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Age and cardiovascular disease

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Abstract

Adult age 65 and older are more likely than younger people to suffer from cardiovascular disease . Aging can cause changes in heart and blood vessels that may increase person's risk of developing cardiovascular disease This can include a change in heart rate or rhythm, changes to the shape of the heart, thickening of heart valves and blood vessels, and more. The changes with age occurs in everyone but not necessarily at the same rate. The changes associated with decrease elasticity and increase stiffness of the arterial system.This result in increased afterload on the left ventricle, an increase in systolic blood pressure and left ventricular hypertrophy as well as other changes in the left ventricular wall. The normal process of aging is associated with progressive deterioration in structure and function of the heart including coronary heart disease , hypertension and heart failure.

KeyWords: Cardiovascular disease, aging.

INTRODUCTION

The cardiovascular system is sometimes called the blood-vascular or simply the circulatory system.It consists of heart, which is muscle pumping device and closed system of vessels called arteries,veins and capillaries. The vital role of the cardiovascular system in maintaining homeostasis depends on the continuous and controlled movement of blood through the thousands of miles of capillaries that permeate every tissue and reach every cell in the body.

The heart has two sides. The right side pumps blood to the lungs to receive oxygen and get rid of carbon dioxide. The left side pumps oxygen-rich blood to the body.

Blood flows out of the heart, first through the aorta, then through arteries, which branch out and get smaller and smaller as they go into the tissues. In the tissues, they become tiny capillaries.

Capillaries are where the blood gives up oxygen and nutrients to the tissues, and receives carbon dioxide and wastes back from the tissues. Then, the vessels begin to collect together into larger and larger veins, which return blood to the heart.

AGEING CHANGES

Heart:

- The heart has a natural pacemaker system that controls the heartbeat. Some of the pathways of this system may develop fibrous tissue and fat deposits. The natural pacemaker (the sinoatrial or SA node) loses some of its cells. These changes may result in a slightly slower heart rate.
- A slight increase in the size of the heart, especially the left ventricle occurs in some people. The heart wall thickens, so the amount of blood that the chamber can hold may actually decrease despite the increased overall heart size. The heart may fill more slowly.
- Heart changes often cause the electrocardiogram (ECG) of a normal, healthy older person to be slightly different than the ECG of a healthy younger adult. Abnormal rhythms (arrhythmia), such as atrial fibrillation, are more common in older people. They may be caused by several types of heart disease.
- Normal changes in the heart include deposits of the "ageing pigment," lipofuscin. The heart muscle cells degenerate slightly. The valves inside the heart, which control the direction of blood flow, thicken and become stiffer. A heart murmur caused by valve stiffness is fairly common in older people.

Blood vessels:


- Receptors called baroreceptors monitor the blood pressure and make changes to help maintain a fairly constant blood pressure when a person changes positions or is doing other activities. The baroreceptors become less sensitive with aging. This may explain why many older people have orthostatic hypotension, a condition in which the blood pressure falls when a person goes from lying or sitting to standing. This causes dizziness because there is less blood flow to the brain.
- The capillary walls thicken slightly. This may cause a slightly slower rate of exchange of nutrients and wastes.
- The main artery from the heart (aorta) becomes thicker, stiffer, and less flexible. This is probably related to changes in the connective tissue of the blood vessel wall. This makes the blood pressure higher and makes the heart work harder, which may lead to thickening of the heart muscle (hypertrophy). The other arteries also thicken and stiffen. In general, most older people have a moderate increase in blood pressure.

Blood:















- The blood itself changes slightly with age. Normal aging causes a reduction in total body water. As part of this, there is less fluid in the bloodstream, so blood volume decreases.
- The speed with which red blood cells are produced in response to stress or illness is reduced. This creates a slower response to blood loss and anemia.
- Most of the white blood cells stay at the same levels, although certain white blood cells important to immunity (neutrophils) decrease in their number and ability to fight off bacteria. This reduces the ability to resist infection.

