University of BRISTOL

Bristol Heart Institute

University Hospitals Bristol NHS
NHS Foundation Trust

Tips and Tricks:

Blood pressure targets and how to achieve them

Dr Amy Burchell & Dr Laura Ratcliffe
University of Bristol

October 2013

BHI
CardioNomics

Overview

- BP targets
- Lifestyle intervention
- Adherence
- NICE guidance – Step 4 plus
- Drug updates
- Drug intolerant patients

BP Targets

- Target BP
  - Aged ≤ 80 years old, aim for <140/90
  - Aged > 80 years old, aim for < 150/90
  - If using ABPM or HBPM targets (e.g. in those with "white-coat" HPT) are:
    - <135/85 for those ≤ 80 year old
    - <145/85 for those > 80 years old
  - Monitor at least annually

Type II Diabetes

- Target levels
  - <140/80 mmHg for most people with Type 2 diabetes
  - <130/80 mmHg for those at more particular risk
    - Raised albumin excretion rate (ACR) (microalbuminuria or worse)
    - eGFR <60 ml/min/1.73 m2
    - Retinopathy
    - Prior stroke or TIA

Lifestyle Interventions

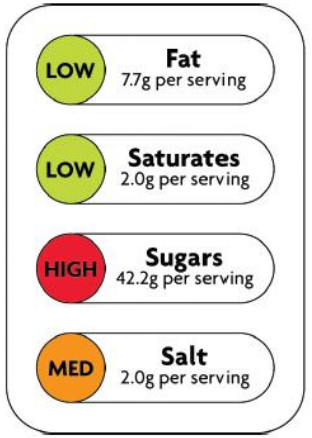
- Ask people about their diet and exercise patterns and offer guidance to promote lifestyle changes
  - Smoking cessation advice
  - ↓ Salt (or substitute sodium salt)
  - ↓ Alcohol
  - ↓ Coffee and other caffeine-rich products
  - Tell people about local initiatives that provide support and promote lifestyle change

- Do not offer
  - Calcium, magnesium or potassium supplements to treat BP
  - Relaxation therapies
    - may reduce blood pressure however not recommended that primary care teams provide them routinely

Lifestyle Advice

www.bhf.org.uk/heart-health/prevention/healthy-eating

All measures per 100g	Low – a healthier choice	Medium – ok most of the time	High – just occasionally
Sugars	5g or less	5.1g – 15g	More than 15g
Fat	3g or less	3.1g – 20g	More than 20g
Saturates	1.5g or less	1.6g – 5g	More than 5g
Salt	0.30g or less	0.31g – 1.5g	More than 1.5g



Salt

- Adults - <6 grams/day
  = 1 level teaspoon

- Salt sometimes called sodium on food labels
  - 6g salt = 2.5g sodium

- 75% of salt comes from processed foods

	Low: a healthier choice	Medium	High: Just occasionally
Salt	0g-0.3g	0.3g - 1.5g	More than 1.5g
Sodium	0g-0.1g	0.1g-0.6g	more than 0.6g

DASH Diet

- Dietary Approaches to Stop Hypertension
  - Eating more fruits, vegetables, and low-fat dairy foods
  - Cutting back on foods that are high in saturated fat, cholesterol, and trans fats
  - Eating more whole grain products, fish, poultry, and nuts
  - Eating less red meat (especially processed meats) and sweets
  - Eating foods that are rich in magnesium, potassium, and calcium

- *Appel LJ, Moore TJ, Obarzanek E, Vollmer WM, Svetkey LP, Sacks FM, Bray GA, Vogt TM, Cutler JA, Windhauser MM, Lin PH, Karanja N. A clinical trial of dietary patterns on blood pressure. N Engl J Med. 1997; 336: 1117–1124.*

- http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf

Effect of Lifestyle Interventions on BP

Modification	Recommendation	S-BP reduction
Weight reduction	Maintain normal weight (BMI 18.5 – 24.9 kg/m^2)	1 mmHg/kg
DASH eating plan	Diet rich in fruit & veg, low fat dairy prod, low sat & total fat	8 - 14
Reduced Na^+ intake	<100 mEq/l (2.4 g Na^+/day)	2 - 8
Physical activity	Regular aerobic activity (brisk 30 min walk / day)	4 - 7
Moderate alcohol	Not more than 2 drinks men, 1 drink women daily	2 - 3

