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Evaluation and Management of Hypertensive Emergency and Urgency

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Relevant RWI: None

Case Example

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- **58 yo woman with HTN comes to the ED w headaches and blurred vision for 3 days**
- **Home meds: amlodipine, HCTZ, and lisinopril, she reports poor adherence, has not taken drugs in 3 weeks**
- **Average of multiple BP measurements is 242/134 mm Hg, and HR 68 bpm.**
- **Fundoscopy: arteriolar narrowing, flame hemorrhages, cotton-wool spots, and papilledema**
- **ECG: LVH, other lab tests and CXR are normal.**
- **CT head: no hemorrhage or infarction.**
- **How would you further evaluate and treat this patient?**

Evaluation and Management of Hypertensive Emergencies

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- Classification and clinical manifestations
- Evaluation
- Therapeutics

Classification and Clinical Manifestations

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- **Hypertensive Urgency**

- **Hypertensive Emergency**

Classification and Clinical Manifestations

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Hypertensive Urgency

- Definition: sBP ≥ 180 and/or dBP ≥ 120
- No end-organ involvement
- Asymptomatic (or mild sx without end-organ involvement)

- 2 – 3 x more common than HTN emergency

Classification and Clinical Manifestations

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Hypertensive Emergency

- sBP ≥ 180 and/or dBP ≥ 120
- Evidence of end-organ involvement
  - Brain – CVA, ICH, PRES
  - Retina – Hemorrhage, exudates, papilledema
  - Heart – ACS, ADHF
  - Large vessels - Aortic dissection
  - Kidney – AKI
  - Microvasculature - MAHA

Evaluation and Management of Hypertensive Emergencies

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- **Classification and clinical manifestations**
- ***Evaluation***
- **Therapeutics**

Evaluation and Management

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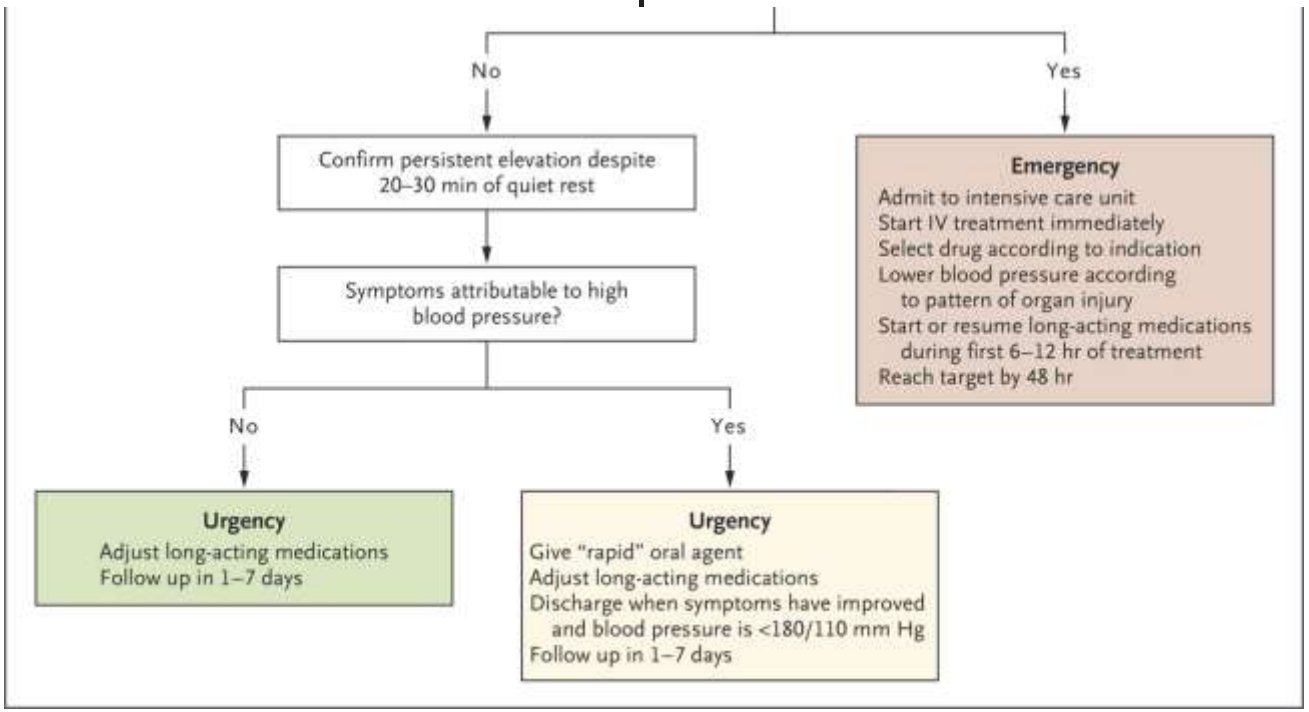
Blood pressure >180/110–120 mm Hg, reproducible on multiple measurements with an accurate device



