STANDARD treatment algorithm 130-140mmHg

(i) At BASELINE, If AVERAGE SBP\(^1\) > 140mmHg

If on no antihypertensive drugs: **Start 1 drug:**
- If >55 years old / Afro-Caribbean: **Calcium channel blocker (CCB)**\(^2\)
- If <55 years old: **Angiotensin converting enzyme inhibitor**\(^3\) (ACEi)
  If on antihypertensive – See Combined Drug Algorithm

(ii) Week 2 Review

- Home BP>160mmHg\(^1\): **increase dose*/add drug**\(^*\)
- Home BP 130-160 mmHg\(^1\): no change
- Home BP <130 mmHg\(^1\): **repeat in clinic and decrease dose / stop drug**\(^***\)

(iii) SCHEDULED Week 4 visit

- Home BP>140mmHg\(^1\): **repeat in clinic and increase dose/add drug** (see Combined Drug Algorithm)
  - Home BP 130-140 mmHg\(^1\): no change
  - Home BP <130 mmHg\(^1\): **repeat in clinic and stop drug**\(^*\) if average BP <130mmHg

(iv) If not at target, 6 week home BP review

- Clinic BP>160 mmHg\(^1\): **increase dose / add drug** (see Combined Drug Algorithm)
  - Clinic BP 130-160 mmHg\(^1\): no change
  - Clinic BP <130 mmHg\(^1\): **decrease dose / stop drug**\(^*\)

(v) If not at target Week 8 clinic BP

- Clinic BP>140 mmHg\(^1\): **increase dose / add drug** (see Combined Drug Algorithm)
  - Clinic BP 130-140 mmHg\(^1\): no change
  - Clinic BP <130 mmHg\(^1\): **decrease dose / stop drug**\(^*\)

(vi) SCHEDULED Week 12 review

- If not at target: **repeat steps ii-vi**
- If at target: **continue with scheduled follow up at months 6,12,18,24**
1. **SBP**: Home readings are an average of 3 daily blood pressure readings prior to the date of review. They also help to exclude symptomatic hypotension before any increase in medication. Clinic blood pressure readings are required before any new drug is added. In the **Standard** regime, medication changes are indicated if SBP outside target range (130-140mmHg systolic) on an average of the last 2 out of 3 readings, unless home readings show consistent readings below 130 mm Hg. If any clinic reading were below 130mmHg then antihypertensive medication withdrawal would be indicated. In the **Intensive** treatment arm, medication changes are indicated if any SBP were over 125mmHg systolic unless home readings show consistent readings below 110 mm Hg.

2. **Calcium channel blocker (CCB)**: First line antihypertensive therapy if patient is older than 55 years old (or Afro-Caribbean). Non-rate control CCB such as Amlodipine 5mg od (5-10mg od), Nifedipine MR/LA 20 or 30 mg od (range 20, 30, 40, 60 mg od). Peripheral oedema is a common side effect and although benign, may need to have dose reduction or discontinuation depending on patient comfort. Combination with long acting thiazide diuretic or ACEI can minimise peripheral oedema.

3. **Angiotensin converting enzyme inhibitors (ACEi)**: First line antihypertensive therapy in patients less than 55 years old with normal kidney function. Monitor renal function 1-2 weeks after ACEI initiated. Start Lisinopril at 10-20 mg per day (up to 80 mg per day). Some experts prefer to use Lisinopril twice a day when in high doses. Others include Perindopril 2mg od (range 2, 4, 8mg od), Ramipril 2.5mg od (range 1.25, 2.5, 5, 10mg od). If intolerant or develops cough, consider substituting with an **Angiotensin receptor blocker** (ARB) e.g. Losartan 50mg od (up to 100mg od), Candesartan 8mg per day (up to 32 mg per day in daily doses).

4. **Thiazide diuretic (D)**: In patients with normal kidney function start Bendroflumethiazide 2.5mg od. In patients with decreased eGFR (<30 ml/minute/1.73m2), loop diuretics may be used instead (Furosemide 80mg od).

5. **Beta Blocker (BB)**: Atenolol 25-100mg od (in some cases such as patients with kidney failure, 12.5 mg daily could be adequate). Bisoprolol 10mg od (5-20mg od). **Monitor HR and do not titrate dose up if resting HR is <60 bpm**

6. **Potassium sparing diuretic (PSD)**: Spironolactone 25 mg od (12.5-200mg od) or Amiloride 10mg od (5-20mg od).

7. **Alpha-receptor antagonist (ARA)**: Doxazosin 4mg od (4-16mg od). This is an effective vasodilator. Ideally add to regimens that include a diuretic and a rate-controlling agent like a BB. Monitor for CHF and volume overload carefully.

