

Consensus Report

Patient profile based management approach for Optimal Treatment of Angina: a consensus from India cases

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Received: 25 February 2019

Revised: 15 March 2019

Accepted: 20 March 2019

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ABSTRACT

Chronic stable angina (CSA) is an incapacitating disorder. The pain can hinder the routine chores of an individual and significantly impact one's quality of life (QoL). However, the good news is that this can be treated and the QoL can be improved. The key to apt management lies in the accurate early diagnosis of this condition, followed by a detailed evaluation and accordingly planned management, which should be regularly revised and be backed by an adequate follow-up. OPTA-Optimal Treatment for chronic stable Angina-is an educational initiative to assist the clinicians in India with screening and diagnostic tools, strengthened by updated guideline-directed management to ensure satisfactory patient outcomes. OPTA aims to improve clinical outcomes by providing optimized pharmacotherapy for patients with stable angina. This expert consensus document intends to provide information for better understanding of the condition by clinicians and to ensure an early, accurate diagnosis, followed by optimal management of angina. For better clinical and practical understanding of Indian clinical scenario, the most commonly encountered patient profiles are briefly described here. These inputs and an extensive literature review were blended to develop the recommendations for clinicians across the country. An attempt is made to include clinical recommendations that meet the needs of the majority of patients in most circumstances in the Indian scenario. However, the ultimate judgment regarding individual case management should be based on clinician's discretion. This expert consensus document is not a substitute for textbooks and/or a clinical judgment.

Keywords: Angina, CAD, Consensus, Case profiles, OMT, OPTA

INTRODUCTION

Coronary artery disease (CAD) is one of the major health concerns for the Indian population. Worldwide, its prevalence has been steadily increasing, and India is no exception to this. Moreover, there is a rising incidence of CAD in the younger population in India.

In the contemporary clinical practice, we often interchangeably use stable ischemic heart disease (SIHD), stable CAD, and stable angina. However, stable angina is the symptomatic form of SIHD, whereas stable CAD is the pathology that may or may not be symptomatic.¹

Classically, the presence of substernal chest pain or discomfort lasting for less than 10 minutes has been described as angina pectoris. Angina may present as pain that may be referred to the arms or the jaw. An atypical presentation may include the complaints of discomfort, dyspnea, and diaphoresis.²

Emotional or physical stress or exercise can provoke this pain, which can be relieved by rest or nitroglycerin in patients who have stable angina.² These transient episodes of chest pain may occur over several weeks in cases of stable angina.³

Angina is the first symptom of CAD in nearly 50% of patients with SIHD. It was first described in 1772 by William Heberdeen.⁴ The most likely pathology is atheromatous CAD, which may be documented by various imaging techniques. Vasospasm and microvascular angina also form a part of the pathology for SIHD.³ Angina develops due to an inadequate coronary blood flow during the periods of an increased myocardial oxygen demand.⁴

It is estimated that nine million adults in the United States have chronic angina.⁴ India too has witnessed a rising prevalence of chronic angina that is subsequent to the increasing prevalence of CAD. The latter has increased from 1.1% to about 7.5% in the urban population and from 2.1% to 3.7% in the rural population.⁵ An early diagnosis and appropriate, immediate measures are necessary to reduce the morbidity and mortality associated with SIHD. However, clinical outcomes for patients with SIHD can vary greatly depending on patient characteristics.⁴ Some of these are commonly encountered in clinical practice. Few such common patient profiles for angina in the Indian scenario are discussed here to facilitate the clinical practice recommendations.

Objectives

The goal of OPTA is to assist clinicians with tools for the accurate diagnosis and prognosis of suspected angina and provide the patients with the optimum medical management in the Indian setting.

The key parameters to be addressed by a panel of experts included:

- Symptomatic relief,
- Delay in disease progression,
- Building exercise capacity,
- Improvement in QoL.

OPTA intended to develop the following tools to assist in meeting the above-mentioned goals: A prompt and accurate diagnosis of CSA, understanding of the symptomatology and presentation of a patient with angina, forming a treatment algorithm to manage CSA.

METHODS

In accordance with the above-mentioned objectives, ten regional board meetings were conducted across India. In all, more than 100 experts from the field of cardiology attended these meetings. The patient profiles commonly encountered in the Indian population and their management were discussed.

