Enhanced Counter-pulsation Therapy: A Non-invasive Treament Modality for Cardiovascular Patients

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India accounts for approximately 60% of the world's heart disease burden,[1] despite having less than 20% of the world's population. According to Global Burden of Disease study state age-standardized CVD death rate is 272 per 100000 population in India that is much higher than that of global average of 235. CVDs strike Indians a decade earlier than the western population.[2] For us Indians, particular causes of concern in CVD are early age of onset, rapid progression and high mortality rate. At present the definitive treatment for unstable angina, non-ST elevation myocardial ischemia and ST elevation myocardial ischemia is invasive treatment of stent placement or coronary artery bypass graft in blocked coronary arteries followed by lifelong medical treatment besides the life style modification. Limitations of each of these approaches include: adverse drug effects, procedure-related mortality and morbidity, restenosis after PCI, and time dependent graft attrition after CABG. Furthermore, an increasing number of patients are not appropriate candidates for standard revascularization options, due to co-morbid conditions (HF, peripheral vascular disease), poor distal coronary artery targets, and patient preference. The morbidity and mortality associated with repeat surgical revascularization procedures are significantly higher, and often excludes these patients from consideration for further revascularizations.[3] Patients with CAD who have chronic ischemic symptoms that are unresponsive to both conventional medical therapy and revascularization techniques have refractory angina pectoris.[4]

Prevention is better than cure is an age old saying that is true in present day scenario for chronic diseases.

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Nothing is better than not having a diseased or a cure at an early phase of ailment. In case of ischemic heart disease besides traditional approach of diet, life style modification, EECP holds a promising option.

EECP means Enhanced External Counter Pulsation therapy. It is performed as a non-invasive treatment to lower the number and intensity of angina episodes. At present it has been approved by the United States Food and Drug Administration (USA-FDA) for the management of refractory angina and heart failure.

In 1953 Dr. Adrian Kantrowitz of USA first described the concept of "Phase Shift Diastolic Augmentation Mechanism",. Dr. Kantrowitz demonstrated that by increasing the aortic diastolic pressure there is increase in coronary perfusion pressure and blood flow in the coronary arteries. He showed in animal study if coronary arteries are perfused at elevated pressure during diastole the coronary blood flow can be increased by 20-40%. This concept of Counter-Pulsation leads to development of invasive Intra-aortic balloon pump Counter pulsation (IABP) and non-Invasive Enhanced External Counter pulsation (EECP).

During the 1950s and 1960s, Harvard Researchers found that a technique called counter-Pulsation could provide mechanical assistance to patients with low cardiac output. Based on their findings, two groups developed two devices. The first group uses a balloon in aorta came to be known as the Intra-Aortic Balloon Pump (IABP) Counter Pulsation which is the Invasive Method and Second group uses a complete external and non-invasive approach to increase the diastolic pressure in aorta. This Noninvasive technique is known as External Counter pulsation. Scientists hoped the latter would increase venous return, boost cardiac

output, and improve coronary artery perfusion, thus causing development of collateral circulation.

In the 1970s, Chinese doctors looking for a more cost-effective way to treat heart patients began researching the early Harvard work and eventually modified ECP - with good results.

EECP Treatment is administered through three pairs of external inflatable cuffs that are applied around the lower legs, upper legs and buttocks. These cuffs continuously inflate and deflate between the resting period of the heartbeat and increase blood returned to the heart. The basic principle of EECP treatment involves increasing the amount of blood returning to the heart, which helps supply more oxygen to its starved areas. With more oxygen available, the heart can function much more efficiently and therefore reduce chest pain.

Individuals are eligible for treatment if they have been diagnosed with disabling stable angina (Class III or IV Canadian Cardiovascular Society or equivalent classification), who in the opinion of a cardiologist or cardiothoracic surgeon, are not readily amenable to surgical intervention because:

Their condition is inoperable, or at high risk of operative complications or postoperative failure;

Their coronary anatomy is not readily amenable to such procedures; or

They have co-morbid states, which create excessive risk.

Contraindications for EECP Treatment

Hypertrophic cardiomyopathy, Valvular disease, Enlarged heart, Pacemaker, Atrial fibrillation (Afib), Pulmonary hypertension, Peripheral artery disease (PAD), also called peripheral vascular disease (PVD), Severe elevated blood pressure.

Benefits of EECP Treatment

Increased oxygen supply for the heart, Decrease in chest pain, Improved EKG response to exercise, Decrease in nitroglycerin use, Increase in energy and increased exercise duration. These effects remain up to 2 years.

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