

Management Of Refractory Angina

DR. Yahya Kiwan

ACC/AHA Guidelines Treatment of Symptoms Angina Pectoris to Prevent MI and Death and Reduce Symptoms

Class I

- Aspirin in the absence of contraindications. (Level of evidence A)
- Beta-blockers as initial therapy in the absence of contraindications in patients with prior MI (A) or without prior MI. (B)
- Angiotensin-converting enzyme inhibitor in all patients with CAD* who also have diabetes and/or LV systolic dysfunction. (A)
- Low-density lipoprotein-lowering therapy in patients with documented or suspected CAD and LDL cholesterol >130 mg/dl, with a target LDL of <100 mg/dl. (A)
- Sublingual nitroglycerin or nitroglycerin spray for the immediate relief of angina. (B)
- Calcium antagonists † or long-acting nitrates as initial therapy for reduction of symptoms when beta-blockers are contraindicated. (B)
- Calcium antagonists † or long-acting nitrates in combination with beta-blockers when initial treatment with beta-blockers is not successful. (B)
- Calcium antagonists † and long-acting nitrates as a substitute for beta-blockers if initial treatment with beta-blockers leads to unacceptable side effects. (C)

Class IIa

- Clopidogrel when aspirin is absolutely contraindicated. (B)
- Long-acting nondihydropyridine calcium antagonists † instead of beta-blockers as initial therapy. (B)
- In patients with documented or suspected CAD and LDL cholesterol 100-129 mg/dl, several therapeutic options are available. (B)
 - a. Lifestyle and/or drug therapies to lower LDL to <100 mg/dl.
 - b. Weight reduction and increased physical activity in persons with the metabolic syndrome.
 - c. Institution of treatment of other lipid or nonlipid risk factors; consider use of nicotinic acid or fibric acid for elevated triglycerides or low HDL cholesterol.
- Angiotensin-converting enzyme inhibitor in patients with CAD or other vascular disease. (B)

Class IIb

- Low-intensity anticoagulation with warfarin in addition to aspirin. (B)

Class III

- Dipyridamole. (B)
- Chelation therapy. (B)

* Significant CAD by angiography or previous MI

† Short-acting, dihydropyridine calcium antagonists should be avoided.

Effect of Guidelines-Based Care on Health-Related Quality of Life At 1 Year in Patients with Refractory Angina

	P
Seattle Angina Questionnaire (SAQ)*	
Angina stability	0.028
Angina frequency	0.02
Treatment satisfaction	0.001
Quality of life	<0.001
Short form-12 (SF-12)	
Mental component	0.023
1-year anxiety domains	0.015
1-year depression domains	0.018

* All significant changes within the SAQ domains were large enough to be considered clinically relevant.

Other Therapies in Patients with Refractory Angina

Class IIa

- Surgical laser transmyocardial revascularization. (**Level of evidence A**)

Class IIb

- Enhanced external counterpulsation. (**B**)
- Spinal cord stimulation. (**B**)

Applicable ACC/AHA Classifications

Class II: Conditions for which there is conflicting evidence or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.

Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.

Class IIb: Usefulness/efficacy is less well established by evidence/opinion.

Published Controlled and Uncontrolled Trials of Enhanced External Counterpulsation in Patients with Stable Angina

Study (Ref.)	Year	n	Treatment Duration (h)	Clinical Effects
Zheng, et al.	1983	200	12	Reduction of ≥ 1 CCS class (97%)
Lawson, et al.	1992	18	36	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; an increase in exercise tolerance (67%); increased cardiac perfusion (78%)
Lawson, et al.	1996	27	35	An increase in exercise tolerance (81%); increased cardiac perfusion (78%)
Lawson, et al.	1996	50	35	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; increased cardiac perfusion (80%)
Lawson, et al.	1998	60	35	A reduction of ≥ 1 CCS class; an increase in exercise tolerance; increased cardiac perfusion (75%)
Arora, et al.	1999	139	35	Reduction of ≥ 1 CCS class; a reduction in nitrate use; an increase in exercise tolerance; an increase in time to ST depression
Lawson, et al.	2000	33	35-36	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; increased cardiac perfusion (79%)
Lawson, et al.	2000	2,289	35	Reduction of ≥ 1 CCS class (74%)
Urano, et al.	2001	12	35	An increase in exercise tolerance; an increase in time to ST depression; increased cardiac perfusion
Masuda, et al.	2001	11	35	An increase in exercise tolerance; an increase in time to ST depression; increased cardiac perfusion
Stys, et al.	2001	395	35	Reduction of ≥ 1 CCS class (88%)
Barsness, et al.	2001	978	35	Reduction of ≥ 1 CCS class (81%); a reduction in nitrate use
Stys, et al.	2002	175	35	Reduction of ≥ 1 CCS class (85%); an increase in exercise tolerance; increased cardiac perfusion (83%)