EFFECT OF CHANGES

Normally, the heart continues to pump enough blood to supply all parts of the body. However, an older heart may not be able to pump blood as well when you make it work harder. Some of the things that make the heart work harder are:

- Certain medicines
- Emotional stress
- Physical exertion
- Illness
- Infections or any 
- Injuries

COMMON PROBLEMS

-  Angina (chest pain caused by temporarily reduced blood flow to the heart muscle), shortness of breath with exertion.
-  Abnormal heart rhythms (arrhythmias) of various types can occur.
-  Anemia may occur, possibly related to malnutrition, chronic infections, blood loss from the gastrointestinal tract, or as a complication of other diseases or medicines.
-  Arteriosclerosis (hardening of the arteries) is very common. Fatty plaque deposits inside the blood vessels cause them to narrow and totally block blood vessels.
-  Congestive heart failure is also very common in older people. In people older than 75, congestive heart failure occurs 10 times more often than in younger adults.
-  Coronary artery disease is fairly common. It is often a result of atherosclerosis.
-  High blood pressure and orthostatic hypotension are more common with older age. Older people on blood pressure medicines need to work with their doctor to find the best way to manage their high blood pressure. This is because too much medicine may cause low blood pressure and could lead to a fall.
-  Heart valve diseases are most common. **Aortic stenosis** or narrowing of the aortic valve, is the most common valve disease in older adults.
-  Transient ischemic attacks (TIA) or strokes can occur if blood flow to the brain is disrupted.
Other problems with the heart and blood vessels include the following:
-  Blood Clots
-  Deep Vein Thrombosis
-  Thrombophlebitis
-  Peripheral vascular disease
-  Aneurysms may develop in one of the major arteries from the heart or in the brain. Aneurysms are an abnormal widening or ballooning of a part of an artery due to weakness in the wall of the blood vessel. If an aneurysm bursts it may cause bleeding and death.

Ageing also alters cardiac responsiveness to β -adrenergic stimuli, be they pharmacologically or physiologically determined. Both the catecholamine- or exercise-induced increases in heart rate and myocardial contractility are definitely blunted in elderly subjects. Thus, for cardiac output to be increased in proportion to the body's metabolic needs despite inadequate contractile and chronotropic reserves, the aging left ventricle mainly engages the Frank-Starling mechanism, i.e., it undergoes marked increases in volume, both end-diastolic and end-systolic. Via such hemodynamic a pattern.

The aging heart can significantly increase its maximum output and allows elderly subjects to perform vigorous exercise, although not up to the same intensity as a younger individual can sustain. Overall, the peak cardiac output attained in response to maximal effort is blunted by some 20–30% in elderly compared with young healthy subjects, the blunting being largely attributable to a lesser degree of effort tachycardia rather than to altered stroke volume.

The aged heart also shows a reduction in the Inotropic responses to digitalis (but not to calcium ions, indicating that the defect involves the signaling processes rather than the contractile machinery itself)

A study “**Aging associated cardiovascular changes and their relationship to heart failure**” conducted by ‘James B. Strait’ and ‘Edward G. Lakatta’ and they concluded in their study about the stages for heart failure

- 1) Structurally, the heart thickens and stiffens with age resulting in the increased imposition of a number of functional demands.
- 2) Functionally, a number of changes which assist the resting heart to deal with the effects of aging cause significant functional deficits with exercise or stress, thereby lowering the cardiac reserve that the younger heart can call on to deal with disease or insult.
- 3) Finally, while the increased incidence of disease, less structurally efficient heart, and decreased cardiac reserve associated with aging would be well served by an effective repair system- this too declines with age. It is hoped that improved understanding of the aged heart will enable the development of therapies which prevent the genesis of Heart Failure or at a minimum help clinicians to treat the unique properties of the failing, senescent heart.

Similarly the study regarding “**Aging and the cardiovascular system**” was conducted by **Alberto U.**

Ferrari and Marco Centola in Dec. 2003 concluded that cardiovascular aging encompasses such a wide and complex range of phenomena at the structural, functional, and molecular levels that its study has come to be viewed as a distinct branch of physiology, whose advances will be crucial to understand the functioning of an increasingly larger section of the population and will help to succeed in the difficult task of defining the border between normality and disease.

PREVENTION:

- ☐ Control the heart disease risk factors include high blood pressure, cholesterol levels, diabetes, obesity and smoking.
- ☐ Eat a healthy diet with reduced amounts of saturated fat and cholesterol and control body weight. follow the health care provider’s recommendations for treating high blood pressure , high cholesterol or diabetes.
- ☐ Men between the ages of 65 to 75 who have ever smoked should be screened for aneurysms in their abdominal aorta usually with an ultrasound exam.
- ☐ Get more exercise daily.Exercise may help prevent obesity and it helps people with diabetes control their blood sugar and also helps to maintain abilities as much as possible and also reduces stress.
- ☐ Peoples who exercise often have less body fat and also tend to have less heart disease.
- ☐ Have regular check ups for the heart.
- ☐ Monitor blood pressure every month.
- ☐ If cholesterol level is normal rechecked it every 6 months and monitored closely.