



# ANTIHYPERTENSIVES

## Top tips for MURs

- Check that patient has had their blood pressure and heart rate measured every twelve months
- Check that the patient has had renal function tests every twelve months
- Ensure that diltiazem, verapamil or nifedipine modified release preparations are prescribed by proprietary name
- Counsel patients on signs and symptoms of complications that need referral (**see red flags overleaf**) and common side effects (**see overleaf**)
- Advise patient to avoid drinking grapefruit juice if taking calcium channel blockers or aliskiren and to avoid taking OTC NSAIDs
- Advise patient to sit up and stand slowly first thing in the morning and to drink adequate but not excessive amounts of fluids to prevent hypotension (dizziness & light headedness)
- Advise patient to take medication regularly (no missed doses)
- Counsel patients on avoiding soluble OTC preparations e.g. painkillers due to high sodium content
- Check that the patient has an annual influenza vaccination and a one off pneumococcal vaccination
- Report any relevant adverse drug reactions to the Yellow Card Scheme

## Pathophysiology of Hypertension

Hypertension (increased blood pressure) is caused by an increased cardiac output due to raised peripheral resistance caused by prolonged contraction of the arterioles of smooth muscle walls which results in a thickening of the vessel walls. Additionally blood pressure may be increased via the activation of the renin-angiotensin aldosterone system, resulting in vasoconstriction and sodium / water retention, as well as vasoconstriction due to activation of the sympathetic nervous system by stress or exercise<sup>1</sup>.

## Lifestyle issues

- Counsel patient on reducing alcohol intake to within safe limits (up to 14 units a week, spread evenly over 3 more days, with several alcohol free days)
- Counsel patient on healthy eating, exercise & weight loss (if BMI > 25kg/m<sup>2</sup>) - reduce saturated fat and salt intake, avoid salt substitutes, increase oily fish intake, complete 30 minutes of aerobic exercise three to five times a week, reduce caffeine intake to no more than 5 cups a day and recommend 5 portions of fruit and vegetables a day
- Advise patients who smoke of the benefits of stopping smoking and refer to Stop Smoking Wales or Pharmacy Stop Smoking services if willing to stop

## How does antihypertensive medication work?

Calcium-channel blockers e.g. amlodipine	Relaxes the blood vessels in smooth muscles by interfering with the flow of calcium through the channels in these vessels, causing peripheral arteriolar dilation which reduces the resistance to blood flow and hence reduces BP.
Drugs affecting the renin-angiotensin system e.g. lisinopril, losartan	ACEIs (angiotensin-converting enzyme inhibitors) inhibit conversion of angiotensin I to angiotensin II by inhibiting ACE. Prevent breakdown of bradykinin and accumulation causing a dry cough.  ARBs (angiotensin II receptor blockers) act directly on angiotensin II receptor to antagonise its effects. Does not inhibit bradykinin breakdown.  Both block the effects of aldosterone and therefore reduce reabsorption of sodium and water from the kidneys.
Thiazides, thiazide-like diuretics and related diuretics e.g. bendroflumethiazide, indapamide, amiloride and spironolactone	Increases excretion of sodium, potassium and water, which causes the circulating volume to be diminished, reducing preload on the heart, reducing cardiac output which reduces BP.
Alpha-adrenoreceptor blocking drugs e.g. doxazosin	Blocks the action of noradrenaline in arteries / veins causing vasodilatation of vascular smooth muscles and a fall in peripheral resistance, which reduces BP.
B-Blockers e.g. bisoprolol	Act on the sympathetic nervous system (reduces the peripheral resistance to blood flow by relaxing smooth muscle in arteries and reduces the cardiac response to stress and exercise which reduces BP).
Centrally acting antihypertensive drugs e.g. methyldopa	Stimulates the alpha-2 adrenoreceptors in the brain, which decreases cardiac output and peripheral vascular resistance which reduces BP.