Common patient profiles

Case 1 - Chronic stable angina

History

A 65-year old man presented with progressively increasing, transient episodes of chest pain for the past 15 days; the pain would radiate to the left arm, occur with a routine activity, and be relieved by rest. The patient was a known case of CSA for the past 3 years and was on medical therapy for the same. He was also on treatment for hypertension for the past 6 years.

The patient had a family history of CAD; his father and elder brother both died due to myocardial infarction (MI) at the ages of 57 and 63 years, respectively, and his 38-year-old son had been diagnosed with hypercholesterolemia.

The patient was a tobacco chewer for the past 35 years and would consume alcohol (120-180 mL) 2-3 days in a week (Table 1).

The medication history was as follows:

Metoprolol succinate 25 mg twice daily, telmisartan 40 mg once daily, atorvastatin 40 mg once daily, aspirin 75 mg once daily, clopidogrel 75 mg once daily, Short-acting nitrate SOS for immediate relief from angina

Examination

On general examination, the BP was elevated at 138/94 mmHg, and the BMI was 30 kg/m². Systemic examination revealed no abnormality.

Table 1: Consensus on diagnosis of anginal symptoms and risk factors.

Stable angina diagnosis	Risk Factors in patients with stable angina	All modifiable risk factors need to be addressed.
<p><i>Location</i> Substernal or left sided chest discomfort (pain or tightness)</p> <p><i>Radiation</i> To left or right arm or jaw</p> <p><i>Duration</i> Less than 10 minutes</p> <p><i>Aggravating factor</i> Exertion or emotional stress</p> <p><i>Relieving factor</i> Rest or by administration of nitroglycerin</p> <p><i>Implication</i> In this typical form, angina is suggestive of obstructive CAD²</p>	<p><i>Nonmodifiable</i> Male, age 60 years, and a strong family history of MI Premature MI is said to occur when it occurs in men aged < 60 years and in women aged < 65 years</p> <p><i>Modifiable</i> Smoking Hypertension Hypercholesterolemia Hyperglycemia</p>	<p><i>BP targets</i> -Systolic BP (SBP) of less than 120 mmHg had 25% better outcomes than those who were assigned to a target SBP of less than 140 mmHg.⁷ -During office BP, SBP should be maintained at <130 mmHg while during home BP, SBP should be maintained at <120 mmHg.</p> <p><i>Smoking:</i> -Complete cessation³</p> <p><i>Lipids:</i> -LDL-C preferred: Less than 70 mg/dL -Triglycerides preferred: Less than 150 mg/dL⁸</p> <p><i>Blood glucose levels:</i> -Glycosylated hemoglobin less than 7% -6.5% preferred if can be achieved without significant hypoglycemia or other adverse effects of treatment (i.e., polypharmacy)⁹</p>

Investigations

Results of blood investigations were as follows (Table 2). Resting ECG showed sinus bradycardia with concentric left ventricular hypertrophy and severe type IV left ventricular diastolic dysfunction. The LVEF was 55%, and no regional wall motion abnormalities were observed with 2D echocardiogram. Exercise treadmill test (Bruce protocol) had to be stopped at 4.12 minutes, because the patient complained of moderate angina. Angiography revealed triple vessel disease with three stable lesions. One of the lesions showed 99%-100% block.

Table 2: Blood investigations.

Investigations	Values
Fasting blood glucose	95 mg/dL
Total cholesterol	143 mg/dL
LDL-C	87 mg/dL
HDL-C	31 mg/dL
TG	197 mg/dL
eGFR	90.01 mL/min/1.73m ²
Serum creatinine	0.9 mg/dL
Renal and liver function tests	Normal

Management

Management of angina includes the treatment of risk factors to reduce the risk of future cardiac events. This can be achieved by lifestyle modifications, medical therapy, and surgery.

Lifestyle modification

- Complete cessation of tobacco chewing needs to be ensured.
- A nutritionist/dietician should be consulted for weight reduction in view of high BMI and dyslipidemia.

