



Hypertension is one of those issues that we encounter every day in family practice, whether in the office or acute settings. Roughly one in four to one in five Canadian has hypertension. It is a top modifiable risk factor for cardiovascular disease and the number one cause of death and disability worldwide.

In fact, a 2018 systematic review in *Canadian Family Physician* found that globally, across both developed and developing nations, hypertension was essentially tied with upper respiratory tract infections for being the most common reason for a visit (at least according to the doctors).

Which is why it is typically the first disease that comes to my mind when I think about the preventative side of primary care.

All that to say, this episode is a big one. We focused primarily on the Hypertension Canada guidelines when researching this episode, since that's what will be most relevant for your CCFP exam. But other guidelines exist and you should be aware that they do not all agree.

And given the scope of all there is to know, we are going to talk mostly about adult hypertension. For the kiddos in your practice, Hypertension Canada pediatric sub-committee released guidelines in 2017. We will post links to all these and more in the show notes.

Objective One

Screen for hypertension.

There is no single recommended frequency or timing for blood pressure screening.

Hypertension Canada recommends screening for patients over age 18 at all 'appropriate' visits – i.e. any visit, if you deem it an appropriate opportunity to monitor blood pressure.

You do not need to take a blood pressure on every patient at every visit if there's no clinical indication. But the risks of increased blood pressure generally increase over a person's lifetime with age, and with changes in co-morbidities and other risk factors. For this reason, in patients without a current diagnosis of hypertension or other indications requiring more frequent screening, you should check blood pressure once a year at minimum.

For patients with other vascular risk factors or a tendency towards 'high normal' blood pressure, then checking more frequently may be indicated. For all patients, Dr. Ringrose recommends teaching patients to know their numbers" by periodically monitoring their blood pressure at home or at a pharmacy.

The guidelines for pediatrics are similar. Check blood pressure regularly in children 3 and older, and ensure you compare these against normal values for age, sex and height.



Objective Two

Use correct technique and equipment to measure blood pressure.

Technique is incredibly important when it comes to measuring blood pressure. There's a reason it's one of the first things we learn for physical exam in Medical school. Despite this, I am going to make a willllld guess, not at all based on personal experience, that most of us are guilty of taking subpar measurements.

No need to guess. This is backed up by a lot of data. The evidence, including a recent 2020 JAMA Internal Medicine study, suggests that readings with proper technique, such as those done in the setting of reseatch trials like SPRINT, are typically 5 to 15 mmHG lower than readings for those same patients in routine clinical practice.

Poor technique can lead to both over and underestimation of blood pressure. But some of the most common things we do incorrectly, like not giving patients enough rest prior to readings, talking during measurement, or leaving the arm unsupported are all associated with an overestimation of blood pressure.

Using the wrong cuff size, leaving the back or feet unsupported, and just having a health care worked present during measurement can also cause measurement errors.

Ok, so how about I always just round the office pressure up or down by 10 points – will that work?

Nope. The literature suggests that the variability is, well, variable. There's no consistent evidence that you can simply apply a correction and assume that will estimate a good reading.

Ok ok. No shortcuts. Then how do we do this properly?

It starts with the device.

The preferred in-office method is Automated Office Blood Pressure Measurement, using a validated automated device to take a series of 3 to 6 consecutive readings 1 to 2 minutes apart, on the upper arm, while the patient is left in a private area, in the correct position with no one present.

Less preferred is the what is called an 'Office blood pressure measurement', This is an automated measurement using the same type of device as with an automated pressure, but with



the provider in the room taking readings one at a time – if you do it this way, you should take 3 readings, discard the first, and average the last two.

The classic stethoscope auscultation can still be used, but research shows it's less reliable in a clinical setting due to technique. Clinicians are rushed and offices are busy!

Regardless of the device and approach you use, should also:

- Have the patient seated, back supported, both feet flat on the floor (*not* dangling off the side of the bed). They should rest comfortably in this position for *5 minutes* before taking the measurements.
- Take blood pressure on both arms during at least one visit (and if one arm is consistently higher, use the higher arm in the future)
- The arm should be at heart level, supported, and bare or over thin clothing– no sweaters!
- Choose the right size of cuff – the bladder (that's the part that inflates) width should be 40% of arm circumference, and length should be 80-100% of the arm circumference.
- Position the bottom edge of the cuff 3cm above the elbow crease, bladder centered over the brachial artery.
- And lastly, the room should be quiet with no talking. Which means not continuing to try to rush through your HPI while taking it.

