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Cardiovascular diseases

In this section the doctor mainly read the slides with some comments (those underlined)

- ✓ <u>1st cause of of death in Jordan: CVD</u>.
- ✓ Cardiovascular diseases (CVDs) are the number one cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths.
- ✓ Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke → Cardiovascular diseases involve : <u>strokes + acute cardiac symptoms.</u>
- ✓ Low- and middle-income countries are disproportionally affected: over 80% of CVD deaths take place in low- and middle-income , <u>and that is caused by :</u>
  - slower paramedic help supply – though this is not a major cause nowadays since it has improved greatly–
  - less awareness in those countries.
  - smoking (THE MAJOR CAUSE since it kills about half of its users) → it's prohibited in public areas in high income countries while in low/middle it's not!
- ✓ Tobacco kills up to half of its users(nearly 6 million people each year). More than five million of those deaths are the result of direct tobacco use while more than 600,000 are the result of non-smokers being exposed to second-hand smoke. → <u>Types of smoking:</u>
  - Direct smoker.
  - 2nd hand smoker : the one sitting besides the smoker inhaling the toxic gases.
  - 3rd hand smoker : affected by the remnants a smoker leaves on surfaces / clothes / furniture.   (زي وحدة جوزها بدخن بقايا السجاير على الأواعي ممكن تأثر عليها).

↓

1. <u>To prove that</u> : a specialist in King Hussein Cancer Center made a study on a group of healthy students → measured blood gases (in plasma) : test for APG's (arterio-pulmonary gases) + did a pulmonary function test (by blowing into an apparatus) → then this group went and (شربوا أرجيلة) ☺ : many of them did worse than before the test
- ✓ <u>Note:</u> being a smoker, Hb levels in blood will be higher (18 for example) and actually this is a bad thing since it alters blood viscosity!
- ✓ The number of people who die from CVDs, mainly from heart disease and stroke, will increase to reach 23.3 million by 2030. CVDs are projected to remain the single leading cause of death.
- ✓ Unless urgent action is taken, the annual death toll could rise to more than eight million by 2030.

- ✓ Nearly 80% of the world's one billion smokers live in low- and middle-income countries.
- ✓ Acute coronary syndrome (ACS) involves:
  - Unstable angina.
  - Non-ST segment elevation myocardial infarction (NSTEMI).
  - ST segment elevation myocardial infarction (STEMI).

- ✓ What's an ST segment ? a part of an ECG that may be seen elevated in MI, and based on that there are two types of MI.

- ✓ Now let's talk a little about the anatomy of the heart:
  it is supplied by 2 coronary arteries (Rt + Lt), Lt divides into :
  1) LAD (left anterior descending / left interventricular ar. → it's called the widow maker since it's most commonly occluded (supplies about 40% of heart).
  2) Lt circumflex ar.

- ✓ If you hear that someone died all of sudden by ACS without any previous complaints, would u agree that this is possible ?
  Of course you will :p → this is called sudden cardiac death : elevated ST segment cuz of an occluded coronary , this is a medical emergency that must be treated immediately by catheterization.

- ✓ About 99% of medical cardiac emergencies of young males (35-55) → ARE SMOKERS : smoking for long years without measuring blood pressure or even with having family history of cardiac problems will put them at higher risk for suffering from CVDs.

- ✓ Risk factors of atherosclerosis :
  - Age (Male > 45 yrs , Females >55) since females have estrogen that decreases the risk. However: post-menopausal --> will be equal .and if this postmenopausal woman is a smoker she'll have higher risk than males non-smoker .
    Can u give estrogen after menopause to decrease the risk ? NO ! scientists have found that it increases the risk rather than decreasing it !!!
  - Family history (below age of 55 in male if sudden cardiac death occurs then this is a risk factor for other relatives ; and 65 in females).
  - Hypertension (HTN) → which can be caused by obesity.
  - Smoking.
  - Daibetes Mellitus.
  - Dyslipidemia / hyperlipidemia (high LDL).

- Physical inactivity and obesity.

✓ Some statistics involving diabetes mellitus:
  - 347 million people worldwide have diabetes.
  - In 2004, an estimated 3.4 million people died from consequences of high fasting blood sugar.
  - More than 80% of diabetes deaths occur in low & middle income countries.