Pharmacotherapy

Optimization of therapy

Metoprolol succinate extended release 100 mg once daily, Telmisartan 40 mg once daily, Atorvastatin 40 mg once daily[@], Aspirin 75 mg once daily, Clopidogrel 75 mg once daily, Trimetazidine 60 mg once daily, Pantoprazole 40 mg once daily, Long-acting nitrate SOS (Figure 1 and Table 3). {[@]With an increase in atorvastatin from 40–80 mg, 6% reduction in LDL-C is expected}.

Case 2 - Microvascular angina

History

A 61-year-old woman presented with the complaint of chest pain upon exertion for the past 3 months. The pain would radiate to the left arm and neck and was not associated with breathlessness or palpitations. The patient was a known case of diabetes mellitus for the past 10 years and hypertension for the past 15 years. Her father died of MI at the age of 67 years (Table 4).

Table 3: Consensus on role of dual antiplatelet therapy and metabolic modulators.

Role of antiplatelet therapy (Mono or Dual [DAPT]) in CSA	Use of trimetazidine in elderly and in combination	The use of ranolazine is associated with improvements in EST parameters, such as:
Antiplatelet therapy reduces recurrent major adverse cardiovascular events (MACE) in patients with stable CAD.	Benefits of trimetazidine use in the elderly population A significant decrease in the frequency of angina	Total exercise duration is a 34.5-second change from baseline. ¹² Time to angina increases compared with placebo. ¹²
Aspirin forms the cornerstone for secondary prevention in patients with SIHD irrespective of the management strategy.	A significant reduction in the frequency of nitroglycerin tablets used, both short- and long-acting An increase in the duration of exercise on testing	Time to onset of ST-segment depression increases with ranolazine use. ¹² A decreased frequency of angina is seen in patients treated with maximally tolerated doses of β -blockers and CCB. ^{12,13}
Routine DAPT is currently not recommended for patients with stable CAD without the history of ACS, PCI, or CABG within 12 months.	<i>Benefits of combining trimetazidine with metoprolol</i> 1-mm ST-segment depression	Reduced use of nitrates: When added to amlodipine, ranolazine reduced the frequency of angina and nitroglycerin consumption. ¹³
DAPT provides more intense platelet inhibition than a single antiplatelet therapy does and results in incremental reductions in the risk of thrombotic events and hence should be used in SIHD patients at a higher risk of cardiovascular (CV) events. ¹⁰	A reduction in the total workload, time to onset of angina, and maximum ST-segment depression Mean weekly number of angina attacks, mean weekly nitrate consumption, and grade of anginal pain ¹¹	Ranolazine is well tolerated. ¹³ Ranolazine may be considered when the patient continues to be symptomatic even after Nitrate therapy.
The antiplatelet agents used currently with aspirin in DAPT are clopidogrel and ticagrelor.	Improved efficacy of β -blockers when used along with trimetazidine	

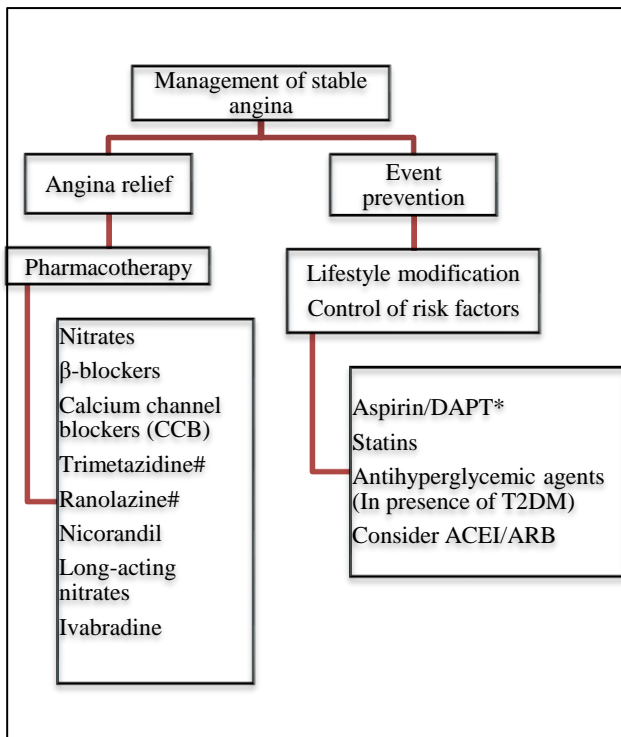


Figure 1: Management of stable angina.