Ok, and what about out of office measurements?

Out of office measurements are actually the better predictors of cardiovascular events.

The gold standard method for diagnosing hypertension is ambulatory monitoring, where patients wear a monitor for 24 hours and readings are taken every 20-30 minutes. This is the best choice if you suspect white-coat hypertension (or yellow gown and goggle hypertension as I've been calling it in this age of COVID). Ambulatory BPM also provides nocturnal readings, which is a big part of why it's a better predictor and better for diagnosing.

The other option is Home Blood Pressure Monitoring with an automated cuff. This is a good choice for patients who you suspect will require ongoing, regular monitoring, but they can also be used for diagnosis. Home devices are relatively inexpensive (\$60-\$100), but the cost can still be prohibitive for some patients.

Think twice about asking patients to buy one if they don't really need it. If they do buy a device, make them buy a validated device. Patients can check the Hypertension Canada "recommended device listing" to check if the device they wish to purchase is validated.

Some benefits plans do cover these machines with a prescription though, so get your patients to look into this.



For home monitoring, patients should be instructed to take a series of readings – morning and evening for seven days, with the first day values discarded. I tell my patients to take their readings first thing in the morning when they wake up (before coffee or tea, but after emptying their bladder) and then again, an hour or two after dinner.

Hypertension Canada has templates and instructions that are readily available on their website that you can print and give to your patients.

Make sure to teach them the same good techniques that we use for in-office readings, including taking multiple measurements each time, and make sure they know to write down both the systolic and the diastolic numbers (best known as the top one and the bottom one). If you are having patients do home monitoring, it's not a bad idea to have them bring in the device and demonstrate their technique.

Objective Three

Make the diagnosis of hypertension only after multiple BP readings (i.e., at different times and during different visits).

Finally, we've come to a flow chart. You almost certainly know the one I am talking about, this should look very familiar from medical school.

Diagnosing hypertension with measuring blood pressure in the office, either during normal screening or because your patient took their blood pressure somewhere and came in because it was high.

Using that proper technique, we talked about of course and regardless of method used(!), if the mean blood pressure is greater than or equal to 180/110, we're done. Hypertension, diagnosed.

If it's less than this, then the threshold to diagnose depends on whether or not the patient has diabetes. If they have diabetes, then you're looking for a manual office blood pressure greater than or equal to 130/80 for more than three measurements on different days. If you meet this threshold, then you can (*probably*) diagnose hypertension.

If your patient does *not* have diabetes, then the threshold to (*probably*) diagnose is greater than or equal to 135/85 for an automated office blood pressure, or greater than or equal 140/90 for a manual office blood pressure.

There's that probably again. Why do we keep saying that? Well, even if your patient seems above these thresholds in the office, the guidelines recommended that you *consider* repeating the process out of office to rule out possible white coat hypertension. That's where the ambulatory or home monitoring comes in.



On a 24hr ambulatory monitor a daytime mean pressure greater than or equal to 135/85 OR a 24hr mean pressure greater than or equal to 130/80 is hypertension, Diagnosed! If they do a home series with a home monitor instead, then a mean greater than or equal to 135/85 is also diagnostic of hypertension.

If your patient is hypertensive in the office but all those home readings are below the diagnostic thresholds, then you're likely looking at white coat hypertension.

The other situation where out-of-office measurements can be helpful is masked hypertension. This is where patients have a normal blood pressure in the office, but then it's high the rest of the time. I don't personally know a lot of patients who are calmer at the doctor . . . but it's nice to think that happens. It's important to pick up masked HTN, because it is associated with an increased cardiovascular risk.

