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Effects of Enhanced External Counter Pulsation Therapy on Patients with Angina

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Effects of Enhanced External Counter Pulsation Therapy on Patients with Angina

Valerie Jones, RN

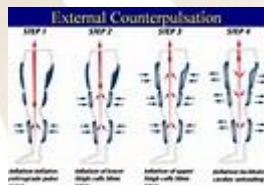
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Introduction

According to the literature, coronary heart disease (CHD) is responsible for 370,000 deaths annually in the United States (Centers for Disease Control and Prevention [CDC], 2015). A symptom commonly associated with CHD is angina (US Department of Health & Human Services, National Institute of Health, National Heart, Lung, and Blood Institute [NIH], 2011). An estimated 300,000 to 900,000 patients in the United States have refractory angina pectoris (RAP), with nearly 100,00 new cases diagnosed yearly (Manchanda, Aggarwal, Aggarwal, & Soran, 2011). Kones describes refractory angina as continued angina class III/IV, in the non-surgical candidate, with objective evidence of ischemia despite optimum medical treatment (Kones, R., 2010). Many medications are available for the treatment of angina. Beta blockers, calcium channel blockers, and angiotensin-converting enzyme inhibitors are often useful in the reduction of angina pain. Angioplasty and life changes such as smoking cessation, weight loss, and stress reduction are additional treatment options for the patient suffering from chronic angina (Mayo Clinic, 2015). Despite endless treatment options, chronic angina continues to pose significant challenges to both patient and medical professional. The patient diagnosed with chronic angina frequently suffers from anxiety, fear, pain, and decreased quality of life. According to the literature, a continual challenge of modern cardiovascular medicine is to discover new, effective treatments for patients with refractory angina pectoris, a clinical condition characterized by severe angina despite optimal medical therapy (Gennari, Gambini, Bassetti, Capogrossi, & Pompilio, 2014). Enhanced external counterpulsation (EECP) is approved for the management of refractory angina. EECP has proven beneficial in the decrease of anginal symptoms, decreased nitroglycerin use, and improvement of exercise tolerance (Sharma, Ramsey, & Tak, 2013).

Case Presentation

A 62 year old female diagnosed with refractory angina pectoris, presents with long standing debilitating angina pain. The patient's ability to ambulate and perform activities of daily living are significantly affected. Daily routine tasks such as walking, climbing stairs, or basic housekeeping become impossible without the patient experiencing chest pain (Manchanda et al., 2011). Symptom relief could not be achieved through standard pharmacological interventions. Over the course of several years all treatment options were explored. In addition to medication management, the patient underwent two coronary artery bypass graft surgeries, and numerous extensive stent placements. Despite continued efforts, the debilitating pain and anxiety associated with angina continued, affecting all aspects of the patient's life. With all other treatment options exhausted, enhanced external counterpulsation (EECP) therapy was recommended. The treatment was non-invasive, painless, and beneficial. After one month of continued EECP treatment new collateral veins were noted to several areas of the heart. The patient reported a decrease in angina symptoms. Additionally, a reduction in pharmacological treatment was noted.



Pathophysiology

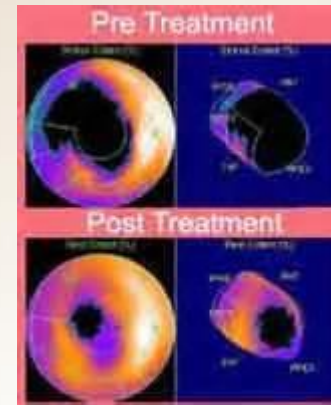
Angina pectoris is a clinical syndrome of precordial discomfort or pressure due to transient myocardial ischemia without infarction (Warnica, 2015). Plaque disruption, thrombosis, vasoconstriction, and supply-demand mismatch are all contributory factors related to unstable angina (Medscape, 2013). Angina pectoris occurs as a consequence of increased cardiac workload, subsequently myocardial oxygen demand exceeds the capability of the coronary arteries to supply an acceptable volume of oxygenated blood. (Warnica, 2015). Myocardial oxygen demand is primarily determined by heart rate, systolic wall tension, and contractility, narrowing of a coronary artery typically results in angina that occurs during exertion and is relieved by rest (Warnica, 2015). Unstable angina falls within the range of clinical presentations referred to collectively as acute coronary syndromes (ACS), ranging from ST-segment elevation myocardial infarction (STEMI) to non-STEMI (Medscape, 2013). The patient experiencing ACS should be diagnosed with refractory angina when there is no detectable release of enzymes and biomarkers of myocardial necrosis (Medscape, 2013).

