THE AGING HEART, THE HEART FAILURE AND THE CARDIOMYOPATIES

HAND OUT FOR STUDENTS

In absence of specific diseases, the human heart AGES VERY WELL. The size may remain unchanged or increase or decrease very slightly. The number of the single contracting cells (the CARDIOMYOCYTES) may show a mild decrease in number and few a mild increase in size.

AMYLOID, an abnormal protein found in many old organs as typical sign of aging, is present in small amount even in centenarians.

There's a tendency for an increased vascular intimal thickness and increased vascular stiffness.

The decreased number of myocytes together with the increased myocyte size, is notable especially in the left ventricular wall, hence some increase in the LEFT VENTRICULAR WALL THICKNESS.

AGE ASSOCIATED CHANGES IN CARDIAC FUNCTION

The HEART rate decreases very slightly while the STROKE VOLUME presents no change. The CONTRACTILITY may decrease but only during exercise and not at rest. The EJECTION FRACTION (one of the most important cardiac functional aspects) presents no CHANGE.

(A simple formula "220 minus AGE" may provide an index of how much the heart rate may be permitted to increase DURING EFFORTS.

THE BLOOD PRESSURE increases with age due to increased peripheral vascular resistance and an increase (with age) of aortic pulse wave velocity, but if the systolic values go above 140 and the diastolic above 90 then this is "HYPERTENSION".

(with the hypertension do not forget either the HYPOTENSION of the elderly, secondary to standing still, fortunamid etc.)

HEART FAILURE THE ARRHYTHMIAS and the CARDIOMYOPATIES

HEART FAILURE, definition = insufficient cardiac output.
A condition frequent in persons older than 65 and increasing after age 70. DUE TO:
  a) impediments to forward ejection (hypertension, aortic stenosis etc.)
  b) myocardial failure (due to ischemias or infarctions or myocarditis).
  c) impaired cardiac filling (due to ventricular hypertrophy or diastolic dysfunction etc.) and
  d) volume overload: due to regurgitation or increased intravascular volume or overload (like in anemias, thyrotoxicosis etc.)

THE CARDIOMYOPATIES:
  A) DILATED leading to systolic dysfunction due to dilation of the chambers without compensatory increase in the wall thickness.
  B) HYPERTROPHIC with marked ventricular hypertrophy without other cardiovascular diseases.
  C) RESTRICTIVE with excess rigidity of the walls of one
of one or both ventricles. In this condition the increased myocardial stiffness is secondary to infiltrative pathology and in the elderly amyloid heart disease is a common cause.

Especially the hypertrophic cardiomyopathy is very frequently related to an abnormality genetically transmitted.

THE ARRHYTHMIAS in the ELDERLY:

In the elderly the incidence of supraventricular and ventricular ectopic beats is increased.
Many of the SUPRAVENTRICULAR ectopic beats in the elderly are benign.
The PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA (from 150 to 200 beats per min.) can be present in 13% of elderly people with no evidence of heart disease.
The ATRIAL FLUTTER is rapid, regular with atrial activity between 250 and 350 beats per minute. The ventricular response is usually limited to non more than 100 beats per minute.
ATRIAL FIBRILLATION: is the most frequent arrhythmia of the elderly. The incidence being up to 5.2 per 1000 in the ages between 55 to 64 but up to 76 per 1000 in those age 80 or more.
Atrial fibrillation frequently indicates presence of organic heart disease and heart failure is the most common predisposing disorder. Les common causes being thyrotoxicosis, sick sinus syndrome and amyloidosis.

The Ventricular ECTOPIC BEATS: unless extremely frequent usually produce no symptoms.

THE VENTRICULAR TACHYCARDIA present in up to 10% of individual older than 65 y, frequently in occasional asymptomatic runs(exercise-induced). Asymptomatic in patients with no organic heart disease, may induce hypotension and syncope among patients with organic heart disease.

AND FINALLY the SUDDEN KILLER, the VENTRICULAR FIBRILLATION!! Indeed in the cardiac conditions suspicious to lead to potential VFib, the surgical insertion of a defibrillator is mandatory.