HYPERTENTION

BY : Dr. HUSSEIN SAAD

24/10/2012 08:19

EPIDEMIOLOGY

- In developed countries, essential Hypertension affects 25-35% of the adult population. Up to 60-70% of those beyond the seventh decade of life.
- Each increment of 20 mm Hg in systolic blood pressure or 10 mm Hg in diastolic blood pressure doubles the risk of cardiovascular disease events independent of other factors.

Prevalence of Hypertension in Obese and non-Obese Saudis

- The study group: 14.805
  - males: 6225
  - females: 8580
- The age: 14 – 70 years
- Non-obese prevalence: 4.8 % males
  2.8 % females
- Obese prevalence: 8 % males
  8 % females

Mohsen A El-Hazmi, Saudi Medical Journal 2001; vol 22 (1): 44-48

Hypertension among attendants of primary health care centers in Al-Qassim region

Saudi Arabia. Khalid A,et al Saudi Med J 2001; Vol. 22 (11) 960-963

- The study sample: 1114
- The prevalence: 30 %
- Higher in:
  - Age > 40 years
  - Overweight and obese people
  - illiteracy
- Awareness: 20 % Of hypertensive women
  - 25 % of hypertensive men

EPIDEMIOLOGY

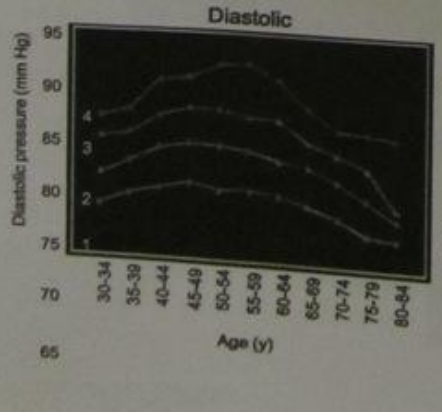
n the Framingham Heart Study:

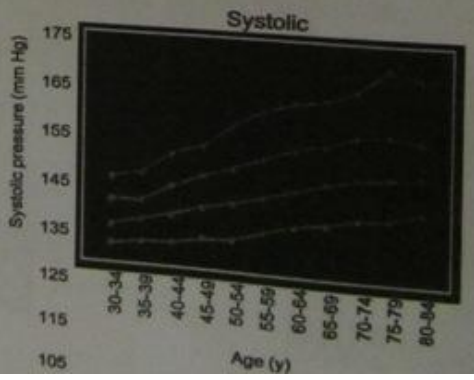
◊ Those **below Age of 55** *diastolic* Bp is the **strongest** predictor of cardiovascular risk

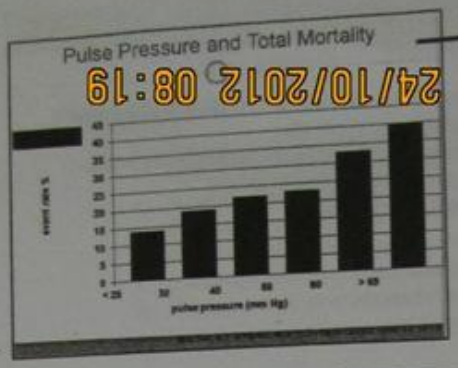
◊ **Above 55 years**, diastolic Bp was negatively related to the risk of coronary events, so the *pulse pressure* became superior predictor to the systolic Bp.

What happens to blood pressure with aging?

- Systolic pressure increases with age
- Diastolic pressure increases with age but peaks between 55 and 60 years then starts to decrease.
- Arterial stiffness: cause of elevated systolic and lower diastolic pressure with aging







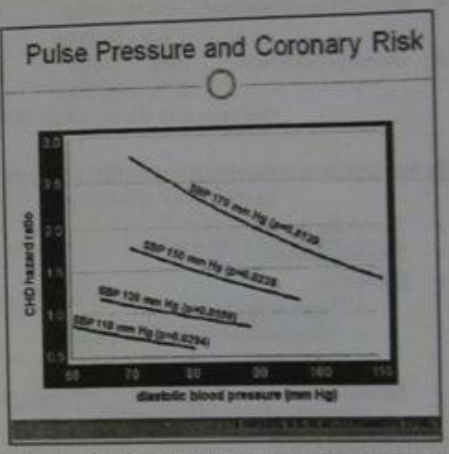
Description:

This slide shows the relation between the pulse pressure amplitude and the event rate of total mortality in the Survival and Ventricular Enlargement Study.