Examination

Table 4: Consensus on evaluation of chronic stable angina (CSA) and significance of left ventricular hypertrophy (LVH) findings.

4D's in CSA diagnosis	Symptoms
4 Ds that need to be evaluated in case of CSA are	Dyspnea
	Discomfort
	Dizziness
	Diaphoresis
The significance of findings of LVH	
Supply and demand in the normal myocardium versus LVH	Left ventricular hypertrophy leads to a demand–supply mismatch, thereby causing ischemia/angina In cases of pathologic LVH, the symptoms and signs are suggestive of myocardial ischemia despite normal coronary angiograms. In such cases, ischemia is often due to coronary microvascular dysfunction (CMD).
Microvascular angina is more common in women than in men. ¹⁴	

The results of general and systemic examinations were normal.

Table 5: Consensus on factors to be considered in lifestyle modification and antianginal therapy in microvascular angina.

Factors to be considered in lifestyle modification	Antianginal drugs for Microvascular Syndrome
<ul style="list-style-type: none"> • Consumption of a diet rich in fruits, vegetables, and low-fat dairy products • Reduction in dietary sodium intake • Regular physical activity • Moderation in alcohol consumption • Weight loss management: Aim to reduce 5%-10% of the weight 	<ul style="list-style-type: none"> • B-blockers - Preferred for patients with increased adrenergic activity • Ranolazine - Improves anginal symptoms in women^{15,16} • Trimetazidine - Beneficial effect in microvascular angina are: <ul style="list-style-type: none"> • It prolongs total exercise time. • It prolongs time to 1-mm ST-segment depression compared with placebo. • Maximum ST-segment depression is less in patients with trimetazidine therapy than those with placebo.^{15,17} • Ivabradine - Improves coronary collateral flow and coronary flow reserve in patients with microvascular angina^{15,16}

Investigation

The troponin I level was normal (6.3 ng/mL). On the lipid profile, except for LDL-C (109 mg/dL), other levels were within normal limits. The liver function test was normal, eGFR was 67. 65 mL/min/1.73 m², and serum creatinine was 1.1 mg/dL.

Resting ECG revealed ST-T changes.^{\$\$} {^{\$\$} Exercise ECG is not recommended in this case, Dobutamine stress test can be considered. In patients with osteoarthritis, cycling can be utilized instead of treadmill test (TMT)}. On angiogram, coronary arteries appeared normal. In patients with chronic effort angina due to left ventricular hypertrophy (LVH) with hypertension and diabetes with normal coronary arteries, the likely diagnosis was microvascular angina.

Management

Lifestyle modification

Consultation with a dietician: Increased consumption of fruits and vegetables and a low sodium intake, Cardiac rehabilitation with an exercise program (Table 5).

Pharmacotherapy

For diabetes

- Metformin 500 mg twice daily
- Teneligliptin 20 mg once daily
- Pioglitazone 15 mg once daily (SGLT2 inhibitors are preferred over pioglitazone in patients with diastolic dysfunction)

For hyperlipidemia

Atorvastatin 40/80 mg once daily

For hypertension

- Amlodipine 5 mg once daily
- Olmesartan 20 mg once daily

For angina

- Bisoprolol 2.5 mg once daily in the morning
- Chlorthalidone 12.5 mg once daily
- Trimetazidine 60 mg once daily
- GTN 2.6 mg twice daily
- Short-acting nitrates SOS

Case 3 - Angina in a woman

History

A 70-year-old woman presented with the progressive symptoms of chest pain along with palpitations, which would develop on walking and would be relieved by rest over the past 3 months. She reported a history of grade III dyspnea for the past 6 years. She was a known case of hypertension for the past 3 years and COPD for the past 6 years. Her mother and sister died due to MI at the age of 72 and 74 years, respectively. Her father was a patient with hypertension and had been receiving medications for it. She used to be a passive smoker for 36 years, because her husband was a chain smoker.

Table 6: The blood investigations revealed the following results.

