Tips and Tricks:
Blood pressure targets and how to achieve them

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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

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

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<td>0.3g - 1.5g</td>
<td>More than 1.5g</td>
</tr>
<tr>
<td>Sodium</td>
<td>0g-0.1g</td>
<td>0.1g-0.6g</td>
<td>more than 0.6g</td>
</tr>
</tbody>
</table>
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


## Effect of Lifestyle Interventions on BP

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendation</th>
<th>S-BP reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>Maintain normal weight (BMI 18.5 – 24.9 kg/m²)</td>
<td>1 mmHg/kg</td>
</tr>
<tr>
<td>DASH eating plan</td>
<td>Diet rich in fruit &amp; veg, low fat dairy prod, low sat &amp; total fat</td>
<td>8 - 14</td>
</tr>
<tr>
<td>Reduced Na⁺ intake</td>
<td>&lt;100 mEq/l (2.4 g Na⁺/day)</td>
<td>2 - 8</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Regular aerobic activity (brisk 30 min walk / day)</td>
<td>4 - 7</td>
</tr>
<tr>
<td>Moderate alcohol</td>
<td>Not more than 2 drinks men, 1 drink women daily</td>
<td>2 - 3</td>
</tr>
</tbody>
</table>
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
Medicines Adherence

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

Percentage of prescribed drugs taken by nonadherent patients.

Drug Adherence

Adherence to Medication Relates to the Number of Antihypertensive Agents Prescribed

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%

Summary of antihypertensive drug treatment

Aged under 55 years

Aged over 55 years or black person of African or Caribbean family origin of any age

A

C

A + C

A + C + D

Resistant hypertension

A + C + D + consider further diuretic or alpha- or beta-blocker

Consider seeking expert advice

Step 1

Step 2

Step 3

Step 4

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 $K^+$ ≤ 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 $\rightarrow$ 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%)

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

• Prevention And Treatment of resistant Hypertension With Algorithm guided therapy

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
The End
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

NICE – Management of Hypertension

1. All people with hypertension
2. Lifestyle interventions
3. Criteria for starting antihypertensive drug treatment
4. Antihypertensive drug treatment
5. Review annually