Background:

Pulse pressure was taken baseline from a casual blood pressure measured just prior to randomisation, 3 to 16 days after myocardial infarction.

Trends in awareness, treatment, and control of high BP in adults ages 18 -74



Description:

Pulse pressure is useful for predicting coronary heart disease (CHD). For individuals, e.g. with systolic blood pressure of 170 mm Hg, it is interesting to know that, according to current treatment guidelines, individuals with a diastolic blood pressure < 80 or 90 mm Hg appear to have a higher coronary risk than individuals with a diastolic blood pressure of 110 mm Hg. In other words, for a given systolic pressure, lower diastolic pressure was associated with greater mortality. These relations might have great impact on future treatment recommendations.

Interaction:

When treating a 72 year-old male what do you think is "better", a blood pressure of 170/85 mm Hg or 170/110 mm Hg?

Background:

In this study, mortality was related independently with initial systolic, diastolic, and pulse pressure, but the strongest association was with pulse pressure. When systolic pulse pressure was initially considered, there was a negative association with diastolic pressure. Therefore, in the future, treatment of systolic blood pressure (SBP) will become more important and intervention trials will help to consider pulse pressure as a target parameter along with SBP and diastolic blood pressure (DPB).

Trends in awareness, treatment, and control of high BP in adults ages 18 -74

National Health and Nutrition Examination Survey, Percent				
	II (1976-80)	III (Phase 1 1988-91)	III (Phase 2 1991-94)	1999-00
Awareness	51	73	68	70
Treatment	31	55	54	59
Control	10	29	27	34

DIAGNOSIS

Two or more elevated readings are obtained on at least two visits over a period of one to several weeks.

JNC 7th REPORT Classification		
	SBP	DBP
Normal	< 120	< 80
Prehypertension	120 – 139	80 – 89
Stage I	140 – 159	90-99
Stage II	≥ 160	≥ 100

Prehypertension: Signals the need for increasing the health education of the public to reduce Bp levels and prevent the development of HTN.

Definitions and classification of blood pressure

2007 guidelines for the management of arterial hypertension The task force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC) .

	Systolic	Diastolic
Optimal	<120	<80
Normal	120–129	80–84
High normal	130–139	85–89
Grade 1 HTN	140–159	90–99
Grade 2 HTN	160–179	100–109
Grade 3 HTN	180	110

Types of HTN

	Systolic	Diastolic
Isolated Systolic HTN	≥140	<90
Grade 1 isolated HTN	140–159	<90
Grade 2 isolated HTN	160–179	<90
Grade 3 isolated HTN	180	<90

Blood Pressure Measurement

- Patients should be seated with back supported and arm bared and supported.
- Measurements should begin after at least 5 minutes of rest.
- Appropriate size of Cuff. Why?

White-Coat Hypertension

Is it Innocent?

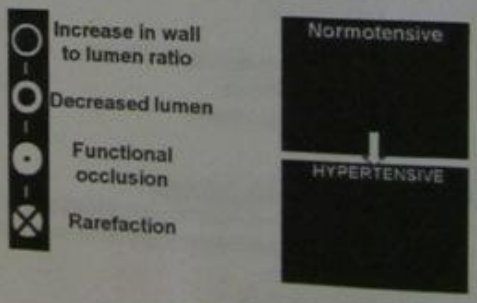
- Raised clinic blood pressure in the presence of a normal daytime ambulatory blood pressure.
- Results of Event-Based Studies have shown that the risk of cardiovascular disease is lower in patients with white-coat hypertension.
- Check for any Metabolic risk factor, if present you have to start medication.

