Transesophageal echocardiographic control at the stages of performing endoscopically assisted coronary bypass graphing

Madina Kadyrova, Vadim Popov, Elizaveta Strebkova, Julia Stepanova, Amiran Revishvili
Relevance

✓ Coronary heart disease occupies a leading place in the structure of morbidity and mortality of the population worldwide\(^1\)

✓ Atherosclerosis of the ADA is characterized by the severity and consequences of coronary circulatory disorders\(^2\)

✓ Optimization of minimally invasive surgical methods of myocardial revascularization\(^3\)

2. Fang J., 2011; Passamani E, 1985
3. Y. Aladdin 2015
2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)

<table>
<thead>
<tr>
<th>Recommendations according to extent of CAD</th>
<th>CABG</th>
<th>PCI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class</td>
<td>Level</td>
</tr>
<tr>
<td>One or two-vessel disease without proximal LAD stenosis</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>One-vessel disease with proximal LAD stenosis</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Two-vessel disease with proximal LAD stenosis</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Left main disease with a SYNTAX score ≤ 22.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Left main disease with a SYNTAX score 23–32.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Left main disease with a SYNTAX score &gt;32.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Three-vessel disease with a SYNTAX score ≤ 22.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Three-vessel disease with a SYNTAX score 23–32.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Three-vessel disease with a SYNTAX score &gt;32.</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>

79%
PCI or CABG

Mortality HR 1.51; 95%CI 1.23-1.84; P<0.001
MI HR 2.02; 95%CI 1.57-2.58; P<0.001
Repeat revascularization HR 2.54; 95%CI 2.07-3.11; P=<0.001
Stroke HR 0.70; 95%CI 0.50-0.98; P=0.04

Benedetto et al International J Cardiology 2016; 210: 19-24
"The final five-year results of the SYNTAX study not only confirm that coronary artery bypass grafting (CABG) in comparison with stenting is accompanied by a lower frequency of repeated revascularization, but also demonstrate a significant role of CABG in reducing cardiac mortality“

Piroze Davierwala and Friedrich W Mohr
According to the conclusion of the First World Congress on Minimally Invasive Heart Surgery (Paris, May 1997), the main goal of MIRM is to reduce the number of predicted complications and accelerate the patient's recovery, provided that the effectiveness of coronary operations and the duration of the therapeutic effect are preserved.
EndoCAB
Endoscopic Coronary Artery Bypass Graft

Combines a fully endoscopic isolation of the a internal mammary artery using the thoracoscopic technology VATS (Video-assisted thoracoscopic surgery) and the formation of a distal anastomosis with ADA Therefore, this method of myocardial revascularization is promising

[Y. Aladdin 2015]
Guidelines for Performing a Comprehensive Transesophageal Echocardiographic Examination: Recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists

Technical Note


Jon-Émile Stuart Kenny 1,2,*, Geoffrey Clarke 1,2, Matt Myers 2, Mai Elfarnawany 2 1, Andrew M. Eibl 1,2, Joseph K. Eibl 1,2,3, Bhanu Nalla 1,3 and Rony Atoui 1,3 1,2
Purpose
to evaluate the possibilities of intraoperative TEE at the stages of performing endoscopically video-assisted CABG
Problem

1. Assessment of anatomical structures of the heart cavities
2. Detection of myocardial and valvular pathology
3. Assessment of myocardial function before and after surgery
Technology EndoCAB

- Safety and effectiveness
- **Complete revascularization**
- Application of well-known technologies
  - reproducibility and a relatively small learning curve
  - relatively low price
- Minimal surgical trauma, rapid recovery and return to work
- Cosmetic result
- Control of bleeding
- Alternative to robotic surgery
- Combination with PCI (**Hybrid procedure** – Endo-CAB and PCI)
Technology EndoCAB
MiECC

Anastadiadis et al. *Perfusion* 2015
Intraoperative TEE

Venous cannula positioning
Intraoperative TEE

Visualization of the left chambers of the heart
STRAIN LV

GS = -19.6%

GS = -19.9%

GS = -20.4%

GS = -19.9%
Preoperative left atrial strain abnormalities are associated with the development of postoperative atrial fibrillation following isolated coronary artery bypass surgery

Olga N. Kostimin, MD, PhD; James L. Cox, MD; Sanjiv J. Shah, MD; S. Chris Mahesri, MD; June Kruse, BSN; Menghan Liu, MS; Adin-Cristian Andrei, PhD; and Patrick M. McCarthy, MD
Characteristics of patients

35 minimally invasive video-assisted myocardial revascularization was performed.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Средний возраст, лет (M±m)</td>
<td>46,72±4,08</td>
</tr>
<tr>
<td>Sex (male/female)</td>
<td>65,7% / 34,3%</td>
</tr>
<tr>
<td>BMI, kg/m2 (M±m)</td>
<td>27,51±1,04</td>
</tr>
<tr>
<td>Atherosclerosis of the coronary arteries</td>
<td></td>
</tr>
<tr>
<td>ADA</td>
<td>91,4%</td>
</tr>
<tr>
<td>ADA+CA</td>
<td>8,6%</td>
</tr>
<tr>
<td>Acute myocardial infarction in the anamnesis</td>
<td>23%</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>37,2%</td>
</tr>
<tr>
<td>LV EF, %</td>
<td>43,51±12,01</td>
</tr>
</tbody>
</table>

All patients undergo a comprehensive clinical and instrumental examination in the perioperative period.
Technology EndoCAB in our center

- Total operations: 35
- Conversions: 2 (5.7%)
- Hybrid: 3 (8.6%)
- Bleeding: 0 (0%)
- Mortality: 0 (0%)
- Time of hospitalization: 7.1
Practical significance

1. Provides intraoperative control of adequate positioning of the cannulas of CAB
2. Monitoring the effectiveness of antegrade cardioplegia
3. Assessment of myocardial contractility at the end of surgery
4. Assessment of the volemic status of a patient with direct myocardial revascularization
Conclusion

Intraoperative TEE is a fundamental imaging method in the accurate assessment of hemodynamics and geometry of cardiac chambers.

TEE helps to ensure accurate positioning of cannulas of CAB, as well as monitoring of adequate antegrade cardioplegia when other control methods are not possible.
Thank you for the attention!