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✓ Okay , now to talk about hypertension (and yeah it's still minute 16:46 so you better not get bored yet :p)
  - Normal blood pressure : < 120/80.
  - Pre-hypertension : (120-139 / 80-89) management here is simply carried by reducing risk factors like : reducing weight/eating for vegetables/leaving smoking.
  - Stage 1 hypertension : (140-159 / 90 -99) : need 1-2 medications for treatment of hypertension.
  - Stage 2 : (> or = 160/100) : requires treatment with many drugs (may reach 5).

✓ Types of hypertension:
  - Primary/ idiopathic/essential : Most cases (90%)
    (why essential ? cuz in the past they thought that for you to have a stronger heart you essentially must have a higher blood pressure , now we know that this is not true but for some reason this name got stuck with this type !)
  - Secondary: you think about secondary causes when a young person (<25 yrs) comes with hypertension // or when a person shows up with hypertension after so many years of having perfect health (like 70 yrs or so) ; Due to adrenal hyperplasia and so on .

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✓ Cause of ACS ?

Most acute coronary syndromes (ACS) are believed to result from the loss of integrity of a protective covering over an atherosclerotic plaque; this occurs with plaque rupture or erosion, this disruption of the protective covering allows blood to come in contact with the highly thrombogenic contents of the necrotic core/collagen of the plaque and luminal thrombosis to occur, i.e. → when a plaque ruptures the body thinks that there is an injury (just like if you cut

your finger: platelet adhesion → activation → aggregation → Thrombosis) , so in MI you give the pt aspirin to prevent this process.

All people have fat streaks but what increases them are the risk factors we mentioned → Intimal digging of plaque → if rupture (in vulnerable plaques: which have Thin fibrous cap + high lipid content+ SM) → blood clot &thrombosis → may occlude the coronary artery MI + tissue necrosis OR partially occlude ar.

- ✓ Do all people with risk factors have plaques that rupture?
  No, but there can be predisposing factors: for example if there is a smoker and he goes out in the cold to shovel snow(extreme physical activity in the cold) in the cold he may be at risk of plaque rupture.

- ✓ Symptoms of MI: (pain thresholds can differ// not all chest pains indicate MI → it can be musculoskeletal which hurts when u press on it)
  - Levine sign : Retrosternal chest pain (tightness/pressure ثقل أو شد)→ those are symptoms cuz pt tells you about them . (whereas what you observe by physical examination is called as sign).
  - This pain may radiate to left shoulder/arm or even Rt arm, neck or jaw → pain in these sites usually is bad cuz this is angina (like pain occurring when pt goes upstairs for example) ,, but the type of pain we're talking about here (in MI) will be sudden in onset !
  - Dyspnea (shortness of breath).
  - Nausea or vomiting.
  - Diaphoresis (sweating).
  - Paplitations or lightheadedness.
- ✓ management: call 911 + give aspirin → in hospital: catheterization & drugs like aspirin and an antiplatelet.
- ✓ Preventative measures: elderly must measure their blood pressure,sugar levels and cholesterol regularly.
- ✓ Complications:
  - Free wall rupture. (rupture of Lt ventricle)
  - Ventricular septal defect (VSD) → from left to rt.
  - Papillary muscle rupture causing mitral regurgitation →blood goes back to lungs.
  - Cardiogenic shock (Left ventricular failure).
  - Arrhythmias (VF→ ventricular fibrillation: only treatment by shock, VT → also shock, AF). → AED (automated external defibrillator) can be seen in crowded

areas like malls and airports : box with scissors , 2 pads put on body and this device that produces the shock if needed.

- Ventricular aneurysm.
- Pericarditis.

✓ Mechanism of catheterization: from femoral/brachial ar. You insert a substance with iodine to give contrast → goes through, reaches and colors LMT (Left main trunk) → which divides to LAD (gives diagonal ar.) + circumflex (gives OM ar.).

- Normally: all the artery is Colored .
- Abnormally →complete occlusion of ar. (coloring of artery is not Completed which means that the dye could not pass through the occlusion site).

