

EECP[®] Clinical Summary

Clinical Outcomes

EECP[®] external counterpulsation therapy provides heart failure and angina patients an effective, non-invasive and enduring therapeutic option. Data from 100's of clinical studies, presentations and patient registries done exclusively with Vasomedical's EECP[®] devices, show that approximately 80 percent of patients benefit from EECP[®] therapy and may experience:

- angina symptoms that are less frequent and less intense;
- reduced need for nitroglycerine or other symptom reducing medications;
- increased energy levels;
- a greater ability to take part in activities of daily living;
- enjoying a better quality of life; and/or
- a more positive outlook.

Summary of Clinical Experience

Study (Ref.)	Year	N	Treatment Duration	Angina Reduction ³ 1 CCS Class(%)*	Nitrate Use	Exercise Tolerance (%)	Time to ST Depression	Cardiac Perfusion
Lawson ¹	1998	60	35 Hr	↓		↑		↑ (75%)*
Arora ²	1999	139	35 Hr	↓	↓	↑	↑	
Lawson ³	2000	33	35-36 Hr	↓	↓			↑(79%)*
Lawson ⁴	2000	2,289	35 Hr	↓(74%)*				
Urano ⁵	2001	12	35 Hr			↑	↑	↑
Masuda ⁶	2001	11	35 Hr			↑	↑	↑
Stys ⁷	2001	395	35 Hr	↓(88%)*				
Barsness ⁸	2001	978	35 Hr	↓ (81%)*	↓			
Stys ⁹	2002	175	35 Hr	↓ (85%)*		↑		↑ (83%)*

1 Lawson WE, Hui JCK, Guo T, Burger L, Cohn PF. Prior revascularization increases the effectiveness of enhanced external counterpulsation. Clin Cardiol 1998;21:841-4.

2 Arora RR, Chou TM, Jain D, et al. The Multicenter Study of Enhanced External Counterpulsation (MUST-EECP): effect of EECP on exercise-induced myocardial ischemia and anginal episodes. J Am Coll Cardiol 1999;33:1833-40.

3 Lawson WE, Hui JCK, Cohn PF. Long-term prognosis of patients with angina treated with enhanced external counterpulsation: five-year follow-up study. Clin Cardiol 2000;23:254-8.

4 Lawson WE, Hui JCK, Lang G. Treatment benefit in the enhanced external counterpulsation consortium. Cardiology 2000;94:31-5.

5 Urano H, Ikeda H, Ueno T, Matsumoto T, Murohara T, Imaizumi T. Enhanced external counterpulsation improves exercise tolerance, reduces exercise-induced myocardial ischemia and improves left ventricular diastolic filling in patients with coronary artery disease. J Am Coll Cardiol 2001;37:93-9.

6 Masuda D, Nohara R, Hirai T, et al. Enhanced external counterpulsation improved myocardial perfusion and coronary flow reserve in patients with chronic stable angina. Eur Heart J 2001;22:1451-8.

7 Stys T, Lawson WE, Hui JCK, Lang G, Liuzzo J, Cohn PF. Acute hemodynamic effects and angina improvement with enhanced external counterpulsation. Angiology 2001;52:653-8.

8 Barsness G, Feldman AM, Holmes DR Jr., Holubkov R, Kelsey SF, Kennard ED, and the International EECP Patient Registry Investigators. The International EECP Patient Registry (IEPR): design, methods, baseline characteristics, and acute results. Clin Cardiol 2001;24:435-42.

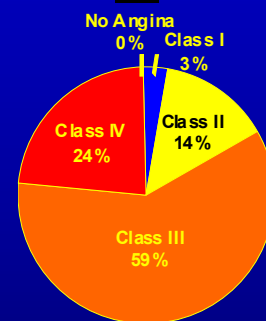
9 Stys TP, Lawson WE, Hui JCK, et al. Effects of enhanced external counterpulsation on stress radionuclide coronary perfusion and exercise capacity in chronic stable angina pectoris. Am J Cardiol 2002;89:822-4.

The International EECF Patient Registry (IEPR) provides data demonstrating patients' sustained improvement of angina symptoms.

Frozen Data From The International EECF Registry (5,022 Patients, 92 Centers)

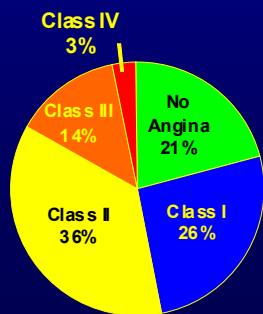
- Independent Voluntary Patient Registry
- Maintained by the University of Pittsburgh Graduate School of Public Health
- Initiated in 1998
- Consecutive patients to minimize bias
- Enrollment closed summer 2001 following achievement of enrollment target of 5000 patients
- Phase II Initiated January 2002 with recruitment goal of 2500 patients

