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Myocardial Infarction in Women versus Men

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Introduction

As a future advance practice nurse (APN), it is important to recognize the symptoms of myocardial infarction (MI) and provide prompt treatment to patients to reduce morbidity and mortality. The worldwide leading cause of death is cardiovascular disease (CVD). In 2008, coronary heart disease (CHD) was the cause of 7.3 million deaths, while cerebrovascular disease was responsible for 6.2 million deaths. Since cardiovascular disease is the leading cause of death for women, it is imperative for the medical community to identify risk factors and seek an increased awareness of gender differences (Worrall-Carter et al., 2011). After myocardial infarction, 23% of women over the age of 40 will die in the first subsequent year. After age 70, this figure rises to 32%. It has also been determined that younger women have a higher propensity to die in the 2 years after MI versus older women. (DeVon et al., 2011). As a student and future APN, it is of the highest importance to learn and recognize varying different presenting symptoms of myocardial infarction, and to initiate prompt treatment to prevent further irreversible damage to the patient's heart and consequently other body systems (Van Berlo & Molkentin, 2014). Time is of the most critical importance due to the cardiac muscle's inability to regenerate. Initiating a specific algorithm to treat the patient presenting with symptoms of MI in a timely manner could mean the difference between life and death (Kalman et al., 2013)

Pathophysiology and its Significance

It has been estimated that over 42 million women in the United States have been diagnosed with cardiovascular disease (CVD). In 2008, about 17.3 million people worldwide died from CVD (DeVon, Saban, & Garrett, 2011; Almond, Salisbury & Ziebland, 2012). The study has shown that after age 40, approximately 23% of women die in the first year following the myocardial infarction (MI), and 32% after age 70. This study also has showed the deaths rates to be three times higher for women younger then 50 years compared to men ((DeVon at el., 2011). Over the years, the mortality rates from CVD have been decreasing in women as well as men, however, the mortality rate is decreasing less vigorously in women (Kalman at el., 2013). The decline in deaths in females nearly 22% between 1996 and 2006 has been contributed in the improvement in awareness of risk, primary and secondary prevention, lifestyle changes, early defibrillation, and advanced treatments (DeVon at el., 2011).

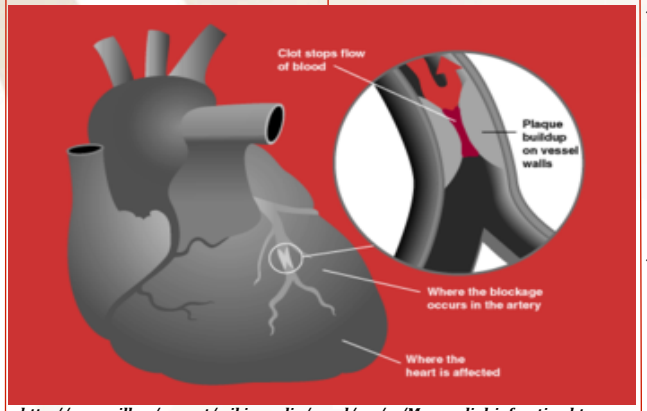
Over the years, coronary heart disease (CHD) has been described as the presence of atherosclerotic lesions in the epicardial coronary arteries which result in narrowing or occlusion of the vessel lumen. However, the recent study does not support this pathophysiology of CHD in women, stating that heart disease is primarily a matter of epicardial stenosis (Edwards, 2012, p.575). Research studies have shown that women who undergo coronary angioplasty for evaluation of chest pain very often have no evidence of obstructive coronary disease, which puts them into a category of the presence of "clear arteries" and low cardiac risk.

The same study showed that about 50% of women with heart disease show normal coronary arteries, compared to 17% in men (Edwards, 2012, p.575).

Coronary microvascular disease (CVD) is consequence of damage to the arterial walls. This disorder is more prevalent in women than men, and it affects about 3 million women in the United States. Microvascular disease develops as result of diffuse plaque deposit, spasms of coronary arteries, and/or damage to the vessel wall. This small vessel disease reduces coronary blood flow and eventually leads to ischemic disease (Edwards, 2012, p.575).

The pathophysiology of heart disease in women is impacted by endothelial function. Myocardial ischemia can be the result of endothelial dysfunction even if obstructive lesions are not present. Endothelial dysfunction is a term used to describe a change in the blood vessel lining resulting from a decrease in nitric oxide (vasodilator and vascular smooth muscle relaxant) which impedes blood flow and weakens vasodilation. Endothelial dysfunction appears to be the result of the presence of plaque which stimulates vessel restructuring (Edwards, 2012, p.575).

In men, a MI usually begins with the sudden rupture of cholesterol filled plaque in a coronary artery, which eventually precipitates a blood clot. In women, plaque is more likely to erode into the vessel wall rather than to burst (DeVon at el., 2011).



http://cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/m/Myocardial_infarction.htm

Unique Signs and Symptoms Women versus Men

Many studies have proven that men and women can experience the signs and symptoms of MI differently. In general, symptoms of MI are more dramatic in men and more subtle in women (Almond at el., 2012; DeVon at el., 2011; Edwards, 2012; Mackay at el., 2011; Poon at el., 2012; Van Berlo & Molkentin, 2014).