Investigations	Values
Hemoglobin	8.5 g% [#]
HbA _{1c}	5.8%
TC	188 mg/dL
LDL-C	138 mg/dL
HDL-C	40 mg/dL
TG	90 mg/dL
Serum creatinine	1.2 mg/dL
Liver function tests	Within normal limits
Serum electrolytes	Within normal limits
D-dimer ^{##}	140 ng/mL

Correction of anemia is very important; ## Normal values of D-dimer are less than or equal to 500 ng/mL. When a pulmonary event is suspected, it must be checked.

Table 7: Cardiac biomarkers were raised.

Cardiac biomarker	Patient's values	Normal values	Inference
Troponin I (ng/mL)	89.6	< 16	Raised
NT-proBNP (pmol/L)	1,667.0	< 450	Raised

The patient was on amlodipine for the past 3 years and a salbutamol/formoterol combination inhaler. She was seeking a second opinion, because her coronary angiogram recorded at another hospital showed left main vessel disease (Table 6).

Chest discomfort remains the main symptom of angina. Women commonly present with atypical symptoms, and

frequently they are inadequately treated. The presentation can be varied from patient to patient, such as: Uncomfortable pressure, squeezing, fullness, or pain in the center of the chest, Pain or discomfort in one or both arms, back, neck, jaw, or stomach, Shortness of breath with or without chest discomfort, Other signs, such as breaking out in a cold sweat, nausea, or lightheadedness. Symptoms may be subtle but consequences can be fatal, so they should not be ignored. Female patients may be under-/over-diagnosed, which can lead to a grave impact on prognosis.¹⁷

Examination

The patient had tachycardia; upon chest auscultation, rales were found. Rest of the examination was normal. Investigations as shown in Table 6 and 7.

Table 8: Consensus on cardiac biomarkers and role of IVUS and FFR.

Cardiac biomarkers	IVUS and FFR
<ul style="list-style-type: none"> • The third universal definition of MI includes the “99th percentile of cardiac troponins” as the decision value for AMI. • Contemporary sensitive and high-sensitivity cardiac troponin (HS-cTn) assays have increased the diagnostic accuracy in patients with acute chest pain versus conventional cardiac biomarkers. • With the advent of HS-cTn, the testing of myoglobin as an early marker of myocardial necrosis is no longer recommended. • The sensitivity for troponin T and I approaches 100% when sampled 6-12 hours after the angina onset. • Therefore, in angina patients, to reliably rule out AMI, patients need to have a repeat troponin sample at 6-12 hours after the initial assessment.¹⁸ • A single measurement of NT-proBNP at the time of hospital admission provides important information about Systolic/diastolic dysfunction in unselected patients.¹⁹ 	<p>The role of IVUS and FFR:</p> <ul style="list-style-type: none"> ▪ Long-term data show improved outcomes with FFR-guided decision-making. ▪ FACT: The FFR use remains significantly underutilized in practice, with the FFR being used in 6.1% of the interventions for intermediate coronary lesions (40%-70% stenosis). • Deferring revascularization based on: <ul style="list-style-type: none"> ▪ FFR > 0.80 or an ▪ IVUS MLA > 6.0 mm² is associated with similar long-term outcomes.¹ • In clinical practice: <ul style="list-style-type: none"> ▪ IVUS is preferred for the left main coronary artery. ▪ FFR is preferred for the distal left anterior descending and right coronary artery.

Table 9: Consensus on influence of diabetes in CSA management and PCI versus OMT.

CSA with T2 DM	PCI versus OMT
<ul style="list-style-type: none"> • More extensive coronary atherosclerosis • Higher ischemic burden • Delayed diagnosis • Protracted prognosis because the extent of ischemia dictates outcomes, not symptoms²² <p>Influence of diabetes with/without other risk factors on age-adjusted CV death</p> <p>The presence of T2DM in patients with stable angina can have more grave consequences than those in individuals who do not have diabetes.</p>	<ul style="list-style-type: none"> • The 3-year data presented by FAME 2 at TCT 2017 showed that patients who received OMT had a higher rate of the composite endpoint than those who received PCI or registry patients when FFR ≤ 0.80. • The MACE occurred in 10.1% of the PCI-treated patients versus 22% of the OMT-treated patients (P < 0.001). • In addition, death and MI were numerically lower in the PCI arm, but the difference did not reach a statistical significance. • The incidence of urgent revascularization was > 4-fold higher in the OMT arm than in the PCI arm (17.2% vs. 4.3%; P < 0.001).²³

Investigation

The ECG demonstrated left bundle branch block (LBBB).