BENEFITS OF LOWERING BLOOD PRESSURE

- The Clinical Trials had shown:
- Reduction in
  - STROKE 35 – 40 %
  - MI 20 – 25 %
  - HEART FAILURE > 50%

Risk Factors

- Smoking
- Dyslipidaemia
- Diabetes Mellitus
- Obesity
- Age older than 60 years



- Sex (men or postmenopausal women)
- F.H. of cardiovascular disease

How to approach a patient with Hypertension?

- Medical History
- Physical Examination
- Routine Laboratory Tests
- Optional Tests
- Non-Pharmacological Treatment
- Drug Treatment

Patient Evaluation

Evaluation of patients with documented HTN has three objectives:

1. Assess lifestyle and identify other **CV risk factors** or concomitant disorders that affects prognosis and guides treatment.
2. Reveal identifiable **Causes** of high BP.
3. Assess the presence or absence of **Target Organ Damage and CVD.**

MEDICAL HISTORY

- Patient History of Cardiovascular Disease
- Current and Previous Medications
- Smoking
- Lifestyle Factors
- Family History

PHYSICAL EXAMINATION

- Blood Pressure (2 Readings)
- Height, Weight and Pulse
- Exam. Of Neck, Heart, Lungs, Abdomen and Extremities
- Funduscopic Examination (Arterial narrowing "copper wiring", A-V nipping, Flame shaped haemorrhages, Soft exudates, Papilloedema)

ROUTINE LAPORATORY TESTS

- CBC
- Urine Analysis and Microalbuminuria
- Urea , Creatinine, Electrolytes, Uric Acid and Calcium
- Fasting Plasma Glucose
- Lipid Profile (T.ch, Trig, LDL and HDL)
- ECG
- Chest X-ray ??

Target Organ Damage

- Heart look for:
  - Left ventricular hypertrophy
  - Angina or prior myocardial infarction
  - Heart failure
- Brain
  - Stroke or transient ischemic attack
- Chronic kidney disease
- Peripheral arterial disease
- Retinopathy

High/Very high risk subjects

- BP 180 mmHg systolic and/or 110 mmHg diastolic
- Syttolic BP > 160 mmHg with low diastolic BP (<70 mmHg)
- Diabetes mellitus
- Metabolic syndrome
- ≥ 3 cardiovascular risk factors

- One or more of the following subclinical organ damages:
  - ECG with LVH and strain
  - [illegible] kening oR plaque
  - Moderate increase in serum creatinine
  - Reduced creatinine clearance
  - Microalbuminuria or proteinuria
  - Established cardiovascular or renal disease

24/10/2012 08:20

OPTIONAL TESTS

- 24-hour Urinary Protein
- Creatinine Clearance
- Echocardiography
- Ultrasonography
- Thyroid Stimulating Hormone
- 24-hour Urinary Vanyl Mandelic Acid
- 24-hour Urinary Catechleamines
- 24-hour Urinary Free Hydrocortisol

What is the goal of management of hypertension?

- Treating (Non-Diabetic) SBP and DBP to targets that are < 140 / 90 is associated with decrease in CVD Complications.

The Target for Blood pressure Control

- < 130/80 mmHg for people with diabetes.
- For diabetic patients with proteinuria systolic blood pressure < 125 mmHg.
- Limited data suggest possible worsening of both renal and CVD outcomes if systolic blood pressure is lowered to < 110 mmHg.

GUIDELINES: JNC 7 & ESH/ESC 2007, BHS 2004 & Canada 2009

1. All support combination therapy +++
2. Support initiation of therapy with drug combinations
3. Approve low-dose fixed combinations for initiation of therapy

((Over the past 6-7 years, since the start of ADVANCE, all hypertension guidelines have stressed the need for combination blood—pressure lowering treatment. These guidelines have increasingly recommended the use of low-dose fixed combinations, not just for maintenance, but also for initiation of blood pressure—lowering therapy.))

