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Abdominal Aortic Aneurysm: A Silent Killer

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The aorta is the largest artery in the body and it originates from the left ventricle of the heart, supplying all of the body’s arteries with oxygenated blood. Three layers comprise the wall of the aorta. The tunica adventitia, the outermost layer, is made up of connective tissue and fibrous tissue that help to support the vessel. The middle layer known as the tunica media, is composed of smooth muscle and elastin capped by an innermost lining. The diameter of the vessel, vascular resistance, the diameter of the artery, a layer with a diameter of endothelial cells bordering the blood (Irwin, 2007; Woodrow, 2011). The hemodynamics properties of the cardiovascular system and its stressful forces can put the aorta at risk of a true aneurysm, affecting all three of these layers (Patel & Arora 2008). An “AAA” is a condition that involves weakening in the wall of a blood vessel causing it to enlarge or dilate. Aneurysms can form in any blood vessel in the body, but are most commonly seen in the aorta and specifically, the abdominal aorta (Moore & Mastracci, 2014). An AAA is a significant cause of mortality in the United States. “Aortic aneurysm is considered a silent killer because it frequently remains asymptomatic until rupture or the patient’s death” (Gordon & Toussaint, 2014). Treatment of AAAs is dependent on recognizing early diagnosis and treatment, highlighting the need for screening and mortality rates of those affected.

**Significance and Underlying Pathophysiology**

The formation of aneurysm involves a multifaceted process of destruction of the aortic media and supporting lamina through degradation of the arterial wall. The vascular wall is composed of two major sub-epithelial layers, the tunica media and tunica adventitia (Crawford et al, 2003). With disruptions in blood flow to vital organs such as the brain, heart, kidneys and GI tracts, ischemia occurs. Ischemia is the inadequate supply of oxygenated blood. Three layers comprise the wall of the aorta. The tunica adventitia, the outermost layer, is made up of connective tissue and fibrous tissue that help to support the vessel. The middle layer known as the tunica media, is composed of smooth muscle and elastin capped by an innermost lining. The diameter of the vessel, vascular resistance, the diameter of the artery, a layer with a diameter of endothelial cells bordering the blood (Irwin, 2007; Woodrow, 2011). The hemodynamics properties of the cardiovascular system and its stressful forces can put the aorta at risk of a true aneurysm, affecting all three of these layers (Patel & Arora 2008). An “AAA” is a condition that involves weakening in the wall of a blood vessel causing it to enlarge or dilate. Aneurysms can form in any blood vessel in the body, but are most commonly seen in the aorta and specifically, the abdominal aorta (Moore & Mastracci, 2014). An AAA is a significant cause of mortality in the United States. “Aortic aneurysm is considered a silent killer because it frequently remains asymptomatic until rupture or the patient’s death” (Gordon & Toussaint, 2014). Treatment of AAAs is dependent on recognizing early diagnosis and treatment, highlighting the need for screening and mortality rates of those affected.

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The pathogenesis of AAAs is still unclear, however inflammation is most likely the leading process responsible for the development of changes in the intimal and medial aortic wall, which leads to obliteration of elastin and alteration of collagen. According to Cox et al. (2006), “studies suggest that aneurysm-derived cytokines perpetuate the cycle of inflammation and proteolysis that is the pathological hallmark of abdominal aortic aneurysm.” 320

The risk factors for AAA are numerous and include smoking, hypertension, hyperlipidemia, and oxidative stress (Mastracci & Delanois, 2014). When an adequate stress, the aneurysm is increased and further weakens the wall of the vessel. Acute hypertension may decrease flow into the media, leading to ischemia, which further weakens this layer (Bard, Swann, 2005). The aortic plaques can continue to expand and weaken the aortic wall, leading to aortic dissection. Aneurysms can form in any blood vessel in the body, but are most commonly seen in the aorta and specifically, the abdominal aorta (Moore & Mastracci, 2014). An AAA is a significant cause of mortality in the United States. “Aortic aneurysm is considered a silent killer because it frequently remains asymptomatic until rupture or the patient’s death” (Gordon & Toussaint, 2014). Treatment of AAAs is dependent on recognizing early diagnosis and treatment, highlighting the need for screening and mortality rates of those affected.

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