The 2D ECHO showed a reduced LVEF (25%). The previous angiography showed 70% ostial stenosis. The intravascular ultrasound (IVUS) of the left main vessel showed a minimum lumen area of 6 mm² (Table 9).

Management

As the IVUS showed a minimum lumen area of 6 mm², optimal medical therapy was opted for instead of revascularization.

Pharmacotherapy

In such cases, transfusion should be avoided.

Iron + folic acid twice daily, Metoprolol 50 mg twice daily, Ramipril 5 mg twice daily, Ivabradine 5 mg twice daily, Atorvastatin 40/80 mg once daily, Furosemide 20 mg once daily, Spironolactone 50 mg once daily, Continuation of the salbutamol + formoterol inhaler SOS. The husband of the patient was encouraged to quit smoking.

Role of ivabradine in CAD

Ivabradine does not unmask α -adrenergic vasoconstriction. Unlike β -blockers, it maintains coronary dilation during exercise. In comparison with β -blockers, ivabradine increases the coronary flow reserve and collateral perfusion, thereby promoting the development of coronary collaterals.²⁰ It also attenuates myocardial ischemia and its consequences even in the

absence of heart rate reduction, possibly through the reduced formation of reactive oxygen species. Ivabradine is an effective antianginal and anti-ischemic agent for the treatment of CAD.^{20,21} Ivabradine versus placebo for treatment in hospitalization for fatal and nonfatal MI in the patients with symptomatic angina.²¹

Case 4 - Chronic stable angina after a graft failure in diabetes mellitus

History

A 76-year-old man with a history of bypass surgery in 2005 presented for a follow-up. He gave a history of reduced effort tolerance (inability to climb staircases without taking frequent pauses).

The patient was a known case of diabetes, hypertension, and hyperlipidemia and was on medication for the same. There was a positive family history of diabetes, hypertension, and CAD. The patient would neither smoke nor consume alcohol.

The medication history included the following drugs:

Metformin 1,000 mg twice daily, Voglibose 0.2 mg thrice daily, Ramipril 5 mg twice daily*, Atorvastatin 20 mg once daily, Aspirin 75 mg once daily, Metoprolol 100 mg twice daily, Diltiazem extended release 180 mg once daily. [*Angiotensin-converting enzyme (ACE) inhibitors are preferred over angiotensin II receptor blockers (ARBs)].

Examination

The results of general and systemic examinations revealed no abnormality.

Table 10: The rationale of modified pharmacotherapy.

Medications	Rationale
Metformin	A long-term follow-up of UKPDS showed the superiority of the metformin use in lowering the incidence of MI and death. ²⁴
SGLT2 inhibitor: Empagliflozin	EMPA REG outcomes have been replicated, thus delaying the need for revascularization and suggesting empagliflozin as a part of OMT for patients with diabetes. ²⁵
Telmisartan	Poor compliance due to intolerance to ramipril-induced cough; an ARB is recommended for patients with HT, DM, and LV systolic dysfunction. ²⁶
Atorvastatin	The 20-80 mg dose is recommended by the NICE lipid-lowering guidelines for the reduction in cardiovascular disease. ²⁷
Aspirin	An antiplatelet agent recommended by the guidelines ²⁶
Metoprolol	A β -blocker used for the antianginal effect and post-MI, LV systolic dysfunction ²⁶
Trimetazidine	Safe when added to ongoing therapy, thus resulting in an increased exercise tolerance with the lower angina frequency ²² Improves the left ventricular function, symptoms, glucose metabolism, and endothelial function Shifts the energy substrate preference away from fatty acid metabolism and toward glucose metabolism ²⁸

Table 11: Choice of antianginal drugs based on the presence of associated comorbidity with angina.