CLASSES OF ANTIHYPERTENSIVE DRUGS

- **BETA BLOCKERS**
  - Atenolol , Bisoprolol ,Carvedilol
- **ACE Inhibitors**
  - Captopril , Lisinopril , Enalapril
- **Angiotensin II Receptor Blockers**
  - Losartan
  - Valsartan
  - Candesartan
  - Irbesartan
- **Calcium Channel Blockers (Long Acting)**
  - Nifedipine Retard
  - Amlodipine
  - Felodipine
- **Diuretics (Thiazides, Indapamide SR)**
- **Vasodilators**

Updated Guideline issued by NICE and the British Hypertension Society June 2006

- **In hypertensive patients aged 55 or older or black patients of any age:**
  - The [illegible] or [illegible] should be:
    - [illegible]
    - a Thiazide-type diuretic
  - If a third drug is needed an ACE inhibitor or ARB is a choice

- **In hypertensive patients younger than 55, the first choice for initial therapy should be:**
  - An ACE inhibitor (or an ARB if an ACE inhibitor is not tolerated).
  - Adding an ACE inhibitor to a calcium-channel blocker or a diuretic (or vice versa are logical combinations).
  - Beta-blockers may be considered in younger people, particularly:
    - Those with an intolerance or contraindication to ACE inhibitors and ARB or
    - Child-bearing potential or
    - People with evidence of increased sympathetic drive.If therapy is initiated with a beta-blocker and a second drug is required, add a calcium-channel blocker rather than a Thiazide-type diuretic to reduce the patient's risk of developing Diabetes.

DM Pt → start with ACE or ARB

- **A meta-analysis of 94,492 patients with hypertension treated with beta blockers to determine the risk of new-onset diabetes mellitus.**
  S. Bangalore et. Al. *American journal of cardiology*, may 2007.
  - B blockers are associated with an increased risk for new-onset DM by 22%.
  - No benefit for the end point of death or mi.
  - Increased risk for stroke by 15%.
  - This risk was greater in patients with higher

Relative risks of drugs (Base Case Studies)

Outcome	Thiazides D	C C blockers C	B. Blockers B	ACEi / ARB A
Unstable Angina	0.893	0.881	0.984	0.970
MI	0.780	0.796	0.855	0.816
Diabetes*	0.985	0.808	1.137	0.720
Stroke*	0.690	0.656	0.851	0.731
Heart Failure	0.530	0.731	0.761	0.642
Death	0.910	0.883	0.939	0.902

Evidence of use of B Blockers

[illegible]	✓		
Heart Failure			✓
Acute Coronary Syndrome		✓	
Post MI			✓
Stable Angina without MI		✓	
Perioperative (non cardiac)		✓	
HOCM		✓	

There is a paucity (قلة) of data or an absence of evidence to support the use of beta-blockers as Monotherapy or as First-line agents in uncomplicated HTN.

- Given the risk of stroke
- Lack of [illegible] benefit
- Numerous adverse effects.
- Lack of regression of target end-organ effects Of hypertension (e.g., left ventricular hypertrophy and endothelial dysfunction).

DIURETICS

- **Meta-analysis of all RCTs support diuretics as first line agent.**
- **62 clinical trials including 192, 478 patients** clearly supports using **Diuretics as first line treatment for HTN** including those with **Diabetes, co-existing risk factors for CVD and asymptomatic LVH.**
- **Dose of Diuretic cannot be higher than an equivalent dose of 25 mg HCZ.**

ANTIPLATELET AGENTS for HYPERTENSION

Primary Prevention:

For patients with elevated blood pressure and no cardiovascular disease, **ASA cannot be recommended since** the magnitude of benefit is negated by a harm of similar magnitude.

(ARI 0.6 %, NNH 167 for 3.8 years)

INITIAL DRUG CHOICES

- **Isolated Systolic Hypertension:**
  - Thiazides
  - Calcium Channel Blockers (Long Acting)
- **Peripheral Arterial Disease**
  - Calcium Channel Blockers (Long Acting)
- **Heart Failure:**
  - ACE Inhibitors
  - Angiotensin II Receptor Blockers
  - Diuretics
  - B-Blockers
- **IHD and MI:**
  - B-Blockers
  - ACE Inhibitors / Angiotensin II Receptor Blockers
  - Calcium Antagonists (Diltiazem)