General Principles

- **General principles**
  - Offer drugs taken only once a day if possible
  - Prescribe non-proprietary drugs if appropriate and minimise cost
  - Offer people with isolated systolic hypertension the same treatment
  - Do not combine an ACEi with an ARB

- **People aged over 80 years**
  - Offer the same antihypertensive drug treatment as people aged 55–80 years

- **Women of child-bearing potential**
  - See NICE clinical guidelines on management of pregnancy with chronic hypertension
  - Methyldopa, labetolol, nifedipine MR
  - SPECIALIST REFERRAL

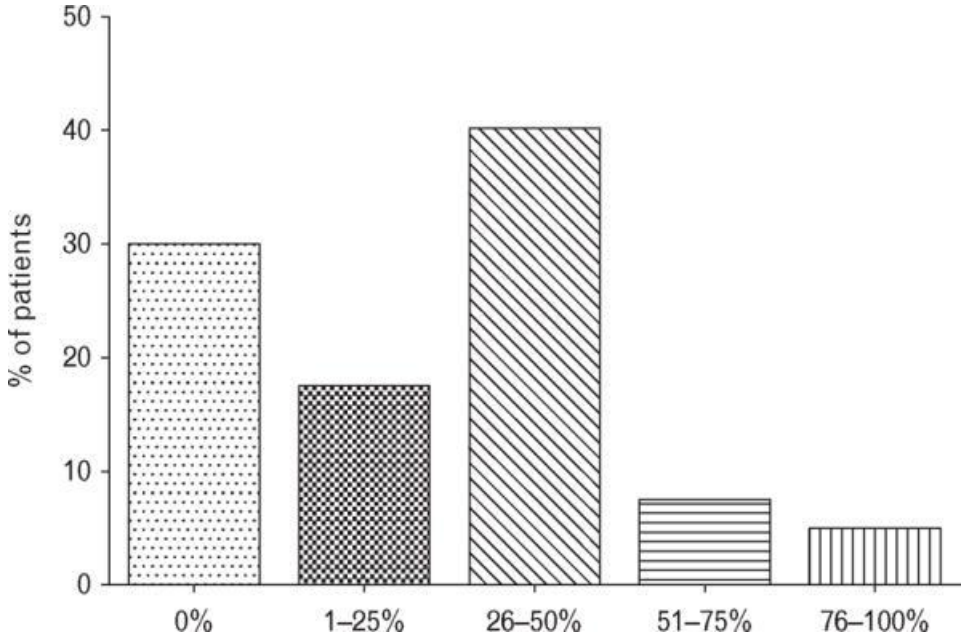
Practical Issues

- Postural hypotension
  - ≥20mmHg drop on standing
  - Use standing BP to guide treatment
  - Review meds
    - Beware common culprits
      - Alpha blockers
    - Modified release preparations/ split dose regime
    - Nocturnal dosing
  - Consider specialist referral

