



Standard Treatment Workflow (STW) SURGICAL MANAGEMENT OF CORONARY ARTERY DISEASE ICD-10-I25.10

For the medical management of Acute Coronary Syndrome, Chronic Stable angina please refer to respective STWs



HEART TEAM APPROACH

Decision to operate is a joint decision of the heart team consisting of a Cardiac Surgeon, Interventional Cardiologist, attending Cardiologist or primary physician and the patient

CONSIDER DEFINITIVE SURVIVAL BENEFITS OF CABG BEFORE MAKING A FINAL DECISION*

This approach is based on:

- Clinical presentation of the patient
- Morphology and extent of coronary artery lesions
- Condition of the left ventricle, its ejection fraction, associated mitral regurgitation, and left ventricular aneurysm
- Associated comorbidities

PREOPERATIVE ASSESSMENT

PRE OPERATIVE REQUISITES

- ECG
- Echocardiography
- ± Stress testing
- Catheter coronary angiography
- ± Viability assessment
- Evaluation for conduits

EVALUATION FOR CO-MORBIDITIES

- Medical conditions such as diabetes, hypertension, obesity
- Carotid Doppler if age > 60 yrs, h/o TIA/stroke
- Neurological evaluation
- USG for renal arteries, abdominal aorta and ilio femoral arteries in clinically relevant cases
- Pulmonary function tests
- RFT/LFT, lipid profile, TSH
- Screening for viral and bacterial infections

PRE-OPERATIVE MEDICATION

Beta-blockers should not be discontinued to avoid acute ischemia

Statins should be continued till day of surgery or initiated if not previously started

Angiotensin-converting enzyme inhibitors and similar drugs might be discontinued 1-2 days prior to surgery

Before elective surgery, discontinue Aspirin 48 hours and other anti-platelet drugs at least 5 days before surgery. Add LMW heparin in high thrombogenic conditions like atrial fibrillation, recent coronary/renal stenting, prosthetic heart valve in-situ, limb ischaemia, and left ventricular clot

SURGICAL REVASCUARIZATION IN ACUTE CORONARY SYNDROME (CABG)

CABG IN NSTE-ACS

Indications for CABG

CABG is preferred over PCI in left main disease, multivessel CAD and diabetics

Timing: After medical stabilization, and or IABP support followed by early CABG

CABG IN STEMI (ACUTE)

Indications for CABG

- CABG is preferred over PCI in left main disease, multivessel CAD, and diabetics
- Mechanical complications (Emergency surgery)
- Coronary anatomy unsuitable for PCI/failed PCI

Timing: Preferably should wait for one week, until and unless there is hemodynamic instability refractory to medical management/ IABP, or if patient develops mechanical complications of MI

CABG IN EVOLVED STEMI (DELAYED)

Choice of procedure depends upon Coronary artery anatomy, Left ventricular function, and myocardial viability

TIMING OF CABG

Chronic stable angina

Elective

NSTE-ACS

Performance of early CABG (< 48 hrs), even in higher-risk patients

STEMI

In the absence of persistent pain or haemodynamic instability, surgery should be performed after 7 days

REVASCUARIZATION IN CAD PATIENTS WITH HEART FAILURE

- CABG is preferred over PCI in patients with congestive heart failure
- Prior myocardial viability assessment is mandatory
- Surgical ventricular restoration is the procedure of choice in patients with left ventricular aneurysm and concomitant CABG with or without mitral valve repair

CORONARY ARTERY BYPASS GRAFTING

On-pump CABG
(With Cardiopulmonary bypass)

Off-pump CABG
(beating heart surgery without CPB)

CONDUITS USED

• LIMA to LAD is the standard of care and has proven survival benefit. If LIMA is unsuitable, RIMA should be used

Additional conduits

- Saphenous vein
- RIMA
- Radial artery

DEFINITIVE SURVIVAL BENEFIT OF CABG* (in the following subsets)

- Left main stenosis greater than 50%
- Three vessel disease with diabetes/LV dysfunction
- Two vessel disease with critical proximal LAD disease
- Two vessel disease without proximal LAD disease (with severe ischemic burden)
- Single vessel disease with critical proximal/ostial LAD disease

LONG TERM POST-OP MANAGEMENT. GO WITH THE GUIDELINES GOAL (GWTG)

RISK REDUCTION/THERAPY

LONG-TERM GOAL

POSTOPERATIVE COMPLICATIONS

Antiplatelets (unless contraindicated or not tolerated)	Single-antiplatelet - Aspirin 75 to 325mg/day, indefinitely
Dual Antiplatelets (unless contraindicated or not tolerated)	Aspirin plus Clopidogrel/Ticagrelor (for one year for OPCAB patients, 6 months for on-pump CABG patients operated during acute coronary syndrome). Thereafter, single antiplatelet agent indefinitely
Beta Blockers	Indefinitely for all patients
ACE inhibitors/ARB/ARNI	Indefinitely for post-MI and CHF, diabetes, hypertension, chronic kidney disease, left ventricular systolic dysfunction, and peripheral vascular disease
Lipid Level Reduction	Diet, Exercise, lipid-lowering agents (statins). Target low density lipoprotein < 70 mg/dl
Diabetes	Hemoglobin A1c <7%
Control of Hypertension	Blood pressure (mm Hg) < 140/85 for most patients, < 130/85 for CHF or renal failure, < 130/80 for diabetes
Smoking	Complete cessation
Physical Activity	30 min (5 times per week)
Weight management	BMI between 18.5 and 24.9

• Bleeding	• Sternal wound infection
• Peri-operative MI	• Conduit harvest site infection
• Rhythm disorders	• Urinary tract infection
• Stroke	• Pulmonary infection
• Acute kidney injury	• Septicaemia
• Post-pericardiotomy syndrome	
• Pericardial collection	
• Pneumothorax	

ABBREVIATIONS

ACS: Acute Coronary Syndrome
ARB: Angiotensin Receptor Blockers
ARNI: Angiotensin Receptor Neprilysin Inhibitor
BMI: Body Mass Index
CABG: Coronary Artery Bypass Graft
CAD: Coronary Artery Disease

CHF: Congestive Heart Failure
CPB: Cardiopulmonary Bypass
EKG: Electrocardiogram
LAD: Left Anterior Descending Artery
LIMA: Left Internal Mammmary Artery
MI: Myocardial Infarction

OPCAB: Off-Pump Coronary Artery Bypass Surgery
PCI: Percutaneous coronary intervention
RIMA: Right Internal Mammmary Artery
STEMI: St Elevation Myocardial Infarction

REFERENCES

1. Neumann FJ, Sousa-Uva M, Ahlsson A, Alfonso F, Banning AP, Benedetto U, Byrne RA, Collet JP, Falk V, Head SJ, Jüni P, Kastrati A, Koller A, Kristensen SD, Niebauer J, Richter DJ, Seferovic PM, Sibbing D, Stefanini GG, Windecker S, Yadav R, Zembala MO; ESC Scientific Document Group. 2018 ESC/EACTS Guidelines on myocardial revascularization. Eur Heart J. 2019 Jan 7;40(2):87-165. doi: 10.1093/eurheartj/ehy394. Erratum in: Eur Heart J. 2019 Oct 1;40(37):3096. doi: 10.1093/eurheartj/ehz507. PMID: 30165437.

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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