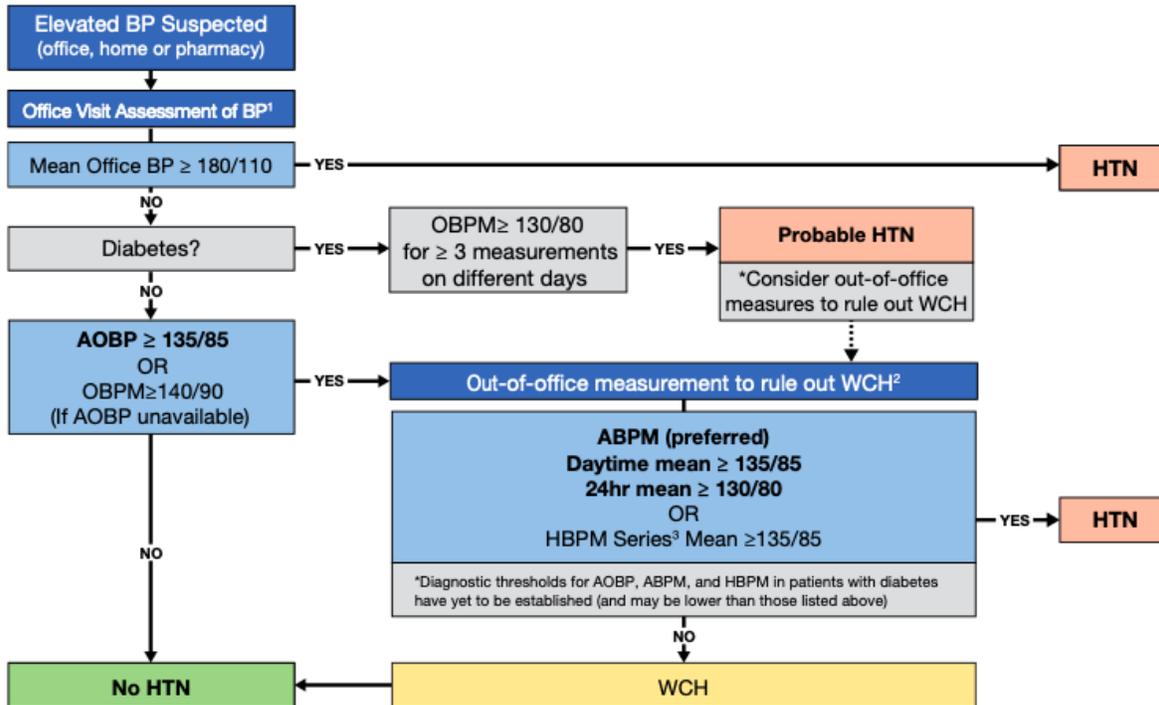
Be on the lookout for masked hypertension for patients with a borderline high-normal in office blood pressure, and in older men, current smokers, heavy alcohol drinkers and anyone with any other classic cardiovascular risk factors.

And if all those numbers made your head spin, you're not alone. It's confusing. Take a look at the flow chart in the show notes, we promise it helps.

On that flow chart you may also notice that for diabetic patients who are confirming with out-of-office measurements, the thresholds for diagnosis are currently the same as non-diabetic patients, even though we have lower thresholds for a manual office blood pressure. That's because diagnostic thresholds for hypertension in diabetic patients have not yet been established using any method other than the manual office blood pressure – but it's likely that will be clarified in future guidelines.

DIAGNOSIS

HYPERTENSION DIAGNOSTIC ALGORITHM FOR ADULTS



Algorithm Notes:

- 1) If AOBP is used, use the mean calculated and displayed by the device. If OBPM is used, take at least three readings, discard the first and calculate the mean of the remaining measurements. A history and physical exam should be performed and diagnostic tests ordered.
- 2) Serial office measurements over 3-5 visits can be used if ABPM or HBPM are not available.
- 3) Home BP Series: Two readings taken each morning and evening for 7 days (28 total). Discard first day readings and average the last 6 days.
- 4) In patient with suspected masked hypertension, ABPM or HBPM could be considered to rule out masked hypertension.

AOBP: Automated Office Blood Pressure. This is performed with the patient unattended in a private room.

OBPM: Office Blood Pressure Measurement. These are measurements performed in the office using an electronic upper arm device with a provider in the room.

ABPM: Ambulatory Blood Pressure Monitoring

HBPM: Home Blood Pressure Monitoring

WCH: White Coat Hypertension

HTN: Hypertension

All measurement values in algorithm are reported as mmHg.

Objective Four

In patients with an established diagnosis of hypertension, assess and re-evaluate periodically the overall cardiovascular risk and end-organ complications:

- a) Take an appropriate history.



**b) Do the appropriate physical examination, and
c) Arrange appropriate laboratory investigations.**

Ask about and look for signs of target organ damage. This means looking for signs and symptoms, and doing investigations to check for:

1. Cardiovascular diseases, like coronary artery disease, angina, or heart failure.
2. Cerebrovascular disease, including carotid artery disease, history of stroke or TIA, or vascular dementia
3. Peripheral Arterial Disease, including vascular claudication or lower extremity trophic changes.
4. hypertensive retinopathy, and
5. Renal disease

In your history you also want to ask about factors that affect cardiovascular risk, such as smoking history, ethnicity, and family history of early heart disease.