Signs & Symptoms

The NIH describes angina as chest pain and discomfort that occurs if the heart muscle does not get enough oxygen rich blood. The pain associated with angina is often described as squeezing or pressure in the chest, the pain may radiate to the jaw, shoulders, arms, and neck (NIH, 2011). Signs and symptoms associated with refractory angina may vary significantly among patients. The patient may present with nausea, lethargy, increased shortness of breath, diaphoresis, dizziness, and generalized weakness. Women experience angina differently, typically presenting with jaw, neck, throat, abdominal or back discomfort. Diabetics may complain of increased shortness of breath, in the absence of pain (PubMed Health, 2010).

Significance of Pathophysiology

The nurse should be familiar with the pathological process that occurs in the patient suffering from refractory angina. Becoming familiar with the signs and symptoms associated with the disorder will enable the nurse to provide accurate and timely care. The advanced practice nurse must understand that the patient may present with symptoms that are often mistaken for a MI. The nurse must be familiar with cardiac enzyme testing. With proper knowledge, the nurse can distinguish angina from a MI. Knowledge of lab values is significant, as cardiac enzymes will be negative in the patient with refractory angina.



Implications of nursing care related to ECP

In June 2002, the United States Food and Drug Administration (FDA) approved enhanced external counterpulsation (EECP), as an effective treatment for the management of refractory angina (Sharma et al., 2013). EECP is a non-invasive treatment in the frequency reduction and intensity of angina episodes. During EECP three pairs of pneumatic cuffs are applied to the lower extremities at the levels of the calves and lower and upper thighs, cuff inflation and deflation are synchronized with the ECG (Kones, R., 2010). Typically, the patient will receive thirty five ½ hour sessions over the course of 7 weeks. (Kones, R., 2010).

EECP treatment requires three sets of pneumatic cuffs that sequentially contract during diastole, and automatically deflate before onset of systole (Kones, R., 2010). This process increases aortic diastolic pressure, while enhancing coronary blood flow and central venous return (Sharma et al., 2013). Simply speaking, EECP increases the volume of blood returning to the heart, which helps supply more oxygen to its starved areas, therefore reducing angina (Medscape, 2013).

According to the literature, EECP is an effective, noninvasive, alternative treatment in the patient suffering from refractory angina. Benefits of EECP are improved ventricular function, systolic BP, coronary perfusion, myocardial oxygen balance, and exercise tolerance. Successful treatment decreases episodes of angina, sparing nitrate use in an impressive proportion of patients (Kones, R., 2010).

Additionally, EECP is also beneficial in the treatment of stable congestive heart failure (CHF) (Sharma et al., 2013). Researchers assume that cardiac benefits associated with EECP are mediated through vascular endothelial growth factor (VEGF) and nitric oxide mediated vasodilatation and angiogenesis (Sharma et al., 2013).

Conclusion

According to the data, the number of patients diagnosed yearly with refractory angina continues to increase. Pain reduction in this patient population is a significant issue faced by clinicians. EECP is an effective, noninvasive treatment option for the patient suffering from refractory angina pectoris. Studies show that patients treated with EECP have a 25% reduction in angina symptoms weekly. According to Kohn, 41% of patients treated with EECP reported being pain free for 2 years post treatment (Kohn, 2010). The advanced practice nurse, must become familiar with all treatment options available to the patient suffering from angina. EECP should be considered as part of the patient's treatment plan, when pharmacological and surgical options have been exhausted. Further education to both clinician and patient is needed with regard to this effective treatment for refractory angina. Many medical professionals are unfamiliar with EECP therapy, therefore EECP is underutilized in the treatment of chronic angina. Increased provider knowledge related to EECP may provide a successful treatment option for the patient suffering from chronic angina. Research shows, EECP has been safely used in the treatment of angina for the past two decades, more recently, several publications support its efficacy (Sharma et al., 2013).

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