11

Medicines Adherence

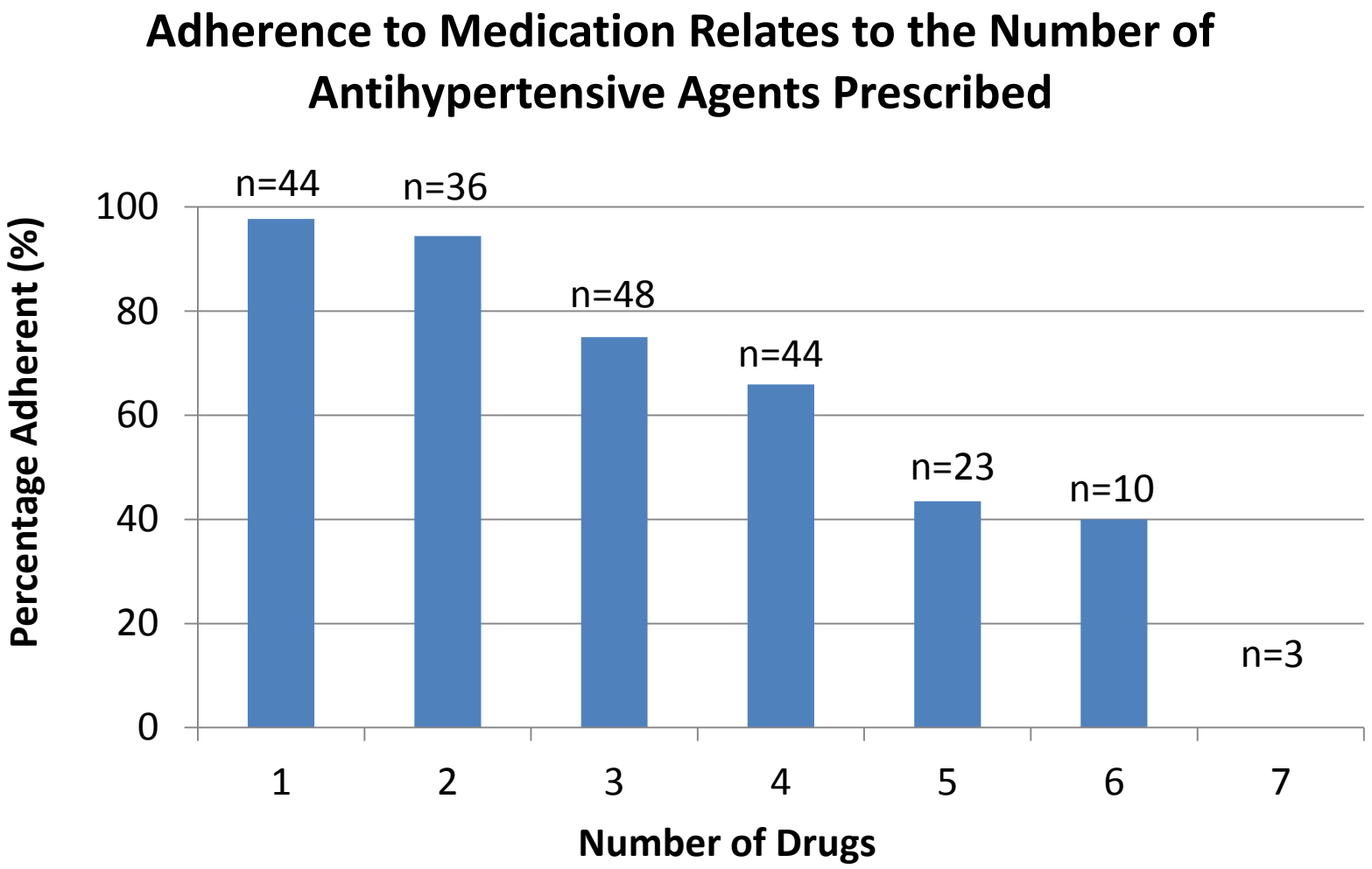
- 40/76 (52.6%) patients with poor BP control despite ≥4 antihypertensives non-adherent



Percentage of prescribed drugs taken by nonadherent patients.

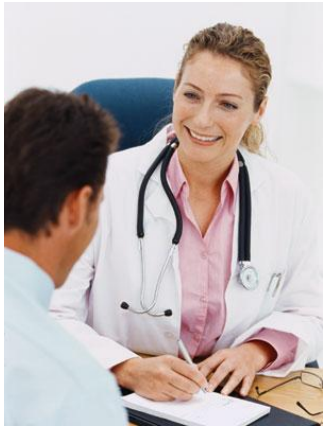
Jung et al. **Resistant hypertension? Assessment of adherence by toxicological urine analysis.** Journal of Hypertension. 31(4):766-774, April 2013.

Drug Adherence



White CMJ et al. **High rates of non-adherence to antihypertensive treatment in patients from a specialist cardiovascular centre: the results of high-performance liquid chromatography-tandem mass spectrometry urine analysis.** J Human Hyperten (2013) 27, S11–S12.