After an initial diagnosis of hypertension, investigations to order include: electrolytes and kidney function, lipid studies, fasting glucose or A1c, and a 12-lead ECG. You'll also want a basic urinalysis, and you should also check for microalbuminuria if patient has diabetes or renal disease.

Routine echos are not recommended for everyone with hypertension. Get one if you suspect heart failure, left ventricular hypertrophy or coronary artery disease.

How often you repeat your investigations in follow-up will depend on the clinical situation and screening guidelines for your patients age.

Finally, you want to put this all together to determine your patient's overall global cardiovascular risk and discuss this with them. This means using something like a Framingham score, which estimates the risk of a cardiovascular events over 10 years.

There are quite a few calculators out there that you can use to do this. I personally like the one at CVDcalculator.com, which has the Framingham risk score as well as several other calculators. allows you to calculate risk as well as benefits of different therapies and numbers needed to treat – I often go through it together with my patients in the office, because I find the little red and green smileys (combined with hard numbers for risk vs. benefit) helps me have more effective discussions about treatment decisions.

We will get to treatment shortly, but first ...

Objective Five

In appropriate patients with hypertension (e.g., young patients requiring multiple medications, patients with an abdominal bruit, patients with hypokalemia in the absence of diuretics):

- a) **Suspect secondary hypertension.**
- b) **Investigate appropriately.**

Most of your patients with hypertension will have idiopathic or primary hypertension, and it is often reasonable to start treatment from this assumption. But anywhere from 5-10% of cases can be secondary hypertension.

But clues to suspect secondary hypertension include:

1. *Resistant hypertension*, that is blood pressure that remains above target despite the patient being on three or more blood pressure medications at optimal doses, usually including a diuretic as well as an ACE or ARB and a Calcium Channel Blocker.
2. *Age less than 30*, with no other risk factors (such as obesity). If patients have hypertension before they've reached puberty that's even more suspicious.
3. *Family history*: if no other family members have hypertension, especially in younger patients, then a secondary cause is more likely.
4. *Severe hypertension* (i.e. blood pressure \geq 180 systolic and/or 120 diastolic), especially newly onset, or rapidly progressing hypertension with end-organ damage
5. *electrolyte disorders*, such as hypokalemia, not otherwise explained by current medication or other causes.

Appropriate investigations will depend on the clinical context, and should start with a detailed history and physical to guide you. This means you don't need to start with urine catecholamines to rule out a pho right off the bat.

I like to remember the differential for secondary hypertension with my ABCDEs:

- **A** is for accuracy (remember, no short cuts!), aldosteronism, and apnea (as in obstructive sleep apnea). Dr. Ringrose noted that hyperaldosteronism is a lot more common than we tender to think.
- **B** is for bruits and bad kidneys, which refers to renal artery stenosis or other renovascular and renal parenchymal diseases.
- **C** is Coarctation of the aorta and Cushing's syndrome. It is also for Catecholamines, which includes to our favorite zebra for secondary HTN, pheochromocytoma, but also acute stress situations, and any over the counter medications, weight-loss medications, herbal medications or street drugs that have sympathomimetic effects (So C is also for cocaine).



- **D** is for all the other ‘drugs’, which can include immunosuppressive drugs including corticosteroids, anabolic steroids, mineralocorticoids, monoamine oxidase inhibitors, oral contraceptives containing estrogen, COX-2 inhibitors and NSAIDs.
- **E** is for erythropoietin (referring to endogenous production secondary to things like COPD as well as exogenous medications use in renal failure). E is also for all the other endocrine cause we haven’t mentioned yet, which includes hypo or hyper thyroid, hyper parathyroid, acromegaly. E can also be for ‘emotions. Anxiety and substance use disorders (such as alcohol and stimulants as we’ve mentioned before) can contribute to hypertension, and some anti-depressants can also increased blood pressure.

Objective Six

Suggest individualized lifestyle modifications to patients with hypertension. (e.g., weight loss, exercise, limit alcohol consumption, dietary changes).

All your patients, not just those with hypertension, can potentially benefit from lifestyle changes to reduce their cardiovascular risk.

In patients with mild hypertension who are close to target blood pressures, it is often reasonable to start with these alone. But often our patients with hypertension look and feel just fine – and so sometimes it can be tricky to convince them that lifestyle changes and potentially medications might be necessary.