8. **Centrally active antihypertensive (CAB)**: Discontinue beta-blocker before starting Moxonidine 200 micrograms od (200-600 micrograms od)

* Increase dose in the following order ‘ACEi’, ‘CCB’, ‘ARA’, ‘BB’, ‘PSD’
** Add drugs in the following order: ACEi, CCB, ARA, PSD, BB, CAB
** Withdraw or reduce dose of last added drug
**INTENSIVE treatment algorithm target <125mmHg**

(i) At BASELINE, If ANY SBP\(^1\) >125 mm Hg

- If on no antihypertensive agent: **start Calcium Channel Blocker (CCB)** AND **Angiotensin converting enzyme inhibitor (ACEi)**
- If on antihypertensive drug: See Combined Drug Algorithm

(ii) Week two review

- If ANY BP >125 mmHg: **Increase dose */add other drug **
  - If BP 110-125 mmHg: **No medication change**
  - If BP <110 mmHg or symptoms of postural hypotension: **decrease dose / stop drug ***

(iii) SCHEDULED Week 4 review

- If ANY BP >125 mmHg: **Increase dose / add drug (see combined drug algorithm)**
  - If BP 110-125 mmHg: **No medication change**
  - If BP <110 mmHg or symptoms of postural hypotension: **decrease dose / stop drug**

(iv) 6 week review home BP

- If ANY BP >125 mmHg: **increase dose/ add drug (see combined drug algorithm) with clinic BP and review at two months**
  - If BP 110-125 mmHg: **No medication change**
  - If BP <110 mmHg or symptoms of postural hypotension: **decrease dose / stop drug**

(v) If not at target, week 8 review clinic BP

- If ANY BP >125 mmHg: **increase dose/add drug (see combined drug algorithm)**
  - If BP 110-125 mmHg: **No medication change**
  - If BP <110 mmHg or symptoms of postural hypotension: **decrease dose / stop drug**

(vi) SCHEDULED Week 12 review

- If not at target, **repeat steps ii-vi**
- If at target: **continue with scheduled visits at months 6, 12, 18, 24**
1. **SBP**: Home readings are an average of 3 daily blood pressure readings prior to the date of review. They also help to exclude symptomatic hypotension before any increase in medication. Clinic blood pressure readings are required before any new drug is added.

In the **Standard** regime, medication changes are indicated if SBP outside target range (130-140mmHg systolic) on an average of the last 2 out of 3 readings, unless home readings show consistent readings below 130 mm Hg. If any clinic reading were below 130mmHg then antihypertensive medication withdrawal would be indicated.

In the **Intensive** treatment arm, medication changes are indicated if any SBP were over 125mmHg systolic unless home readings show consistent readings below 110 mm Hg.

2. **Calcium channel blocker (CCB)**: First line antihypertensive therapy if patient is older than 55 years old (or Afro-Caribbean). Non-rate control CCB such as Amlodipine 5mg od (5-10mg od), Nifedipine MR/LA 20 or 30 mg od (range 20, 30, 40, 60 mg od). Peripheral oedema is a common side effect and although benign, may need to have dose reduction or discontinuation depending on patient comfort. Combination with long acting thiazide diuretic or ACEI can minimise peripheral oedema.

3. **Angiotensin converting enzyme inhibitors (ACEi)**: First line antihypertensive therapy in patients less than 55 years old with normal kidney function.

Monitor renal function 1-2 weeks after ACEI initiated. Start Lisinopril at 10-20 mg per day (up to 80 mg per day). Some experts prefer to use Lisinopril twice a day when in high doses. Others include Perindopril 2mg od (range 2, 4, 8mg od), Ramipril 2.5mg od (range 1.25, 2.5, 5, 10mg od). If intolerant or develops cough, consider substituting with an **Angiotensin receptor blocker** (ARB) e.g. Losartan 50mg od (up to 100mg od), Candesartan 8mg per day (up to 32 mg per day in daily doses).

4. **Thiazide diuretic (D)**: In patients with normal kidney function start Bendroflumethiazide 2.5mg od. In patients with decreased eGFR (<30 ml/minute/1.73m2), loop diuretics may be used instead (Furosemide 80mg od).

5. **Beta Blocker (BB)**: Atenolol 25-100mg od (in some cases such as patients with kidney failure, 12.5 mg daily could be adequate). Bisoprolol 10mg od (5-20mg od). **Monitor HR and do not titrate dose up if resting HR is <60 bpm**

6. **Potassium sparing diuretic (PSD)**: Spironolactone 25 mg od (12.5-200mg od) or Amiloride 10mg od (5-20mg od).

