

Short Communication

Enhanced External Counter Pulsation (EECP) for Refractory Angina Pectoris (RAP); Results from a first case series

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Abstract

Enhanced External Counterpulsation (EECP) has emerged as a promising non-invasive modality not only for patients with refractory angina pectoris (RAP) but also for patients with heart failure. To our knowledge, no published data exists in Pakistan about the benefits of EECP. We report on a case series of 16 consecutive patients undergoing EECP. All patients were either deemed not to be candidates for revascularization or had failed revascularization with RAP on optimal medical therapy. Data was collected regarding the coronary anatomy, clinical presentation, Pre and Post EECP Canadian Cardiovascular Society (CCS) class, nitrate use and 6-min walk test. Patients with severe peripheral vascular disease and arrhythmias were excluded. The mean age was 56 ± 11.1 years.

Eight patients had 3-vessel disease, 4 post-CABG

with occluded grafts and the rest with variable combination of coronary disease. Seven (44%) patients had Unstable Angina and 9 (56 %) had Stable Angina. The mean 6 min walk distance before EECP was 295 ± 148.60 meters and after EECP was 360 ± 102.12 meters ($p = 0.013$). The CCS class before and after EECP also showed significant improvement ($p = 0.017$). Sublingual nitroglycerine use also showed a positive trend after EECP. EECP was noted to be a safe and effective modality for patients with RAP with statistically significant improvement in measures of quality of life.

Introduction

Despite the dramatic improvement in treatment modalities for coronary artery disease in the last two decades, the number of patients with refractory angina pectoris remains quite high. In the US alone, there are an estimated

300,000 to 900,000 patients who have RAP and each year an estimated 25,000 to 75,000 cases are added to this growing problem.¹ The last two decades have seen a number of new options for patients with RAP. The most promising of these, so far, has been enhanced external counter pulsation (EECP). The benefits of EECP were initially seen in open labeled studies but now randomized studies have clearly demonstrated sustained benefits of EECP.²⁻⁴ The beneficial effects of EECP are modulated through several possible mechanisms i.e. collateral circulation, increased nitric oxide levels and reduced endothelin-1 levels and increased secretion of vascular endothelial growth factor (VEGF).⁵ Recent past has seen EECP being used not just for RAP but congestive heart failure (CHF), peripheral arterial disease, erectile dysfunction, cardiac syndrome-X and even in patients with cardiogenic shock.^{6,7} To the best of our knowledge, there is no published data so far in Pakistan regarding the use, benefits and economic feasibility of EECP. We report the results of EECP on 16 patients with RAP.

Case Series

We reviewed a case series of 16 consecutive patients undergoing EECP for RAP. Patients were referred for EECP from cardiology OPD for continued symptoms of angina despite maximum medical therapy. Patients were deemed not candidates for either initial percutaneous revascularization or coronary artery bypass grafting (CABG) or repeat procedures. All patients underwent a detailed questioning about base line characteristics including coronary artery disease risk factors, coronary anatomy, cardiac medication use, CCS class, nitroglycerine use frequency before and after EECP and pre and post-EECP six minute walk test. Data was analyzed using SPSS v.11 and a p value of < 0.05 was considered statistically significant. Patients were also questioned about subjective improvement in quality of life (QOL). Patients with severe peripheral arterial disease and significant arrhythmias (atrial or ventricular) were excluded

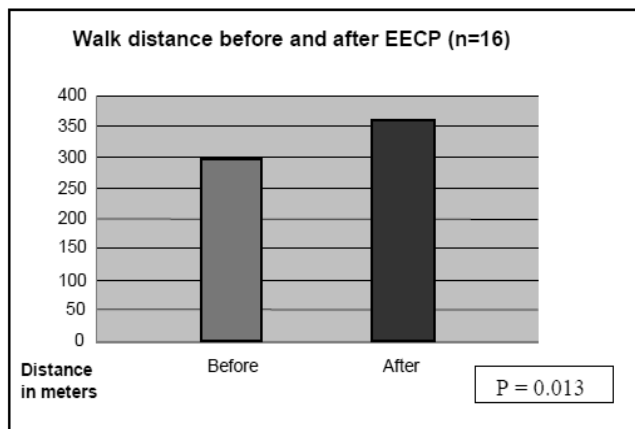


Figure-1: Pre and post EECP six-minute walk test (n=16).