Medicines Adherence



- **Patient education**
  - **Benefits and effects of drugs**
    - Informed choices
    - Benefits vs. unwanted side effects
    - Discuss how the tablets work (12 - 24 hour effect)
    - Discuss likelihood of more than one drug needed & why
  - **Patient association website**
    - Blood Pressure Association - bpassoc.org.uk

Medicines Adherence

- **Interventions**
  - Suggesting that people record their medicine-taking
  - Encouraging people to monitor their condition
  - Simplifying the dosing regimen
  - Using alternative packaging for the medicine

- **Practicalities**
  - Repeat prescription
  - Pre-payment certificates
  - Use of local community pharmacist
  - Aide-memoires
  - Dosset box
  - Support of family

Medicines Adherence

- ***Patients don't tell us they don't take their tablets***

- Picking up clues for non-adherence from drug boxes
  - Drug name and dose correct
  - Date dispensed?
  - Are insufficient number of tablets missing from boxes
  - Are the drugs are out of date
  - Do they use different pharmacist to obtain their drugs
  - Checking patient records for prescription reordering
  - Audit of 'in house' pharmacies
- Pulse if beta blocked
- Postural BP if alpha blocked

Morisky Medication Adherence Scale

- High adherence (8 points), average adherence (6 to 7 points), poor adherence (< 6 points)
- <6 identifies patients with poor BP control
  - Sensitivity 93%, specificity was 53%

Table 1. Morisky's Medication Adherence Scale

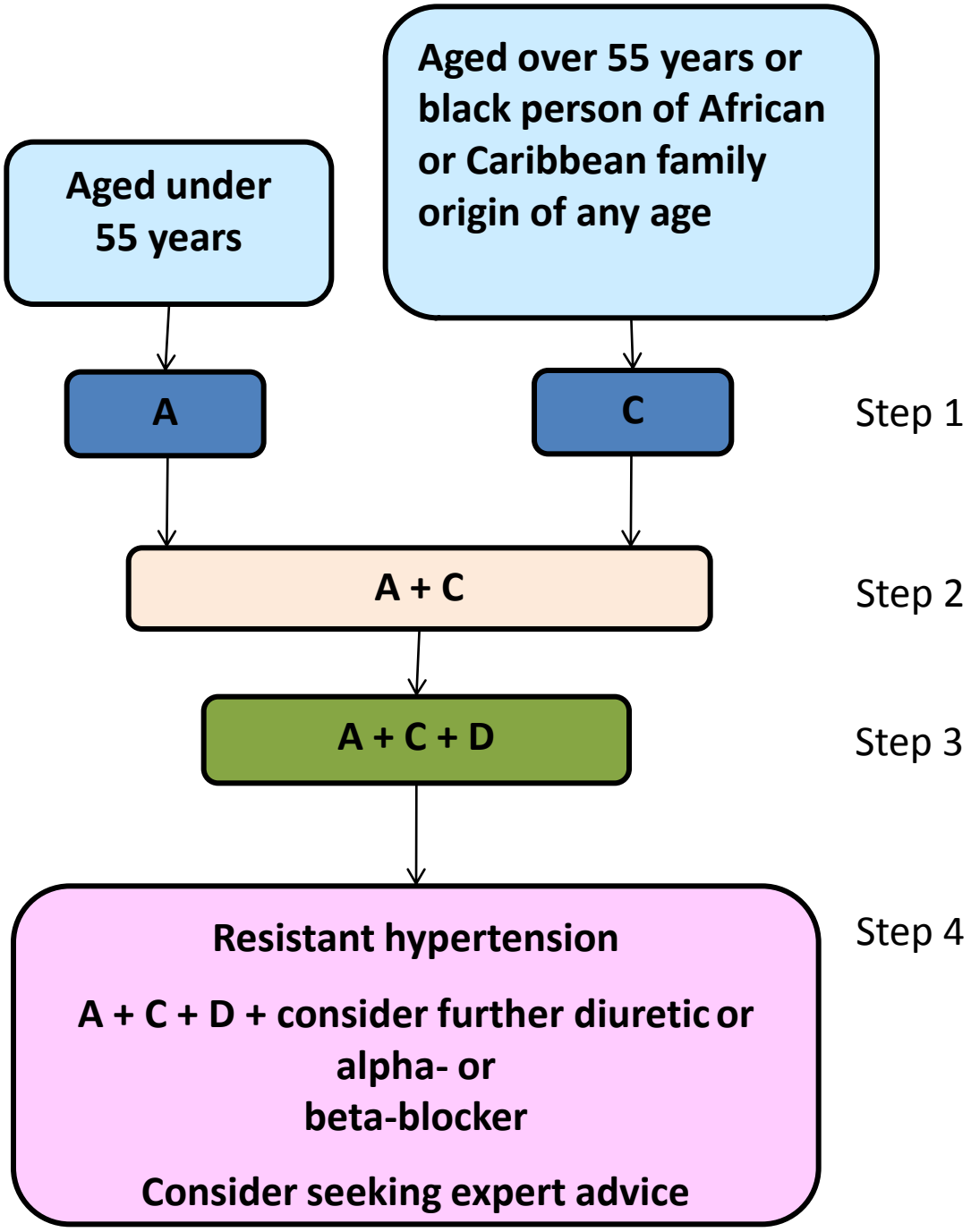
1. Do you sometimes forget to take your high-BP pills?
2. Over the past 2 weeks, were there any days that you did not take your high-BP medication?
3. Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?
4. When you travel or leave home, do you sometimes forget to bring your medication?
5. Did you take your high-BP medication yesterday?
6. When you feel that your BP is under control, do you sometimes stop taking your medication?
7. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your BP treatment plan?
8. How often do you have difficulty remembering to take your BP medication?