7. **Alpha-receptor antagonist (ARA)**: Doxazosin 4mg od (4-16mg od). This is an effective vasodilator. Ideally add to regimens that include a diuretic and a rate-controlling agent like a BB. Monitor for CHF and volume overload carefully.

8. **Centrally active antihypertensive (CAB)**: Discontinue beta-blocker before starting Moxonidine 200 micrograms od (200-600 micrograms od)

* Increase dose in the following order ‘ACEi’, ‘CCB’, ‘ARA’, ‘BB’, ‘PSD’
** Add drugs in the following order: ACEi, CCB, ARA, PSD, BB, CAB
*** Withdraw or reduce dose of last added drug
BP above target

Yes

Either increase dose or add another drug to achieve desired BP

If on 'A' or 'B', add 'C'
If on 'C' or 'D', add 'A'

If on 'AC' OR 'BD Add 'E'
If on 'AD' or 'BD' add 'C'
If on 'AB', add 'C'
If on 'CD', add 'A'
If on 'A' or 'B' + 'any', add 'C'
If on 'C' or 'D' + 'any', add 'A'
'any' + 'any' add 'C''

If on 'ABCD', add 'E' or 'G'
If on 'ABCE', add 'D' or 'G'
If on 'ACDE', add 'G' or 'B'
If on 'BCDE', add 'G' or 'A'

If on 'ABCDE', add 'G'
If on 'ABCDG', add 'F'

*Increase dose in the following order 'A', 'C', 'G', 'B', 'E'

** Non-rate control Calcium channel blocker in combination with Beta Blocker

On any BP lowering drug

No

If <55yrs: Lisinopril 5mg od OR
If > 55yrs/Afro-caribbean: Amlodipine 5mg od

Amlodipine 5mg od AND Lisinopril 5mg od

Increase calcium channel blocker
Amlodipine 10mg od + Lisinopril 5mg od

Increase ACE inhibitor
Amlodipine 10mg od + Lisinopril 10mg od

Add Thiazide diuretic
Amlodipine 10mg od + Lisinopril 20mg od + Bendroflumethiazide 2.5mg od + Spironolactone 25mg od

Add Beta Blocker
Amlodipine 10mg od + Lisinopril 20mg od + Bendroflumethiazide 2.5mg od + Atenolol 50mg od

Increase diuretic
Amlodipine 10mg od + Lisinopril 20mg od + Bendroflumethiazide 2.5mg od + Spironolactone 25mg od + Doxazosin 4mg od

Add alpha Blocker
Amlodipine 10mg od + Lisinopril 20mg od + Bendroflumethiazide 2.5mg od + Atenolol 50mg od + Spironolactone 25mg od + Doxazosin 8mg od

Replace Bendroflumethiazide with Furosemide
Amlodipine 10mg od + Lisinopril 20mg od + Furosemide 80mg od + Atenolol 50mg od + Spironolactone 25mg od + Doxazosin 8mg od

Remove Atenolol 50mg then add Moxonidine 200mcg od
Amlodipine 10mg od + Lisinopril 20mg od + Furosemide 80mg od + Moxonidine 200mcg od + Spironolactone 25mg od + Doxazosin 8mg od
Legend for Treatment Example

A: Angiotensin converting enzyme inhibitor (ACE-I) e.g.
Lisinopril 10mg od (range 5, 10, 20 mg od)
Perindopril 4mg od (range 2, 4, 8 mg od)
Ramipril 5mg od (range 1.25, 2.5, 5, 10 mg od)

If ACEi not tolerated:

Angiotensin receptor antagonist (ARB) e.g.
Losartan 50mg od (range 25, 50, 100 mg od)
Candesartan 8mg od (up to 32mg per day in divided doses)

B: Beta-receptor blocker (BB) e.g.
Atenolol 50mg (range 25, 50, 100mg od)
Bisoprolol 10mg od (range 5, 10, 20 mg od)

C: Calcium channel blocker (CCB) e.g.
Amlodipine 5mg od (range 5, 10 mg od)
Nifedipine MR/LA 20mg (range 20, 30, 40, 60 mg od)

D: Diuretics (D)
Thiazide diuretic: Bendroflumethiazide 2.5 mg od
Loop diuretic: Furosemide 40mg od (range 20, 40, 80 mg od)

E: Potassium sparing diuretic (PSD) e.g.
Spironolactone 25mg od (range 12.5-200 mg od)
Amiloride 10mg od (range 5-10mg od)

F: Centrally acting antihypertensive (CAB) e.g.
Moxonidine 200 micrograms (range 200, 400, 600 micrograms od)

G: Alpha-receptor antagonist (ARA) e.g.
Doxazosin 4mg od (range 4, 8, 16 mg od)