Comorbidity	Preferable antianginal drugs	Less preferred choices
Based on the heart rate		
High heart rate	β -blockers, nondihydropyridine CCB (diltiazem and verapamil), and ivabradine are the preferred drugs when the heart rate is > 70 bpm.	Dihydropyridine CCB and nitrates may further increase the heart rate.
Low heart rate	Dihydropyridine CCB, nitrates, and nicorandil help increase the heart rate by evoking the sympathetic reflex. Ranolazine and trimetazidine may be considered.	-
Based on blood pressure		
Hypertension	β -blockers and dihydropyridine CCB	-
Hypotension	Ranolazine or trimetazidine Ivabradine (preferred only if associated with a high heart rate)	CCB, nitrates, and β -blockers, as they would further lower the BP
Based on the underlying pathology of angina		
Microvascular angina	β -blockers Ranolazine Trimetazidine Ivabradine	-
Vasospastic angina	CCB and long-acting nitrates	β -blockers can precipitate spasm.
Based on rhythm disorders		
Defects in AV conduction	Antianginal drugs other than β -blockers and nondihydropyridine CCB	β -blockers and nondihydropyridine CCB
Atrial fibrillation	β -blockers and nondihydropyridine CCB	-
Based on LVEF		
Heart failure and left ventricular dysfunction	β -blockers If the heart rate remains high despite the β -blocker use, ivabradine may be added. Trimetazidine	Diltiazem and verapamil can worsen LV dysfunction.
Based on other systemic disorders		
Peripheral arterial disease	Trimetazidine Ranolazine Ivabradine	β -blockers
Diabetes	Trimetazidine Ranolazine Carvedilol/nebivolol	β -blockers other than vasodilating β -blockers, i.e., carvedilol/nebivolol
CKD	Other than ranolazine and trimetazidine	Ranolazine and trimetazidine not suitable for patients with the GFR < 30 mL/min/1.73 m ²
Hyperthyroidism	Nonselective β -blockers (propranolol) Diltiazem Verapamil Ivabradine	Vasodilators
COPD	Bisoprolol For the reduction in the heart rate, ivabradine, diltiazem, or verapamil	β -blockers except for bisoprolol

Investigation

The HbA1C value, fasting and postprandial blood glucose levels, and serum triglycerides were elevated. Results of 2D ECHO showed a mildly hypokinetic

inferior basal wall of the left ventricle with an LVEF of 50%-55%.

Management

- Lifestyle Modifications

- Referral to a dietician for an appropriate diet to control risk factors and regular, light exercise
- As the patient was unwilling for further intervention, medical therapy was opted.

Pharmacotherapy

For diabetes

- Metformin 1,000 mg twice daily and
- Voglibose replaced by empagliflozin 10 mg once daily in the morning (Table 4).

For hypertension

Ramipril replaced by telmisartan 80 mg once daily.

For hyperlipidemia

Atorvastatin dose increased to 40 mg once daily

For CAD

- Aspirin 75 mg once daily,
- Metoprolol 100 mg twice daily,
- Diltiazem extended release 180 mg once daily and
- addition of trimetazidine 60 mg once daily (Table 12).

DISCUSSION

The discussion section has been divided into evaluation and management of CSA.

Evaluation

The evaluation of CSA requires a detailed history and examination. The latter must include looking out for conditions that can increase the risk of atherosclerotic cardiovascular disease (AsCVD).

Extensive investigations include blood tests for hemogram, lipid profile, blood glucose testing, and liver and renal function tests.

Cardiac biomarkers form the important part of investigation to rule out ACS and heart failure. Whenever a pulmonary event is suspected, D-dimer testing must be included.

Resting ECG, which of normal, would be followed by exercise ECG. In cases with ST-T changes on resting ECG, further ECG testing is not required.

For patients with osteoarthritis, cycling instead of TMT can be considered and in patients who cannot perform exercise testing, dobutamine stress test/ Cardiac MRI must be considered. 2D ECHO should be performed in all patients.

Angiography should be done to review the coronary arteries, and FFR/IVUS should be performed to appropriately evaluate the case.

Management

Management comprises lifestyle changes, pharmacotherapy, and/or revascularization.

Lifestyle modification

Lifestyle changes are necessary for minimizing the influence of risk factors.