## Red flags that need referral

- Any heaviness in the centre of your chest, triggered by effort or emotion
- Any fatigue or water retention
- Feeling unwell and generally out of sorts, irregular heart beat and muscle weakness (potassium levels need to be checked)
- Any intermittent dull, cramping pain or tightness in legs while exercising that disappears at rest
- Any symptoms of depression (low self esteem, lack of energy, weight loss, appetite loss, early morning wakening, lack of concentration)
- Any symptoms of impaired glucose tolerance or diabetes (extreme tiredness, thirst or excessive urination)

## What are the common side effects to look out for?

Drug	Common side effects	Recommendation
Thiazides and related diuretics	Gastro-intestinal disturbances, high blood glucose levels, hyperlipidaemia, hypokalaemia (could lead to arrhythmias), hyponatraemia	Refer to prescriber for tests. Monitor more closely in diabetics.
	Gout	Potential for prophylaxis with allopurinol.
	Postural hypotension	Advise patient to sit up and stand slowly first thing in the morning.
	Cramps	Drink adequate but not excessive amounts of fluids as cramp is common symptom of dehydration.
β-Blockers	Cold extremities, tightness of chest or difficulty breathing, extreme thirst, tiredness or excessive urination	Refer to prescriber for tests.
	Sleep disturbances & nightmares	Refer to prescriber to potentially switch to a water soluble tablet which is less likely to cause these effects e.g. atenolol.
	Bradycardia	Refer to prescriber.
	Masks hypoglycaemia, causes hyperglycaemia	Extra care should be taken for those on medications to lower blood glucose.
Centrally acting antihypertensive drugs	Drowsiness, dry mouth, bradycardia, GI disturbances	Advise patients not to operate machinery or drive. Refer to prescriber if persists.
Alpha-adrenoreceptor blocking drugs	Drowsiness, hypotension, dizziness, headache, dry mouth, blurred vision, GI disturbances	Advise patients not to operate machinery or drive. Refer to prescriber if persists.
Drugs affecting the renin-angiotensin system	Swelling of the hands, feet, eyes, lips or genitals (angioedema), hyperkalaemia	Refer to prescriber (if suspected angioedema refer urgently).
	Troublesome persistent dry cough	Refer to prescriber.
	Hypotension	Refer to prescriber. For first dose hypotension take medication at night.
Calcium-channel blockers	Facial flushing, dizziness & headaches	Refer to prescriber. Take regularly to diminish these effects
	Ankle oedema	Refer to prescriber.
	Constipation	Gentle laxative can be taken.
All	Impotence	Refer to prescriber for assessment of suitability for erectile dysfunction medication.

## Potential serious drug interactions?

See BNF Appendix 1 for details.

- Diltiazem, verapamil, amlodipine, ranolazine and high dose statins can result in increased risk of myopathy. The MHRA recommend a maximum dose of simvastatin 20mg when used in conjunction with amlodipine, verapamil, diltiazem or ranolazine<sup>1</sup>
- Risk of increased levels of ivabradine with diltiazem and verapamil - avoid concomitant use
- ACEIs and ARBs should not be used together as there are increased risks of hyperkalaemia, hypotension and renal dysfunction.
- Spironolactone is cautioned with ACEIs and ARBs as there is a risk of hyperkalaemia<sup>3</sup>

## Where can you find more information?

- Cardiovascular system – BNF sub-section 2.2 to 2.6
- Coronary Heart Disease distance learning pack that can be found on WCPPE website ([www.wcppe.org.uk](http://www.wcppe.org.uk))
- NICE guidance: Hypertension – clinical management of primary hypertension in adults, August 2011 can be found on NICE website ([www.nice.org.uk](http://www.nice.org.uk))
- Clinical Knowledge Summary Hypertension can be found on CKS website (<http://cks.nice.org.uk>)

## References

- 1 Evidence based management of Coronary Heart Disease, NICPLD, 2009
- 2 Drug Safety Update, MHRA, August 2012. Available online at <http://www.mhra.gov.uk/home/groups/dsu/documents/publication/con180638.pdf>
- 3 Drug Safety Update, MHRA, February 2016. Available online at <https://www.gov.uk/drug-safety-update/spironolactone-and-renin-angiotensin-system-drugs-in-heart-failure-risk-of-potentially-fatal-hyperkalaemia>