Remember, just telling patients to ‘lose weight’ or ‘stop smoking’ won’t actually help them do that. It can even threaten your therapeutic alliance if you do it poorly. It also sometimes misses the patient’s broader context – remember, you’re treating the patient, not just their hypertension. You may need to lean hard into your motivational interviewing skills when you tackle this subject.

So what are the guidelines to know?

First, increase physical activity. All patients can benefit from 30-60 minutes of moderate intensity exercise 4-7 days a week. If patients want to do more intense exercise than that, great! But the evidence suggests it’s no more effective at lowering BP than the moderate intensity activities like swimming, cycling or walking.

Next, weight reduction. A BMI of 18.5 – 24.9 and a waist circumference less than 102 cm for men and < 88 cm for women is recommended for hypertensive patients and all patient to reduce risks of developing hypertension.



Moderate alcohol intake. Research increasingly confirms there is no safe limit for alcohol consumption (no more prescribing a heart healthy daily glass of red wine), so if your patients want to abstain that's great. Otherwise, limiting drinks to the healthy recommended limits, < 14/wk for men and < 9 per week for women, will help lower blood pressure.

Similarly, if patients can abstain from smoking, this will help lower their overall cardiac risk.

Consider recommending heart healthy diets like the DASH-diet, which are low in sodium and dietary fats.

And finally, if you suspect that stress is playing a role in your patient's blood pressure, recommend counselling or relaxation therapies such as meditation as appropriate to their circumstances.

Objective Seven

In a patient diagnosed with hypertension, treat the hypertension with appropriate pharmacologic therapy (e.g., consider the patient's age, concomitant disorders, other cardiovascular risk factors).

Recommendations for when to start medications will depend on comorbidities and how you've risk stratified your patients using a measure like the Framingham that we talked about earlier.

Hypertension Canada's definition of a high-risk patient is anyone older than 50 with a systolic blood pressure great than 130 AND who has any of the following cardiovascular risk factors: Existing cardiovascular disease, chronic kidney disease, or a 10-year global cardiovascular risk over 15%. They also define anyone over age 75 as automatically high risk.

These are the patients most likely to benefit from intensive therapy and control. So the recommendation is to treat these patients immediately on diagnosis and target a systolic blood pressure of < 120.

For diabetic patients, you also should treat hypertension with medications immediately on diagnosis, but your treatment targets are less than 130 / 80.

For patients who are moderate-to-high risk, which hypertension Canada defines as anyone with multiple cardiovascular risk factors and or a 10-year risk of cardiovascular events in the 10-14% range, the recommendation is to start antihypertensive when blood pressure is $\geq 140 / 90$, and to target the same.



Low risk patients are those with no end-organ damage, and a 10-year cardiovascular risk of < 10%. In these patients you also want to target a normal blood pressure, so < 140 / 90. But the current recommendation threshold to start antihypertensives is when blood pressure is $\geq 160 / 100$.

This doesn't mean that antihypertensives are never appropriate for mild hypertension in some low risk patients. But the benefits of intensive therapy and intensive targets are less clear and may be more likely to be outweighed by potential side effects, and so this is a discussion to have with your patients.

When you and your patient do decide to start an anti-hypertensive, which one you choose will depend on many factors and there are many to choose from. There is a helpful chart from hypertension Canada in the show notes, which breaks down the best options for first- and second-line therapies based on what other conditions a patient may have, which we highly suggest you read though so that you can absorb all the nuance.

Since we don't have time for that nuance now, here's our rapid-fire review of what is commonly recommended to go with what:

- Systolic and diastolic hypertension and no other indications? A thiazide or thiazide-like diuretic OR an ACE or ARB, OR a long-acting calcium channel blocker, OR a single-combination pill (typically an ACE or ARB combined with either a calcium channel blocker or a diuretic). Beta blockers can also be used, but are not recommended as first-line therapy in patients over 60.
- Isolated systolic hypertension and no other indications? thiazide or thiazide-like diuretics, ARBs or long-acting calcium channel blockers
- Diabetes? ACE or ARB
- Non-diabetic kidney disease: Also ACE or ARB
- Coronary Artery Disease? ACE or ARB; OR stable angina beta blockers or long-acting calcium channel blockers
- Recent MI or heart failure? Beta blocker AND an ACE (or ARB if ACE intolerant)
- Past stroke or TIA? Single-pill combo ACE with a thiazide/thiazide-like diuretic
- Patients who might get pregnant? It's no different from what we just said, but you should be mindful if a patient is planning to get pregnant because ACE inhibitors and ARBs are contraindicated in pregnancy in the second and third trimesters. If there's no other compelling reason to choose an ACE or an ARB, may not want to use them at all to be safe – labetalol or long acting nifedipine are probably the best choice.
- Pregnant and lactating patients? Labetalol, methyldopa and long-acting oral nifedipine

