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Effects of Enhanced Counter Pulsation Therapy on Patients with Angina
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Pathophysiology
Angina pectoris is a clinical syndrome of preclinical or crescendo chest pain 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 (Medcape, 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, 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 broad range of clinical presentations referred to collectively as acute coronary syndromes (ACS), ranging from ST segment elevation myocardial infarction (STEMI) to non-STEMI (Medcape, 2013). The patient experiencing ACS should be diagnosed with refractory angina when there is no detectable release of enzymes and biomarkers of myocardial necrosis (Medcape, 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 (NH, 2015). Signs and symptoms associated with refractory angina may vary significantly among patients. Additionally, a reduction in pharmacological therapy was noted.

Case Presentation
A 62-year-old female diagnosed with severe coronary artery disease presents with long-standing debilitating angina pain. Her 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 should she engage in exertive activities. Most common symptoms included chest pain (Manchanda et al., 2013). Symptom relief or improvement of angina symptoms started with standard pharmacological interventions. Over the course of several years all treatment options were explored. In addition to medication she underwent two coronary artery bypass graft surgeries, and a large number of percutaneous coronary interventions. Despite continued efforts, the patient’s underlying 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 therapy was noted.

Significance of Pathophysiology
The nurse should be familiar with the pathological process that occurs in the patient suffering from refractory angina. Being 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 atypical 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 certain 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 regulation and intensity of angina episodes. During EECP three pairs of pneumatic cuffs are applied to the lower extremities at the level of the calf and upper thighs. cuff inflation and deflation are synchronized with the ECG (Kohn, R., 2010). Typically, the patient will receive thirty five ½ hour sessions over the course of 7 weeks. (Kohn, R., 2010). EECP treatment requires three sets of pneumatic cuffs that are used in the treatment of angina for the patient’s right, left, and in some instances, the bilateral lower extremities. The ECG will monitor the lower extremity movements (Kones, R., 2010). Typically, the patient will receive thirty five ½ hour sessions over the course of 7 weeks. (Kohn, R., 2010). EECP treatment requires three sets of pneumatic cuffs that are used in the treatment of angina for the patient’s right, left, and in some instances, the bilateral lower extremities. The ECG will monitor the lower extremity movements (Kones, R., 2010). Typically, the patient will receive thirty five ½ hour sessions over the course of 7 weeks. (Kohn, R., 2010). EECP treatment requires three sets of pneumatic cuffs that are used in the treatment of angina for the patient’s right, left, and in some instances, the bilateral lower extremities. The ECG will monitor the lower extremity movements (Kones, R., 2010).

According to the literature, EECP is an effective, noninvasive, alternative treatment in the patient suffering from refractory angina. Benefits of EECP include improved ventricular function, systolic BP, coronary perfusion, myocardial oxygen balance, and exercise tolerance (Kones, R., 2010). 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 (HOP) (Sharma et al., 2015). 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., 2015).

Conclusion
According to the data, the number of patients diagnosed yearly with refractory angina continues to increase. Pain management in this patient population is a significant issue faced by healthcare professionals. EECP appears to be a promising noninvasive treatment option for the patient suffering from refractory angina. Researchers have found that patients treated with EECP have a 25% reduction in angina episodes per week. As such, according to Kohn, 41% of patients treated with EECP reported being pain free five years post treatment (Kohn, 2010). The advanced practice nurse must become familiar with all treatment options available to the patient suffering from refractory angina. EECP should be considered as part of the patient’s treatment plan, where pharmacological and surgical options have been exhausted. Further education to both physician and patient is needed with regard to this effective treatment for refractory angina.

Additional Sources

References
Vascular Health and Risk Management, 6, 749-794.