CCS=Canadian Cardiovascular Society

Published Controlled and Uncontrolled Trials of Enhanced External Counterpulsation in Patients with Stable Angina

Study (Ref.)	Year	n	Treatment Duration (h)	Clinical Effects
Zheng, et al.	1983	200	12	Reduction of ≥ 1 CCS class (97%)
Lawson, et al.	1992	18	36	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; an increase in exercise tolerance (67%); increased cardiac perfusion (78%)
Lawson, et al.	1996	27	35	An increase in exercise tolerance (81%); increased cardiac perfusion (78%)
Lawson, et al.	1996	50	35	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; increased cardiac perfusion (80%)
Lawson, et al.	1998	60	35	A reduction of ≥ 1 CCS class; an increase in exercise tolerance; increased cardiac perfusion (75%)
Arora, et al.	1999	139	35	Reduction of ≥ 1 CCS class; a reduction in nitrate use; an increase in exercise tolerance; an increase in time to ST depression
Lawson, et al.	2000	33	35-36	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; increased cardiac perfusion (79%)
Lawson, et al.	2000	2,289	35	Reduction of ≥ 1 CCS class (74%)
Urano, et al.	2001	12	35	An increase in exercise tolerance; an increase in time to ST depression; increased cardiac perfusion
Masuda, et al.	2001	11	35	An increase in exercise tolerance; an increase in time to ST depression; increased cardiac perfusion
Stys, et al.	2001	395	35	Reduction of ≥ 1 CCS class (88%)
Barsness, et al.	2001	978	35	Reduction of ≥ 1 CCS class (81%); a reduction in nitrate use
Stys, et al.	2002	175	35	Reduction of ≥ 1 CCS class (85%); an increase in exercise tolerance; increased cardiac perfusion (83%)

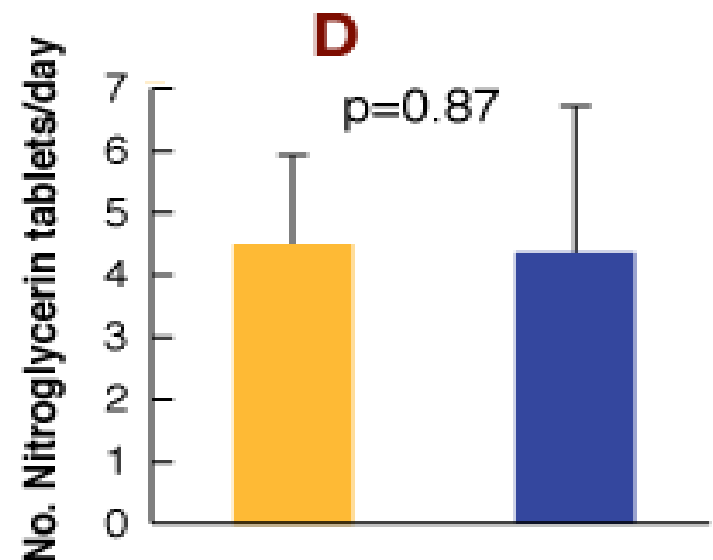
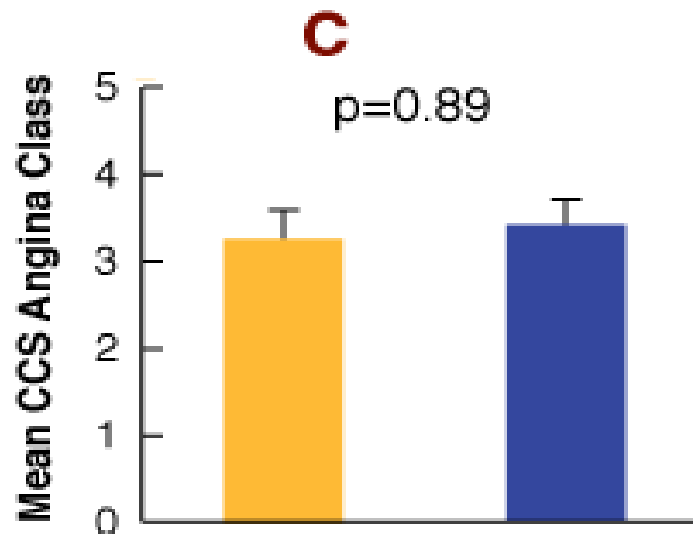
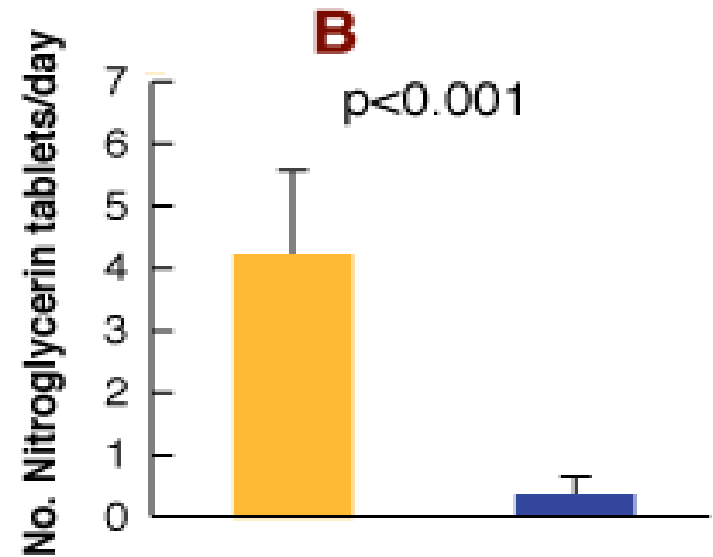
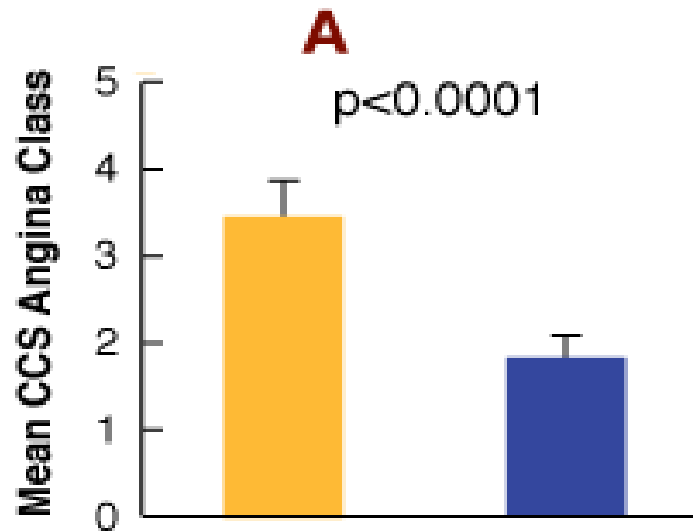
CCS=Canadian Cardiovascular Society