Considerations in the Individualization of Pharmacological Therapy in Adults

Condition	Initial therapy	Second-line therapy	Notes and/or cautions
Hypertension without other compelling indications			
Diastolic hypertension with or without systolic hypertension	Monotherapy or SPC. Recommended monotherapy choices include thiazide/thiazide-like diuretics (longer-acting diuretics preferred), β -blockers, ACE inhibitors, ARBs, or long-acting CCB. Recommended SPC choices include combinations of an ACE inhibitor with CCB, ARB with CCB, or ACE inhibitor/ARB with a diuretic. (Consider statins in selected patients).	Combination of first-line drugs.	Not recommended for monotherapy: α -blockers, β -blockers in those ≥ 60 years of age, ACE inhibitors in persons of African descent except if diabetes. Hypokalemia should be avoided in those prescribed diuretics. Combination of an ACE inhibitor with an ARB is not recommended.
Isolated systolic hypertension without other compelling indications	Thiazide/thiazide-like diuretics, ARBs or long-acting dihydropyridine CCBs.	Combinations of first-line drugs.	Same as above for diastolic hypertension with or without systolic hypertension.
Diabetes mellitus			
Diabetes mellitus with microalbuminuria*, renal disease, CVD or additional CV risk factors	ACE inhibitors or ARBs.	Addition of a dihydropyridine CCB is preferred over a thiazide/thiazide-like diuretic.	A loop diuretic could be considered in hypertensive chronic kidney disease patients with extracellular fluid volume overload.
Diabetes mellitus without factors listed above	ACE inhibitors, ARBs, dihydropyridine CCBs or thiazide/thiazide-like diuretics.	Combination of first-line drugs. If combination with ACE inhibitor is being considered, a dihydropyridine CCB is preferable to a thiazide/thiazide-like diuretic.	Normal urine microalbumin to creatinine ratio < 2.0 mg/mmol.
Cardiovascular disease			
Coronary artery disease	ACE inhibitors or ARBs; β -blockers or CCBs for patients with stable angina.	When combination therapy is being used for high-risk patients, an ACE inhibitor/dihydropyridine CCB is preferred.	Combination of an ACE inhibitor with an ARB is not recommended. Exercise caution when lowering SBP to target if DBP is ≤ 60 mm Hg, especially in patients with LVH.
Recent myocardial infarction	β -blockers and ACE inhibitors (ARBs if ACE inhibitor intolerant).	Long-acting CCBs if β -blocker contraindicated or not effective.	Non-dihydropyridine CCBs should not be used with concomitant heart failure.
Heart failure	ACE inhibitors (ARBs if ACE inhibitor-intolerant) and β -blockers. Aldosterone antagonists (mineralocorticoid receptor antagonists) may be added for patients with a recent cardiovascular hospitalization, acute myocardial infarction, elevated BNP or NT-proBNP level, or NYHA Class II to IV symptoms.	ACE inhibitor and ARB combined. Hydralazine/isosorbide dinitrate combination if ACE inhibitor and ARB contraindicated or not tolerated. Thiazide/thiazide-like or loop diuretics are recommended as additive therapy. Dihydropyridine CCB can also be used. A combined ARB/nephrilysin-inhibitor is recommended (in place of an ACE inhibitor or ARB) in symptomatic patients with hypertension and HFREF on standard guideline-based therapies.	Titrate doses of ACE inhibitors and ARBs to those used in clinical trials. Carefully monitor potassium and renal function if combining any of ACE inhibitor, ARB and/or aldosterone antagonist.