✓ Catheter shape: cylindrical stent (made of stainless steel or cobalt chromium) → u do ballooning then put a stent that sticks to arterial wall and prevents any thrombosis (occlusion).

- Note: In the past, they did angioplasty (ballooning only)→ can have elastic recoil and closure occurs again.

✓ Catheterization is not an open heart surgery cuz they don't open through chest ,they may need to do this type of surgery in cases where catheterization is not possible (to be discussed later on).

✓ Will this catheter interfere with the possibility to do an MRI ? nope , (whereas pacemakers do).
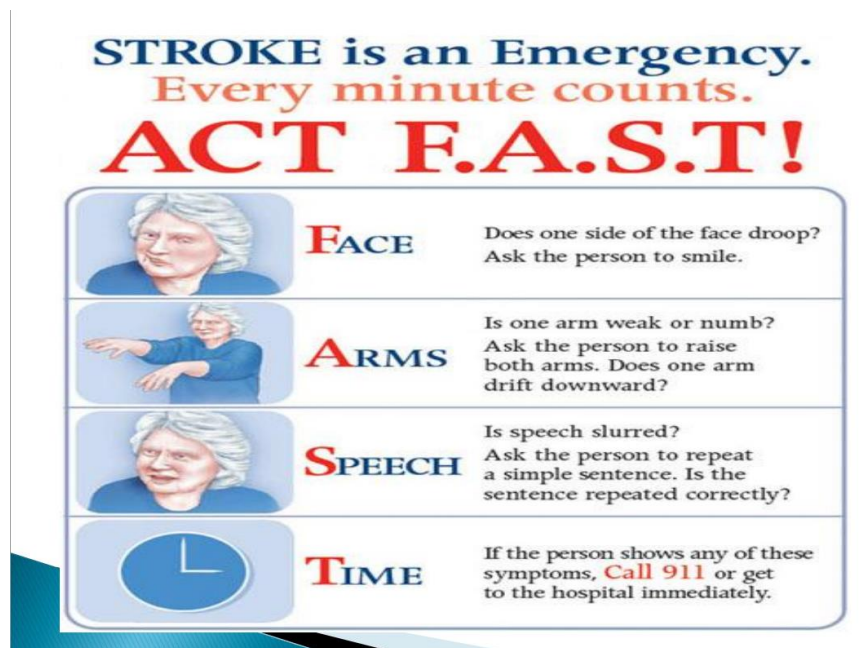

Now let's go through some cases:

- A 60-year old male patient with past medical history of hypertension and smoking presented to the emergency room with sudden aphasia (unable to speak) and weakness in his right arm and leg.
  This is stroke/cerebrovascular accident.

  - Risk factors are the same as those for CV accidents.
  - Two types :
    1) (80% of cases) Ischemic due to thrombosis, embolism, or systemic hypoperfusion (treated by thrombolytics in 1st 3 hours of accident cuz if delayed will be useless).

2) (20% of cases) Brain hemorrhage due to intracerebral hemorrhage or subarachnoid hemorrhage(or subdural hematoma in case of trauma) due to very high blood pressure, treated by neurosurgery to withdraw this blood.

- Symptoms : The most common symptom of a stroke is sudden weakness or numbness of the face, arm or leg, most often on one side of the body → differ according to site (MCA → middle cerebral ar. / ACA → ant CA /PCA→ post).
- Most common site of occlusion: MCA .
- Other symptoms:
    1) confusion.
    2) difficulty speaking or understanding speech.
    3) difficulty seeing with one or both eyes.
    4) difficulty walking, dizziness, loss of balance or coordination.
    5) severe headache with no known cause.
    6) fainting or unconsciousness.

STROKE is an Emergency.
Every minute counts.
ACT F.A.S.T!

FACE — Does one side of the face droop? Ask the person to smile.

ARMS — Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?

SPEECH — Is speech slurred? Ask the person to repeat a simple sentence. Is the sentence repeated correctly?

TIME — If the person shows any of these symptoms, Call 911 or get to the hospital immediately.

IMP note: in case of cerebral stroke you don't give aspirin until you make sure there is no hematoma by doing a CT scan, cuz if the cause of the stroke is hematoma rather than ischemic cause → u only make things worse (bleeding is worsened).

Hope u enjoyed this sheet ☺