Published Controlled and Uncontrolled Trials of Enhanced External Counterpulsation in Patients with Stable Angina

Study (Ref.)	Year	n	Treatment Duration (h)	Clinical Effects
Zheng, et al.	1983	200	12	Reduction of ≥ 1 CCS class (97%)
Lawson, et al.	1992	18	36	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; an increase in exercise tolerance (67%); increased cardiac perfusion (78%)
Lawson, et al.	1996	27	35	An increase in exercise tolerance (81%); increased cardiac perfusion (78%)
Lawson, et al.	1996	50	35	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; increased cardiac perfusion (80%)
Lawson, et al.	1998	60	35	A reduction of ≥ 1 CCS class; an increase in exercise tolerance; increased cardiac perfusion (75%)
Arora, et al.	1999	139	35	Reduction of ≥ 1 CCS class; a reduction in nitrate use; an increase in exercise tolerance; an increase in time to ST depression
Lawson, et al.	2000	33	35-36	Reduction of ≥ 1 CCS class (100%); a reduction in nitrate use; increased cardiac perfusion (79%)
Lawson, et al.	2000	2,289	35	Reduction of ≥ 1 CCS class (74%)
Urano, et al.	2001	12	35	An increase in exercise tolerance; an increase in time to ST depression; increased cardiac perfusion
Masuda, et al.	2001	11	35	An increase in exercise tolerance; an increase in time to ST depression; increased cardiac perfusion
Stys, et al.	2001	395	35	Reduction of ≥ 1 CCS class (88%)
Barsness, et al.	2001	978	35	Reduction of ≥ 1 CCS class (81%); a reduction in nitrate use
Stys, et al.	2002	175	35	Reduction of ≥ 1 CCS class (85%); an increase in exercise tolerance; increased cardiac perfusion (83%)

CCS=Canadian Cardiovascular Society

Beneficial Effects of Short-Term External Counterpulsation (A and B) vs. Controls (C and D)



Effect of Spinal Cord Stimulation on Spontaneous and Stress-Induced Angina and “Ischemia-Like” ST-Segment Depression in Patients with Cardiac Syndrome X

Reduction in angina	p*
Number	0.01
Duration	0.022
Severity	0.011
Nitrate consumption	0.042
Seattle Angina Questionnaire	≤0.013 for all
Visual analogue scale	
(scale: 0-100)	<0.001
24-h Holter monitoring	
Reduction in episodes of ST-segment depression	0.014
Echocardiographic dobutamine stress test	
Time to angina	0.045
Time to 1 mm ST-segment depression	0.04

* Compared with the withdrawal (inactive) phase