Condition	Initial therapy	Second-line therapy	Notes and/or cautions
Cardiovascular disease (continued)			
Left ventricular hypertrophy	ACE inhibitor, ARB, long-acting CCB or thiazide/thiazide-like diuretics.	Combination of first-line agents.	Hydralazine and minoxidil should not be used.
Past stroke or TIA	ACE inhibitor and a thiazide/thiazide-like diuretic combination.	Combination of first-line agents.	Treatment of hypertension should not be routinely undertaken in patients with acute stroke unless extreme BP elevation. Combination of an ACE inhibitor with an ARB is not recommended.
Non-diabetic chronic kidney disease			
Non-diabetic chronic kidney disease with proteinuria [†]	ACE inhibitors (ARBs if ACE inhibitor-intolerant) if there is proteinuria. Diuretics as additive therapy.	Combinations of first-line agents.	Carefully monitor renal function and potassium for those on an ACE inhibitor or ARB. Combinations of an ACE inhibitor and ARB are not recommended.
Other conditions			
Peripheral arterial disease	Does not affect initial treatment recommendations.	Combinations of additional agents.	Avoid B-blockers with severe disease.
Reproductive considerations			
Preconception	As per above indications.	–	Consider discontinuing ACE inhibitors and ARBs unless there is a compelling indication for their use (i.e., proteinuric kidney disease).
Pregnancy	Labetalol, methyldopa and long-acting oral nifedipine. Other β-blockers (acebutolol, metoprolol, pindolol and propranolol) can also be used.	Clonidine, hydralazine and thiazide diuretics.	ACE inhibitors and ARBs should not be used. Additional antihypertensive drugs should be used if target BP levels are not achieved with standard-dose monotherapy. Add-on drugs should be of a different drug class than those chosen from first-line or second-line options. Carefully monitor maternal and fetal response to BP medications.
Lactation	Labetalol, methyldopa, long-acting oral nifedipine, enalapril or captopril.	Combinations of first-line agents.	Monitor infant for adverse effects.

* Microalbuminuria is defined as persistent albumin to creatinine ratio >2.0 mg/mmol.

† Proteinuria is defined as urinary protein >150 mg/24hr or albumin to creatinine ratio [ACR] >30 mg/mmol in two of three specimens.

ACE: Angiotensin converting enzyme

ARB: Angiotensin receptor blocker

BNP: B-type natriuretic peptide

CCB: Calcium channel blocker

CVD: Cardiovascular Disease

HFREF: Heart failure with reduced ejection fraction < 40%

NT-proBNP: N-terminal pro B-type natriuretic peptide

NYHA: New York Heart Association

TIA: Transient ischemic attack

LVH: Left ventricular hypertrophy

SPC: Single pill combination.

OK, so you've treated their hypertension. Do patients with hypertension need to take anything else? Say for vascular protection?

In the updated 2020 guidelines, Hypertension Canada has recommended the removal of ASA for primary prevention of cardiovascular disease because increasing evidence, such as from the ASPREE trial (link in the show notes) has found little benefit, along with significant risks of major bleeding.

But for many years, the recommendation was to consider low-dose ASA in all adults with hypertension over age 50 for primary prevention of CVD. I encounter a lot of patients who have been taking a daily baby aspirin for years – and because it's usually over the counter, it's often not on their prescriptions. So make sure you ask about it! If they are ONLY taking it because of their high blood pressure, then it may be time to stop.

That said, I have personally found that some of my patients are pretty attached to that daily little blue pill, and it can be tricky to convince them to stop. Few people want to hear that the advice they've been diligently following for over a decade might actually have been bad for them. So at a minimum you want to have a conversation about it, ensure they are aware of the new guidelines, and the discuss the associated risk of major bleeding.



Also consider statins and other lipid-lowering therapies as appropriate – check out the hyperlipidemia episode we just released for a much more in-depth discussion of statins.

Objective Eight

Given a patient with the signs and symptoms of hypertensive urgency or crisis, make the diagnosis and treat promptly.

This is where we talk about very high blood pressures, which we are going to define as > 180 systolic and /or > 120 . The urgency with which you need to treat a very high blood pressure is based on a lot more than just the number!

Most patients with a very high blood pressure diastolic are asymptomatic and have no signs of target end-organ damage – this is what we would call severe hypertension, or hypertensive *urgency*. In this situation, we usually have some time – hours to days or longer.

But when patients have a very high blood pressure AND they develop symptoms or signs of target end-organ damage, this is what we call a hypertensive *emergency* or *hypertensive crisis*, and it requires a more rapid response.

First, how do we identify a hypertensive emergency?