Morisky DE, Ang A, Krousel-Wood M, Ward HJ. **Predictive validity of a medication adherence measure in an outpatient setting.** J Clin Hypertens (Greenwich). 2008 May;10(5):348-54.

BHS British Hypertension Society

NHS National Institute for Health and Clinical Excellence

Summary of antihypertensive drug treatment



Key

A – ACE inhibitor or low-cost angiotensin II receptor blocker (ARB)

C – Calcium-channel blocker (CCB)

D – Thiazide-like diuretic

Resistant hypertension

- 20% uncontrolled BP despite at least 3 drugs (Health Survey for England)
- 50% more likely to experience CV event
- 43.2% of patient referrals to the clinic

Need to exclude pseudo-resistance

- Patient factors
  - White coat effect
  - Cuff related artefact
  - Poor concordance
- Physician factors
  - Clinical inertia
  - Doses and combinations of medications

Drug-resistant hypertension

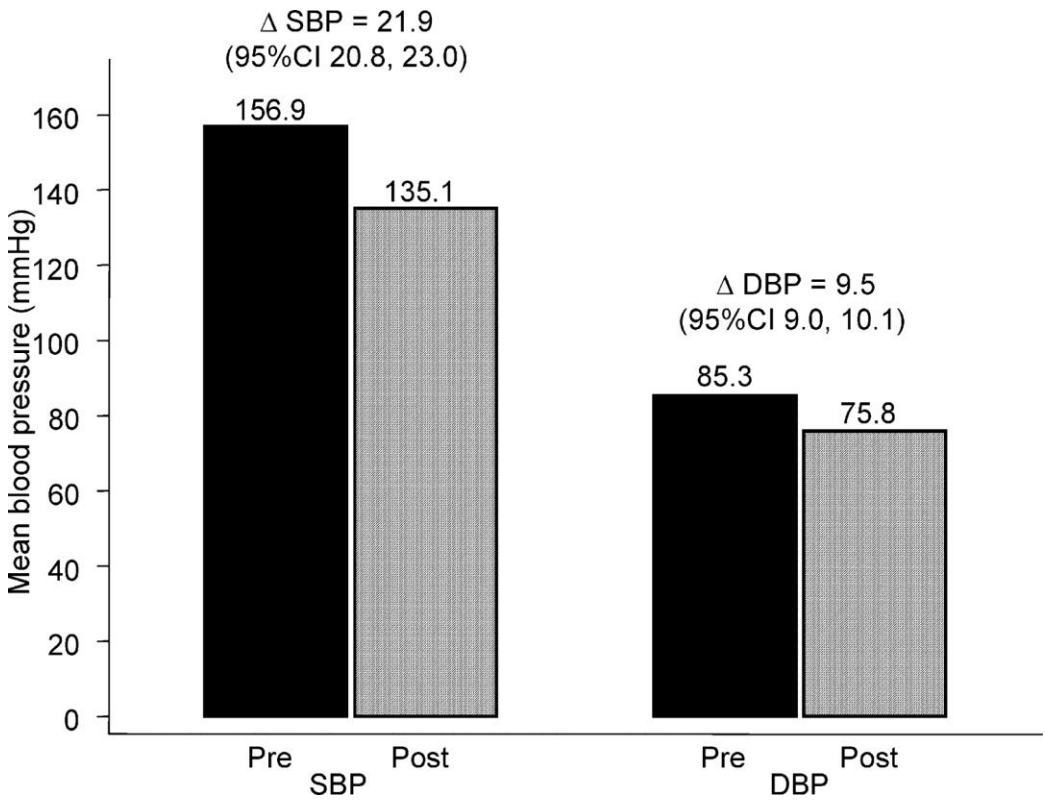
- Consider further diuretic therapy
  - Low-dose spironolactone (25 mg od) if $K^+ \leq 4.5$ mmol/l
  - Higher-dose thiazide-like diuretic if $K^+ > 4.5$ mmol/l
- Alpha- or beta-blocker
- If BP remains uncontrolled with maximum tolerated doses of 4 drugs → expert advice

Spironolactone

- Block aldosterone → promote natriuresis
- Overcome “aldosterone rebound” seen in chronic RAAS antagonism

Spironolactone

- Regression of LVH in pts with resistant HTN
- Incidence of hyperaldosteronism in resistant HTN (17 – 22%)