Pre-EECF® Treatment

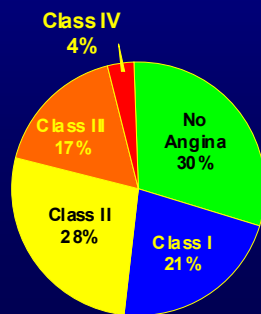


Post EECF Treatment

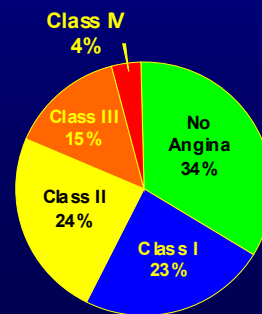
Immediately Post Treatment



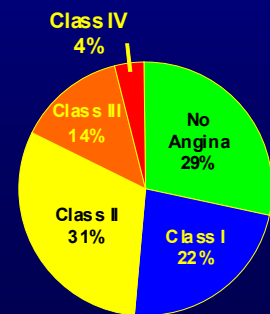
12 Months Post Treatment



24 Months Post Treatment



36 Months Post Treatment

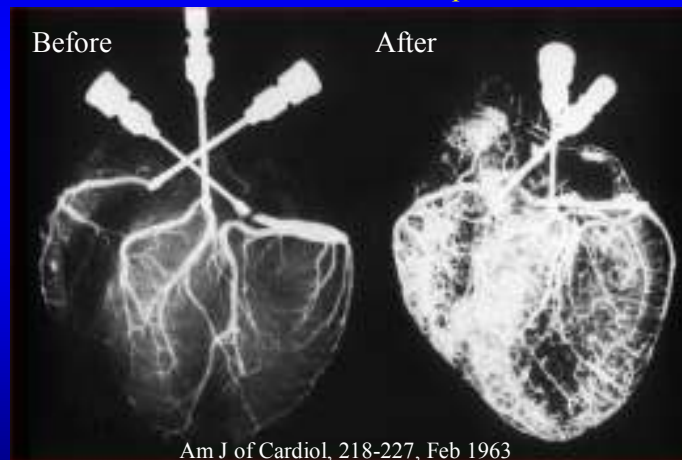


Objective Data

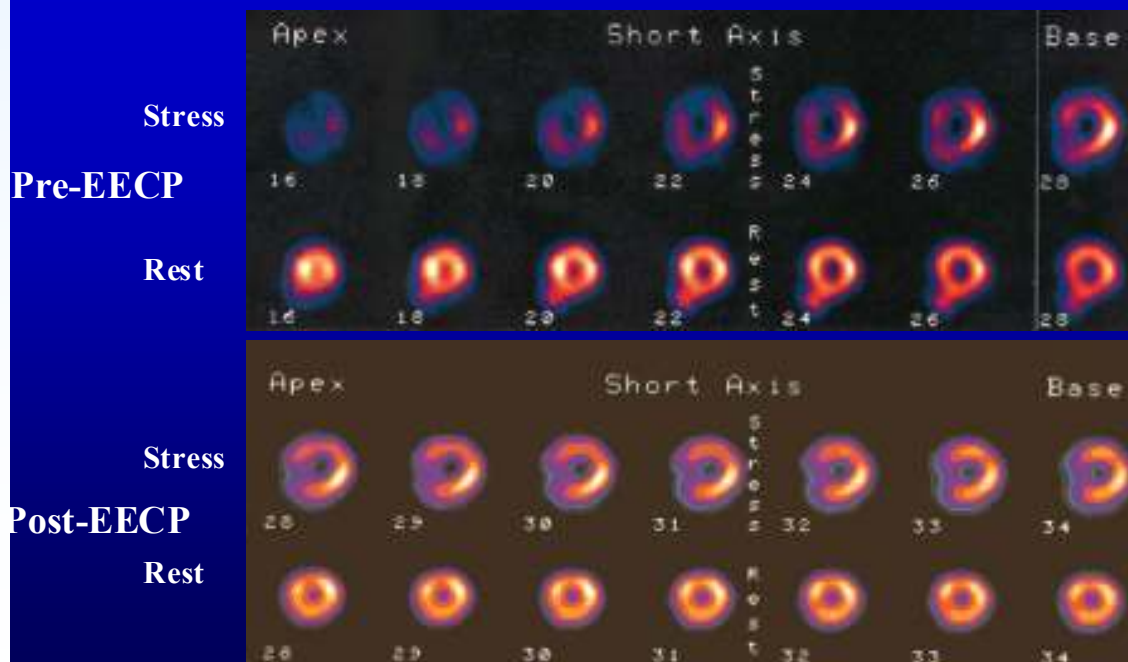
EECP Creates Collaterals in the Heart

- Improve perfusion to ischemic regions via collaterals
- Increase microvasculature density

Experimental Dog Heart
Before and After Counterpulsation



EECP Effect on Radionuclide Stress Perfusion



Lawson WE, Hui JCK, et al. *J Crit Illness* 2000;15(11):629-36

Mechanism of Action

While the exact mechanism whereby EECF therapy produces clinical improvement remains unknown, there are several hypothesized mechanisms of action for EECF that have been discussed in clinical literature and include:

- Improvement of endothelial function
- Promotion of collateral vessels
- Enhancement of ventricular function
- Peripheral training effect with physiologic effects similar to that seen with physical exercise