In patients with a very high blood pressure, as well as patients with an acutely rising blood pressure even if less than 180/120, look for signs and symptoms of target-organ damage:

- Head injuries or trauma
- Generalized or focal neurological symptoms, like agitation or delirium
- Signs of increased intracranial pressure, such as nausea and vomiting or papilledema
- Chest discomfort or pain
- Back discomfort or pain
- Shortness of breath
- Signs of renal failure, such as oliguria or peripheral edema
- Pregnancy
- Prescription, over the counter or illicit drug use, such as cocaine, stimulants, monoamine oxidase inhibitors or phencyclidine, or recent discontinuation of clonidine or other antihypertensives. Recent discontinuation of alpha-blockers, such as in patients who have just had a TURP or prostatectomy – can also lead to hypertensive crises.

In a symptomatic patient, investigations should be guided by your history and physical exam, but again, you're looking for target end organ damage. You'll probably want labs that include electrolytes, renal function and urinalysis, and cardiac markers if appropriate, as well as an ECG,



and a chest X ray. Get a head CT or MRI if you suspect intracranial pathology; a chest CT or MRI if you're concerned about aortic dissection.

Once you've figured out whether you've got an urgent or emergent hypertensive situation, you have to decide how to manage it. For both situations, there are three helpful questions to ask yourself:

- 1) how quickly do I have to reduce the blood pressure?
- 2) what should the target blood pressure be during this period? and
- 3) how should we achieve this?

In hypertensive urgency, there is no clear evidence about optimal management. There is controversy about how fast to bring the blood pressure to a safe level, but the common rule of thumb seems to be over a period of days to weeks. In most cases, you should aim to lower the blood pressure no more than 25% initially, with a short-term goal of < 160/100 within a few days.

Lowering too aggressively can get ahead of the body's ability to autoregulate, and can cause cerebrovascular, myocardial or renal injury. In some rare cases you may want to lower the blood pressure in an otherwise asymptomatic patient more quickly – these will be patients with significant risk factors, such as a known vascular aneurysm, and at that point you may want to consider expert consultation.

To achieve your blood pressure goal, often the best first step is just to put the patient in a quiet room for 30 minutes – this can often lower blood pressure quite effectively!

If antihypertensives are required, a common approach is to choose something short acting such as captopril or hydralazine, observe the patient for a few hours to ensure the blood pressure starts to reduce, and then send them home with a long-acting agent and follow up in a few days. This works best in an inpatient setting or emergency department. In the family medicine office, it's generally safer and easier to just add another long-acting antihypertensive or adjust the patients existing medications, with a plan for follow up in 1-2 days.

In either case, you want to avoid yo-yoing the blood pressure with medications that are too short acting. The goal is a slow, steady, sustained decrease.

For hypertensive *emergencies* a general rule of thumb is 25% initially, or 10-20% in the first hour and 5-15% over the next 23 hours, as per up to date. But keep in mind there is no single effective blood pressure goal that is safe for every underlying condition - targets and first-line treatment are pretty condition-specific. This is getting into the weeds beyond our goals for this podcast, but there are very good discussions in both Tintinalli's and Rosen's for you emerg keeners out there.



Objective Nine

In all patients diagnosed with hypertension, assess response to treatment, medication compliance, and side effects at follow- up visits.

This should go without saying. And how often you follow up with patients is going to depend on the clinical context and your patient's individual needs.

As a rule of thumb: when starting new medications or initiating new life style modifications, patients should be followed every one to two months until below target and stable, in which case every three to six months is probably reasonable. Depending on comorbidities and medications, these follow up visits should also include monitoring of labs like A1C, renal function or electrolytes as appropriate.

Screen for side effects of medications at every visit. Hypotension from over treatment can develop in patients who have been stable on a medication for years, especially in much older adults. And common side effects like an ACE inhibitor cough can be frustrating enough to effect medication compliance.

Finally, Dr. Ringrose strongly recommends that you get your patients doing home blood pressure monitoring. Home monitoring better predicts cardiovascular end points compared to office monitoring. And it empowers patients to know their blood pressure and what affects it.

She also pointed out that we don't treat many other conditions based on only one data point, so why would you treat hypertension that way?.

The best approach is probably to get lots of readings– a mix of home, automated office blood pressures and ambulatory – to start to develop a picture of the average blood pressure over time. But no matter how you get them, the most important thing is an average of lots of readings over many days.

Annnnd, that's hypertension! I feel more relaxed already . . .

Outro babble

I knew a dog on an ACE inhibitor once. A very cute and tiny dog, with a very cute and tiny cough...

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