Chapman N et al. Hypertension 2007;49:839-845

Spironolactone

- **Breast tenderness / gynaecomastia**
  - Dose and duration related; usually reversible
  - Try eplerenone or amiloride instead
- **Hyperkalaemia**
  - ↑ risk in diabetics, CKD and those on ACEi/ARB
  - Check K+ within 2/52 of starting
- **Hyponatraemia** (esp. elderly or those already on diuretics)
- **Document consent** (no UK licence for HTN)

Aliskiren and ALTITUDE

- Aliskiren + ACEi /ARB - serious adverse cardiovascular and renal outcomes

- Combination now **contraindicated** in
  - Diabetic patients
  - Non-diabetic patients with eGFR <60 mL/min/1.73m^2
  - (All other patient groups: not recommended)

- Aliskiren not recommended if eGFR <30 mL/min/1.73 m^2

Simvastatin and amlodipine/diltiazem

- Increases exposure to simvastatin (CYP3A4 interactions)
- Incidence of myopathy is increased
- Simvastatin 20mg od (max.) when given with amlodipine/diltiazem

Other drugs to consider

- Centrally acting agents
  - Moxonidine
  - Clonidine (patches)
  - Methyldopa
- Direct renin inhibitor
  - Aliskiren (secondary care only)
- Vasodilators
  - Isosorbide mononitrate
  - Hydralazine
  - Minoxidil
  - Tadalafil

PATHWAYS study

- **P**revention **A**nd **T**reatment of resistant **H**ypertension **W**ith **A**lgorithm guided therap**Y**

1. Monotherapy v. Combination for initial treatment
2. Optimal therapy of resistant HTN
3. Single v. Combination diuretic in low renin HTN

