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Revascularization in Chronic Coronary Disease: A Comparison between AHA/ACC (2023) and ESC/EACTS (2018) Guidelines

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Abstract

The treatment of chronic coronary artery disease has evolved over decades. AHA/ACC and ESC/EACTS periodically review and update their guidelines for same, and these serve as a reference and guide for medical practitioners all over. Even though literature and evidence on offer is same, they sometimes differ in certain crucial aspects. This comparison serves to bring both on same page, allowing the reader to have a better understanding on the recommendations in particular situation, and the differences. This is especially true when it comes to left main disease, multivessel disease and significant left anterior descending artery stenosis. This comparison also serves to highlight the important role of coronary artery bypass in chronic coronary artery disease, as well as serving as a quick reference in case of dilemma.

Keywords: AHA/ACC Clinical Practice Guidelines; Coronary artery disease; Chronic coronary disease; Syntax score; CABG; PCI.

INTRODUCTION

Management of coronary artery disease in chronic coronary disease has often been controversial, with proponents of angioplasty and surgical bypass at odds with each other many times. The concept of Heart Team approach, while laudable, has not found universal application on ground, with marked variability in PCI-CABG ratios reported among different countries.[1]

Guidelines by American Heart Association (AHA) andEuropean Society of Cardiology (ESC) are widely followed across the globe. Here, I shall briefly compare the 2023 AHA guidelines[2] for the management of patients with Chronic Coronary Disease and the guidelines offered by ESC on myocardial revascularization in 2018,[3] and review of same in 2022[4] by ESC, with focus on revascularization with regards to coronary anatomy in stable coronary artery disease/chronic coronary disease.

As defined by AHA guidelines,[2] CCD includes the following:

1. Patients discharged after admission for an ACS event or after coronary revascularization

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procedure and after stabilization of all acute cardiovascularissues.

2. Patients with left ventricular (LV) systolic dysfunctionand known or suspected coronary arterydisease (CAD) or those with established cardiomyopathydeemed to be of ischemic origin.
3. Patients with stable angina symptoms (or ischemic equivalents such as dyspnea or arm pain with exertion)medically managed with or without positiveresults of an imaging test.
4. Patients with angina symptoms and evidence of coronary vasospasm or microvascular angina.
5. Patients diagnosed with CCD based solely on theresults of a screening study [stress test, coronarycomputed tomography angiography (CTA)], and thetreating clinician concludes that the patient hascoronary disease.

To revascularize, or not?

In patients with chronic coronary syndrome, the decision to treat is guided by following considerations:

1. Relief of symptoms
2. Reduction of non-fatal cardiac events
3. Reduction of fatal cardiac events/survival benefit

Evidence suggests that revascularization has not been found to be significantly beneficial over guideline directed medical treatment/optimal medical treatment in many cases.

Indications for revascularization

	AHA[2]	**ESC[3]**	**Remarks**
Symptom relief	In patients with chronic coronary disease (CCD) and lifestyle-limitingangina despite Guideline-Directed Management and Therapy (GDMT) and with significant coronary artery stenoses amenable to revascularization, revascularization is recommended to improve symptoms (Class 1)	Haemodyanically significant coronary stenosis in the presence of limiting angina or angina equivalent, with insufficient response to optimized medical therapy (Class I)	There is consensus that intervention should be considered only after failure of optimum medical therapy
Survival	In patients with CCD who have significant Left Main (LM) disease or Multi Vessel Disease (MVD) with severe Left Ventricle(LV) dysfunction (LVEF ≤ 35%), CABG in addition to medical therapy is recommended over medical therapy alone to improve survival (Class 1)	LM disease with stenosis >50% (Class I)	
	In selected patients with CCD and significant left main stenosis for whom Percutaneous Coronary Intervention (PCI) can provide equivalent revascularization to that possible with Coronary Artery Bypass Grafting (CABG), PCI is reasonable to improve survival (Class 2a)		
	In patients with CCD and multivessel Coronary Artery Disease (CAD) appropriate for either CABG or PCI, revascularization in addition to GDMT is reasonable to lower the risk of cardiovascular events such as spontaneous Myocardial Infarction (MI), unplanned urgent revascularizations, or cardiac death. (Class 2a)	Two- or three-vessel disease with stenosis >50% with impaired LV function (LVEF <_35%). (Class I)	
	In patients with SIHD, normal ejection fraction, significant stenosis in 3 major coronary arteries (with or without proximal Left Anterior Descending Artery{LAD}), and anatomy suitable for PCI, the usefulness of PCI to improve survival is uncertain (Class2b)[5]	Any proximal LAD stenosis >50%. (Class I)	
		Large area of ischaemia detected by functional testing (>10% LV) or abnormal invasive Fractional Flow Reserve (FFR) (Class I)	
		Single remaining patent coronary artery with stenosis >50%. (Class I)	

Revascularization may take the form of PCI or CABG. Important difference between the two lie in the manner revascularization is accomplished as well as associated morbidity and mortality rates. A bypass graft, by its very design, does not interrupt the native flow in the coronary artery. Nor does it block any branches, or interrupt existing collaterals.