- Unlike men, women frequently experience atypical symptoms suggestive of MI, which in many cases delay them from seeking help (Edwards, 2012).
- Atypical symptoms accompany MI in Women are more likely to report nausea and shortness of breath, but less likely report sweating compared with men (could be related to symptoms of peri-menopausal symptoms) (Edwards, 2012).
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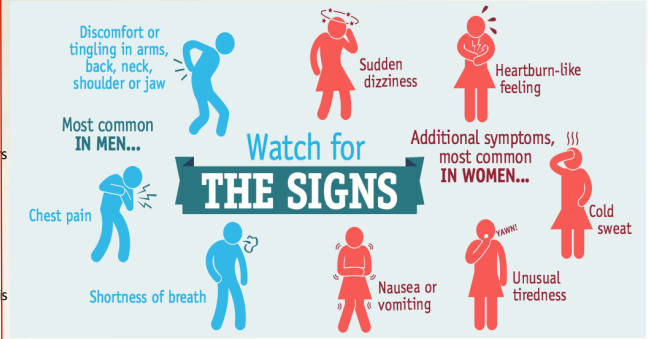

https://myheartsisters.org/2015/09/20/most-common-heart-attack-signs

- The main difference identified between women and men include that women are less aware of risks, less likely to experience chest pain and have higher incidence of prodromal symptoms. As a result of that the evidence suggest that women may experience delays in triage\ and be treated differently from men. Research shows that the average delay ranged from 1.8 to 7.2 hours in women compared with 1.4 to 3.5 hour is in men (Almond at el., 2012).
- Atypical symptoms accompany MI in women include fatigue (59%), shortness of breath (59%), weakness (47%), nausea (44%), sweating/hot sensation (43%), and dizziness (42%) (Edwards, 2012).
- Women are 2-3 times likely than men to report pain in the left arm, hand, left scapula and neck. Because of these mild symptoms, women's heart attacks are often misdiagnosed (Worrall-Carter at el., 2011).
- Hormonal changes after menopause play a role in heart disease process in women. Decreased estrogen causes lipid dysfunctions and significantly increases the incidence of MI
- Insuline resistance and high triglycerides appear to be more harmful to women's hearts.
- Some studies have revealed that 19.8% of women and 13.7% of men experienced prodromal symptoms 90 days prior to the acute event. Those symptoms included pain, anxiety, fatigue, breathlessness, nausea, jaw pain, and pain in the shoulder blade and upper back (Poon at el., 2012)

Implications

- Pathophysiological analysis of CAD has shown that gender based considerations are decisively significant in determining the existence of MI in women. The Women's Ischemic Syndrome Evaluation (WISE) has demonstrated that CAD in women can often beconvincingly associated with endothelial dysfunction (Mieres & Bonow, 2016).
- The difference even in the pathology between the two genders is crucial to understand for healthcare professionals. The knowledge and data gathered from the researchers should be tilized and implemented in the practice and with the first contact with the patient.
- As many researchers are indicating, it is also important to promote a healthy lifestyle and focus modifiable CVD risk factors such as: hypertension, hyperlipidemia, smoking, diabetes, physical activity, obesity, diet and alcohol consumption (Worrall-Carter at el., 2011). All these factors are very influential in the disease process and the outcome.
- With a thorough awareness of the pathophysiological process, advance practice nurses can be instrumental in reducing morbidity and mortality associated with myocardial infarction. Additionally, close scrutiny must be applied to potential female risk indicators such as hormonal changes after menopause and endothelial function.

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Conclusion

According to the study, it has been proven that 50% of MI experienced by women is undiagnosed and unrecognized, in comparison to a 33% statistic for men (Worrall-Carter at el., 2014).

As many researchers have suggested, women experience MI differently than men. Stereotypically, MI has been associated with crushing central chest pain, which is typical for men, but is not a common symptom for women. Because of these atypical symptoms women very frequently are being misdiagnosed when presented with acute coronary syndrome, which eventually leads to myocardial infarction (Mackay at el., 2011).

As the study suggests, gender difference is significant when it comes to early recognition of signs and symptoms of MI in women and men. It is fundamental, as healthcare workers, to be well aware of these "silent" and atypical symptoms in women in order to make an early recognition and diagnosis of the disease. There is a need for additional education between healthcare workers and women themselves about specific gender differences when it comes to heart disease.

Also, Van Berlo and Molkentin (2014), stated in their research that women are underrepresented in cardiovascular disease prevention clinical trials. Some action should be taken, and more women should be involved in preventive care, including clinical trials. Risk factor modifications are the major key in prevention of cardiovascular disease. The focus should be switched to risk factor identification and awareness of sex differences. As healthcare workers we should encourage more gender specific clinical trials, advocate for women, and help them get involved and participate in clinical trials to even better understand the presentation and differences of the symptoms between both genders.

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