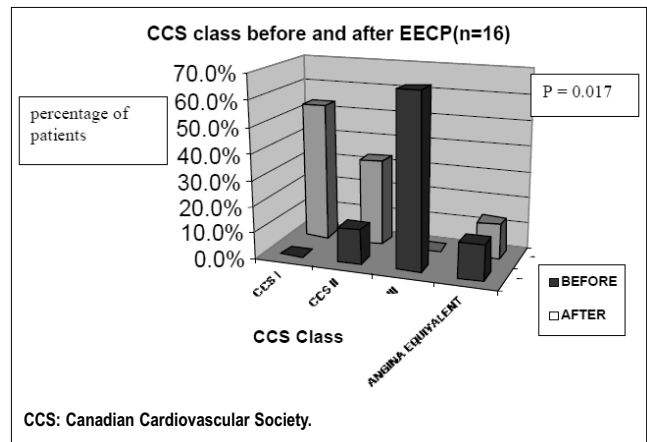


Figure-2: CCS class before and after EECP (n=16).

from the therapy.

A total of 16 patients each underwent a 35 day EECP session during one year period (Jan 2007-Dec 2007). Complete pre and post-EECP data was available for all patients who were included in the study. The mean age was 56 ± 11.1 years. There were 10 males and 6 females. Seven patients had unstable angina (UA) and 9 had stable exertional angina. Seven patients had triple vessel coronary artery disease (CAD) and the rest had variable combination of CAD. Six patients were deemed poor candidates for either CABG or percutaneous intervention (PCI). Five patients had prior coronary artery bypass surgery (CABG) with occluded grafts. Twelve patients were diabetics and there was 1 current smoker. All patients were on maximal medical therapy including beta-blockers, nitrates, angiotensin converting enzyme inhibitors (ACE-I), aspirin and statins. The mean six minute walk distance before EECP was 295 ± 148.60 meters and after EECP 360 ± 102.12 meters ($p = 0.013$) (Figure-1). CCS class-I increased from 0% before EECP to approximately 57% after EECP as well as CCS class-III decreased from 66.6% before EECP to 0% after EECP ($p = 0.017$) (Figure-2). Nitroglycerine use once/week decreased from 25% to 0% and patients not requiring nitroglycerine increased from 33% to 50% ($p = 0.49$). Almost all patients reported a subjective improvement in quality of life. Pre-EECP, 4 patients were able to complete the 6 min-walk test, 6 completed it with symptoms and 6 could not complete it. Post-EECP, 10 patients were able to complete the 6 min-walk test without symptoms, 5 completed it with mild symptoms and 1 stopped due to symptoms. One patient, who was a diabetic female, developed superficial skin eruptions on both lower extremities in the beginning of EECP which responded to topical steroid treatment.

There is an increasing body of data accumulating regarding the benefits of EECP for patients with refractory angina pectoris. The benefits have been shown to be

sustained for up to 2 years after completion of the initial session.⁸ For those patients who do not respond in the first session, there is evidence for benefit after a repeat session.⁹ EECP is now being recognized not just as a last option for patients with RAP, but as a first line therapy in place of percutaneous revascularization or CABG. EECP has been used even in patients with left main disease.¹⁰ Currently a few centers are offering EECP in Pakistan. The cost of a 35 session course is approximately 120,000 Rupees. In view of the economic constraints of Pakistani society, it is imperative that the benefits of EECP be clearly documented before it is widely recommended either as an adjunct to medical therapy or even as an alternate to percutaneous or open revascularization. This case series shows not only tangible and statistically significant improvement in performance parameters for most patients undergoing EECP but also improvement in subjective quality of life. Larger studies with long term data are needed before EECP can be recommended for widespread use in Pakistan.

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