- http://cvrisk.mvm.ed.ac.uk/pathway.htm

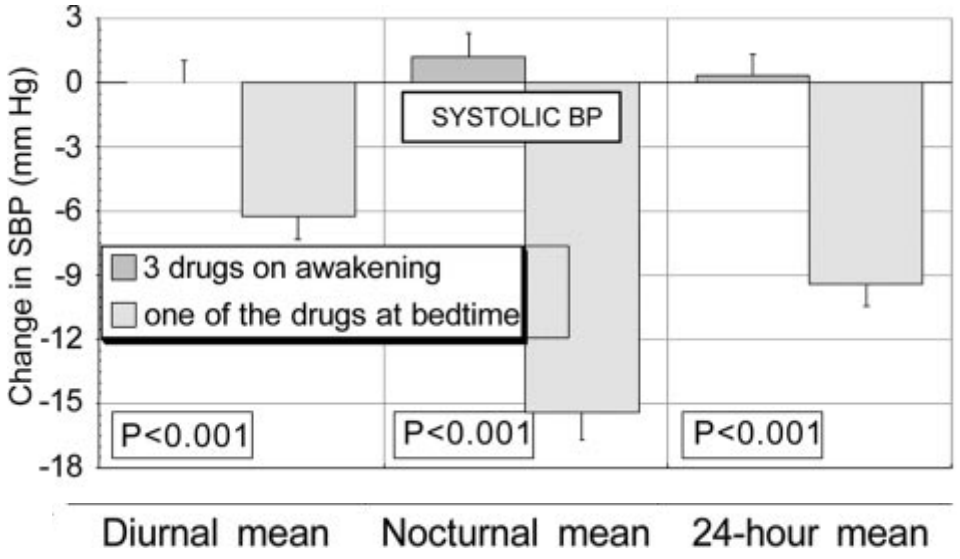
Drug intolerance

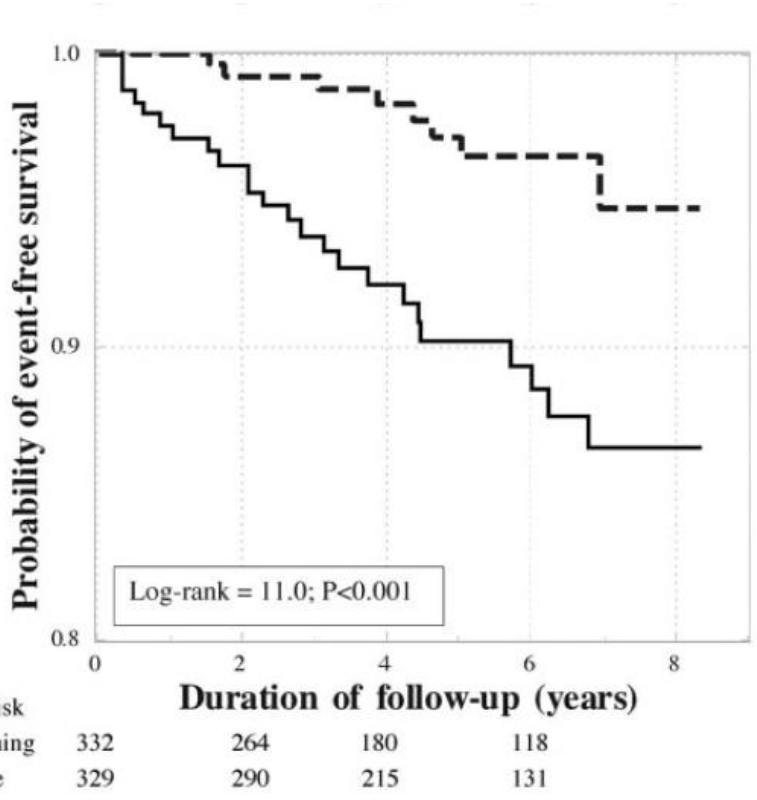
- 12.2% new patient referrals to our clinic
- Patient tailored approach
- Allergy vs. intolerance

Drug intolerance

- Multiple low dose medications
- Maximise those drugs that are tolerated
- Formulation
- Drug rotations
- Bed time dosing

Bed time dosing





Hermida et al.
Hypertension 2008, JASN 2011

Summary

- Change in QOF targets
- Importance of lifestyle advice
- How to tackle issue of adherence
- Step 4+ drug treatment for resistant HTN
- Drug intolerance