Based on the directions from the national committee consensus, the ultimate goals of medical management in patients with stable angina would include the following:

- Alleviation of symptoms
- Improvement in the effort tolerance
- Improvement in the quality of life
- Prevention of future adverse cardiac events

The European Society of Cardiology explains the multipronged approach toward the management of angina and the optimization of medical therapy to ensure successful outcomes.²⁹

The management for event prevention includes lifestyle modification and control of risk factors.

Pharmacotherapy

Antiplatelet drugs, statins, antianginal drugs, and ACEI/ARB form the armamentarium of pharmacotherapy. They are necessary for disease modulation.

Antiplatelet therapy

Aspirin is the prophylactic antiplatelet drug of choice, whereas DAPT may be considered for patients at a higher risk of a CV event.

Statins

High-intensity statins (atorvastatin 40-80 mg/ Rosuvastatin 20-40 mg) is needed.

Antianginal medications

Antianginal drugs

The 2013 European Society of Cardiology (ESC) guidelines recommend the addition of antianginal drugs, such as long-acting nitrates, ivabradine, nicorandil, trimetazidine, and ranolazine, to the first-line agents. Based on the pathophysiology and other contributing

factors, the antianginal medications need to be individualized.

Based on the associated comorbidities, the preferable antianginal drugs and the less preferred choices have been described in Table 13.

Clinicians can evaluate their patients and plan the treatment accordingly by taking into consideration the various comorbidities described in Table 1.

Revascularization

Patients with CAD with significant stenosis (>50%) should be referred for revascularization. A detailed discussion on revascularization is beyond the scope of this statement.

Medical therapy may be continued with or without the revascularization procedures. For each case, a tailored management plan needs to be chalked out based on the evidence-based principles of the treatment described above.

CONCLUSION

This consensus statement was created to guide physicians in the evaluation and management of patients with stable angina. The newer approach, as advised by the ESC guidelines and by several supportive clinical studies and evidence, recommends a paradigm shift from the traditional approach of first-line and second-line agents to the consideration of different antianginal drugs and their combinations based on individual cases and associated morbidities.

ACKNOWLEDGEMENTS

Authors gratefully acknowledge the contribution of experts across India who gave their expert opinion in conceptualization and finalization of OPTA consensus in advisory board meetings.

Vinod Thomas, Anil Balachandran, Jubil P Mathew, Louie Fischer, N. Anil Kumar, Saji Subramanian, Arshad, Sheeba George, S S Binu, Praveen G K, Anup Kumar, Pradeep P, S V Praveen, Kathiresan, Karthickeyan, G Palanisamy, Jaishankar, Somasundaram, Mohana Murugan, Anand, P R Vaidhya Nathan, Sivabalan, Rajendran, Duraisamy, Thiyagarajan, Sarveshwaran, Kinjal Bhatt, Satyam Udhreja, Sharad Jain, Jay Shah, Rutvik Trivedi, Sanjay Vaghani, Anand Ahuja, Haresh Mehta, Mahesh Shah, Ashok Panjabi, Bharat Shivdasani, Dhiren Shah, Dayanand Kumbala, Brijesh Agrawal, Tushar Roy, A K Kheda, Anand Kumar Pandey, Sanjeev Sharma, Ashwani Mehta, Arun Mohanti, Gautam Swaroop, Ayush Shukla, Rajeev Rastogi, Sanjay Tandon, Rajesh Jain, H S Shariq, Abhay Srivastav, P Mariappan, Omnath R, Srinivasan K.N, Krishnamurthy, S Nagendra Boopathy, Arumugam, V Magesh, V

Murugesan, Latchumanadhas A, P Balaji, K P Shamsuddeen, J Ezhilan, S N Narasingan, D Prabakaran, S Guruprasad, Madhan Mohan, P Susheel Reddy, L Srichandran, K Chockalingam, Bivin Wilson, K A Sambasivam, S Socrates, A.L Narayanan, V Ramraj, S Manoj, P Manokar, M Karthik Anjaneyan, Dhamodharan, VE Dhandapani, RH Sundar, K P Suresh Kumar, K Mohan.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Shah VT, Zachariah G, Lakshmanan S, Babu S, Suresh K, Roy DG, et al. Patient profile based management approach for Optimal Treatment of Angina: a consensus from India cases. *Int J Adv Med* 2019;6:551-61.