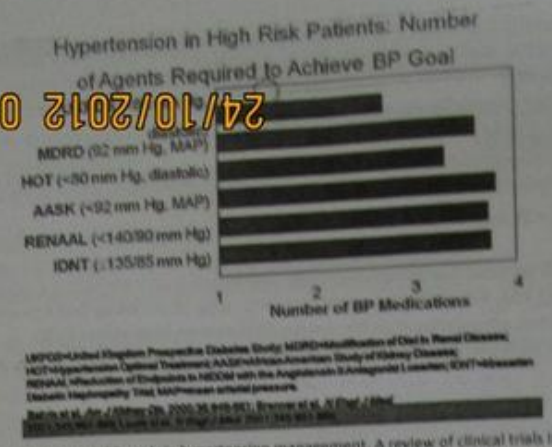
B.P. and DIABETES MELLITUS

- Diabetic patients with Bp > 130/80 are candidate for antihypertensive treatment.
- Patients should be checked to confirm the presence of hypertension.
- **Proceed to:**
  - Behavioral Approach / Lifestyle Modific
  - Drug Treatment

Drug Treatment

- ACE Inhibitors
- Angiotensin II Receptor blockers
- In Microalbuminuria and Nephropathy lower Bp to ≤ 130/80

The goal of Bp for those having IHD or at high risk to develop IHD is < 130 / 80



Polypharmacy may be necessary to reach BP goals in hypertension management. A review of clinical trials in which patients with either diabetes or renal impairment were randomized to 2 different BP reduction targets demonstrated that patients assigned to the lower BP target required an average of 3.2 daily antihypertensive medications to achieve the goal. Patients in the lower-pressure groups had much lower rates of CV events and slower declines in renal function than those in the higher-pressure groups, even when the average blood pressure was <140/90 mm Hg.

Lifestyle modifications to prevent and manage hypertension	Approximate SBP Reduction
Weight reduction Maintain normal body weight (body mass index 18.5–24.9 kg/m2).	5–20 mmHg/10kg
Adopt DASH eating plan Consume a diet rich in fruits, vegetables, and low fat dairy products with a reduced content of saturated and total fat.	8–14 mmHg
Dietary sodium reduction Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2–8 mmHg
Physical activity Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week).	4–9 mmHg

Case 1

A 49 year old lady, a known case of OA of knees, incidentally discovered to have high Bp in two visits, 156 / 106 and 164 / 100 respectively.

What is the target of Bp for this lady?

What additional history you need from this lady?

What investigations are you going to request?

Mention one medication are you going to start with?

Case 2

Abdullah a **53-year** old man presents to your clinic to be control his blood pressure. He is regular on Atenolol 50 mg OD for the last 3 years.

PMH is **unremarkable**.

FH: his father is hypertensive.

Bp:162/98 **P.** 62/m **BMI 31**

O/E: nothing is significant apart from A-V nipping on retinal examination.

What is your comment on his medication based on guidelines?

What action plan are you going to take?

Non-pharmacological management is an important aspect, Explain.

Case 3

Saleh a 64-year old man who is a known case of hypertension, came for follow up. He is regular on Hydrochlorth[illegible] 25 mg daily. BP is 126 / 82

On reviewin[illegible] BP

162 / 76 to 180 / 88

U and E: within normal

FBS: 6.4 mmol/L 2hpp: 9.56 mmol/L

ECG: LVH

What is/are the diagnosis of Saleh?

Based on evidence, which medication of choice are you going to choose?

Case 4

Mofleh a 55 year old man, who is a known case of diabetes on insulin. He came for routine follow up.

BP: 154 / 106 **P.** 92 / min. BMI 33

O/E: * reduced sensation to pin pricks in lower Limb up to the middle of his legs.

* Funduscopy: background retinopathy

24hr urine for protein : 0.438 gm

urea : 8.7 mmol/L (2.5 – 6.4)

creatinine: 144 mmol/L (62 – 115)

sodium : 138 mmol/L (135 – 145)

potassium : 4.7 mmol/L (3.5 – 5.1)

ECG : LVH and inverted T waves in V4,5 and 6

What problems mofleh has?

What is your target(s) for this case?

What medication are you going to give?