References

- http://www.mhra.gov.uk/Safetyinformation/DrugSafetyUpdate/CON146526
- http://publications.nice.org.uk/renin-angiotensin-system-drugs-ktt2/evidence-context
- http://www.mhra.gov.uk/Safetyinformation/DrugSafetyUpdate/CON199561
- Myat et al. Resistant Hypertension. *BMJ* 2012;345:e7473 doi: 10.1136/bmj.e7473
- Chapman N et al. Hypertension 2007;49:839-845
- Eide IK, et al. *J Hypertens*. 2004;22:2217-2226.
- Strauch B, et al. *J Hum Hypertens*. 2003;17:349-352.
- Gallay BJ, et al. *Am J Kidney Dis*. 2001;37:699-705.
- Calhoun DA, et al. *Hypertension*. 2002;40:892-896.
- Hermida et al. J Am Soc Nephrol. 2011 Dec;22(12):2313-21. doi: 10.1681/ASN.2011040361
- Hermida et al. Hypertension. 2008 Jan;51(1):69-76

The End


rx
meds
diet
arteries
cost
health
stroke
co-morbidity
awareness
help
factors
vessels
white coat
headache
lab tech
weight
systolic
doctors
obesity
high
hospital
genetic
blood
testing
men
140/110
heredity
140/100
HYPERTENSION
readings
women
care
htn
doctor
meds
bp
people
pressure
condition
exercise
normal
heart
causes
rx
control
diastolic
risk
prevention
130/90
treatment
spike
research
stress
bmi
medication
rise
blood
causes
rn
salt
cuff

Training and CPD Useful links

- Useful links and reading
  - British Hypertension Society www.bhssoc.org
  - Blood Pressure Association www.bpasoc.org.uk
  - British Medical Journal
    - (Learning sets on line) www.bmj.com
  - Education for Health www.educationforhealth.org.uk
  - NICE link http://guidance.nice.org.uk/CG127
  - BHS NICE Guidance Stream www.bhsoc.org/stream/index/html
  - Clinical Knowledge Summaries www.cks.nhs.uk/home
  - Action planning: making change happen in clinical practice. O'Neal,Helen Nursing Standard,
    - Volume 21 (35) Royal College of Nursing. May 9 2007

Extra slides

Make sure you stop drugs that can worsen HTN

- NSAIDs
- Sympathomimetics
  - weight loss pills, decongestants, cocaine
- Stimulants – amphetamines
- ETOH
- Cyclosporin
- ESA
- Liquorice
- Herbal compounds

Why thiazide-like over thiazide?

- Thiazide-like (indapamide, chlorthalidone) rather than thiazide (bendroflumethiazide, hydrochlorothiazide)
- Chlorthalidone reduces SBP better than HCTZ at equivalent doses with similar effects on potassium levels
- ALLHAT and SHEP have demonstrated reductions in CV end points with chlorthalidone; evidence for HCTZ is less robust.

Ernst et al, Am J Hypertens 2010; 23:440-6

Dual RAAS blockade

- Not recommended for HTN
- Limited role in chronic heart failure

- ONTARGET
  - No added benefit
  - Increased risk adverse events in high risk patients

ACEi and ARB Combination

- **Dual therapy** not indicated in:
  - Hypertension
    - (ONTARGET)
  - Secondary prevention post MI
    - (VALIANT)
  - CKD
    - No evidence to suggest increased effectiveness for an ACEi/ARB combination over maximum recommended dose of each individual drug
    - May improve proteinuria but worse eGFR and major renal outcomes
      - (ONTARGET)

- **Dual therapy** - limited role
  - Chronic heart failure
    - Patients who are still symptomatic despite optimised ACEi and beta-blocker therapy may benefit from the addition of candesartan (CHARM-Added)
    - Significant reduction in hospitalisations but not mortality
    - Increases the risk of worsening renal function, hyperkalaemia and hypotension

http://publications.nice.org.uk/renin-angiotensin-system-drugs-ktt2/evidence-context

NICE – Management of Hypertension