CABG also offers a chance of endarterectomy to open up a completely blocked vessel. Moreover, grafting of LIMA to LAD has been found to be associated with improved patency rates and reduced recurrent ischemia. Addition of BIMA or radial artery graft has been associated with improved long term cardiac outcomes. On the other hand, results of PCI have improved due to use of DES over BMS, which has led to lower stent restenosis and decreased future MI. Use of drug coated balloons and bioabsorbable scaffolds holds promise in future. IVUS use in complex LM/MVD anatomy has shown promising results vis-à-vis angiography guided PCI.

As the above table suggests, even with similar evidence, the recommendation of both societies differ in certain key aspects. For an interventional cardiologist or a cardiac surgeon, these remain grey areas. Hopefully, further RCTs shall offer good quality evidence to clear up these doubts. The presentation of European guidelines is more lucid as it provides recommendation for each situation separately, in author's opinion. An effort has been made to not to delve into evidence base as interpretation is often subjective and confusing. Future guidelines from these organizations shall be eagerly awaited, as is a set of guidelines from India.

PCI or CABG?

Subset	AHA guidelines[2]	ESC guidelines[3]			Trials cited in text in support of guidelines
			CABG	PCI	
LM disease Syntax score 0-32	In selected patients with Stable Ischemic Heart Disease (SIHD) and significant left main stenosis for whom PCI can provide equivalent revascularization to that possible with CABG, PCI is reasonable to improve survival (Class 2a)[5]		Class I(4)	Class I(4)	SYNTAX trial: 40% higher chance of mortality with PCI over CABG in patients with triple vessel disease at 10 years.[6] SYNTAX Score>33 significantly favours CABG.[7]
LM disease – Syntax score >33	In patients with CCD who require revascularization for significant left main involvement associated with high-complexity CAD, CABG is recommended in preference to PCI to improve survival (Class 1)		Class I	Class III	Subgroup analysis at 10 years finds no significant difference in mortality rates between PCI and CABG among patients with LM disease/TVD and low Mental Component Score/Physical Component Score[8]
Non-LM disease	In patients with CCD who require revascularization for multivessel CAD with complex and diffuse CAD (eg, SYNTAX score >33), it is reasonable to choose CABG over PCI to improve survival (Class 2a)	One-vessel CAD Without proximal LAD stenosis	Class IIb	Class I	OPTIMUM trial: where patients with LM and MVD disease considered ineligible for CABG underwent PCI with significant improvement in patients' symptoms and QOL.[9]
		One-vessel CAD With proximal LAD stenosis	Class I	Class I	
		Two-vessel CAD Without proximal LAD stenosis	Class IIb	Class I	NOBEL trial: In patients with LM disease, the primary outcome, a composite of death, non-procedural MI, repeat revascularization, and stroke, at 5 years, had occurred in 28% of the PCI group and 19% of the CABG group (p=0.0002)[10]
Non-LM disease		Two-vessel CAD With proximal LAD stenosis	Class I	Class I	
		Three- vessel CAD without DM & SYNTAX score (0-22)	Class I	Class I	

Table cont...

		Three- vessel CAD without DM & SYNTAX score (>22)	Class I	Class III	EXCEL trial: In patients with low to intermediate complexity LM disease, primary outcome, a composite of death, stroke, or MI, at 5 years, had occurred in 22.0% of the PCI group and 19.2% of the CABG group (p=0.13)[11]
Diabetic patients	In patients with CCD and diabetes who have left main stenosis and low or intermediate complexity CAD (eg, SYNTAX score ≤33), PCI may be considered as an alternative to CABG to reduceMajor Adverse Cardiovascular Events (MACE).(Class 2b)	Three-vessel CAD SYNTAX score (0-22)	Class I	Class IIb	
Diabetic patients	In patients with CCD and diabetes who have left main stenosis and low or intermediate complexity CAD (eg, SYNTAX score ≤33), PCI may be considered as an alternative to CABG to reduce Major Adverse Cardiovascular Events (MACE).(Class 2b)	Three-vessel CAD SYNTAX score (>22)	Class I	Class III	
Diabetic patients	In patients with CCD and diabetes who have left main stenosis and low or intermediate complexity CAD (eg, SYNTAX score ≤33), PCI may be considered as an alternative to CABG to reduce Major Adverse Cardiovascular Events (MACE).(Class 2b)	Three-vessel CAD SYNTAX score (>22)	Class I	Class III	PRECOMBAT trial: In patients with LM disease, primary outcome, a composite of death, MI, stroke, or ischaemia driven target vessel revascularization, at 10 years, had occurred in 29.8% of the PCI group and 24.7% of the CABG group[12] BEST trial: In patients with mean SYNTAX Score of 24, at a median follow-up of 4.6 years, CABG resulted in higher complete revascularization, reducing need for repeat evascularization over PCI, even though there was no significant difference in death, MI, stroke or target lesion revascularization.[13]

CONCLUSION

To conclude, AHA/ACC and ESC/EACTS are rich and reliable source of recommendations in coronary artery disease. Revascularization is beneficial in case of failure of medical management in chronic coronary disease. The benefits of CABG over PCI tend to increase with increasing anatomical complexity of coronary artery disease, as well as in diabetics. One looks forward to more comprehensive guidelines in future.

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