platelet therapy
Patient

72-year-old man presenting for CABG with 3-system disease

Procedure performed

- Isolated CABG with no carotid revascularization

Postoperative complications

- None