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Assess Precipitating Factors

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- **Nonadherence to anti-HTN meds is the most common cause of HTN urgency and emergency**
- **Other common precipitating factors:**
  - **Dietary sodium indiscretion**
  - **Illicit drugs (cocaine, amphetamines)**
  - **NSAIDs**
  - **Pain**
  - **Urinary retention**

Evaluation and Management

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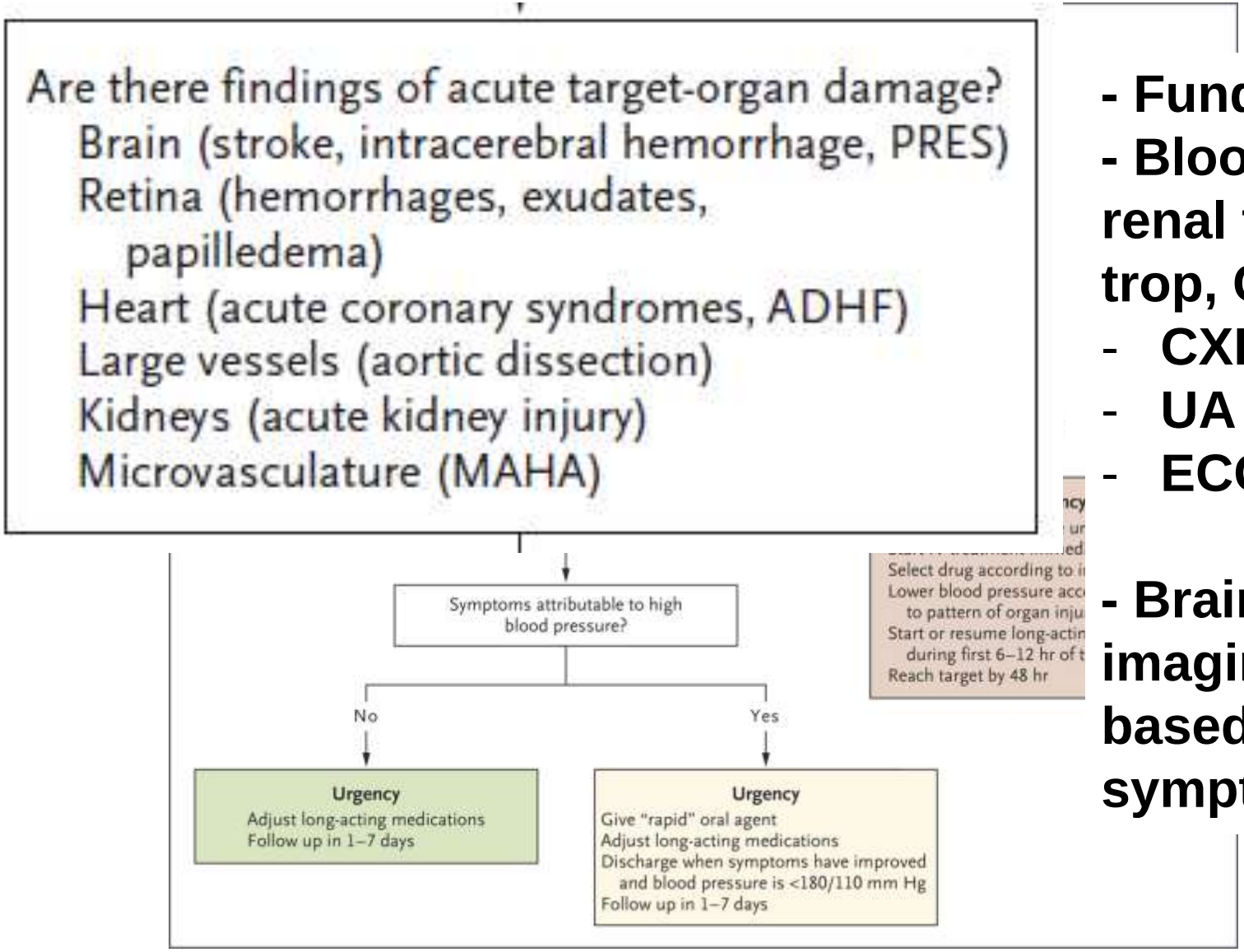

- Fundoscopy
- Blood for renal fxn, trop, CBC
- CXR
- UA
- ECG

- Brain/aortic imaging based on symptoms

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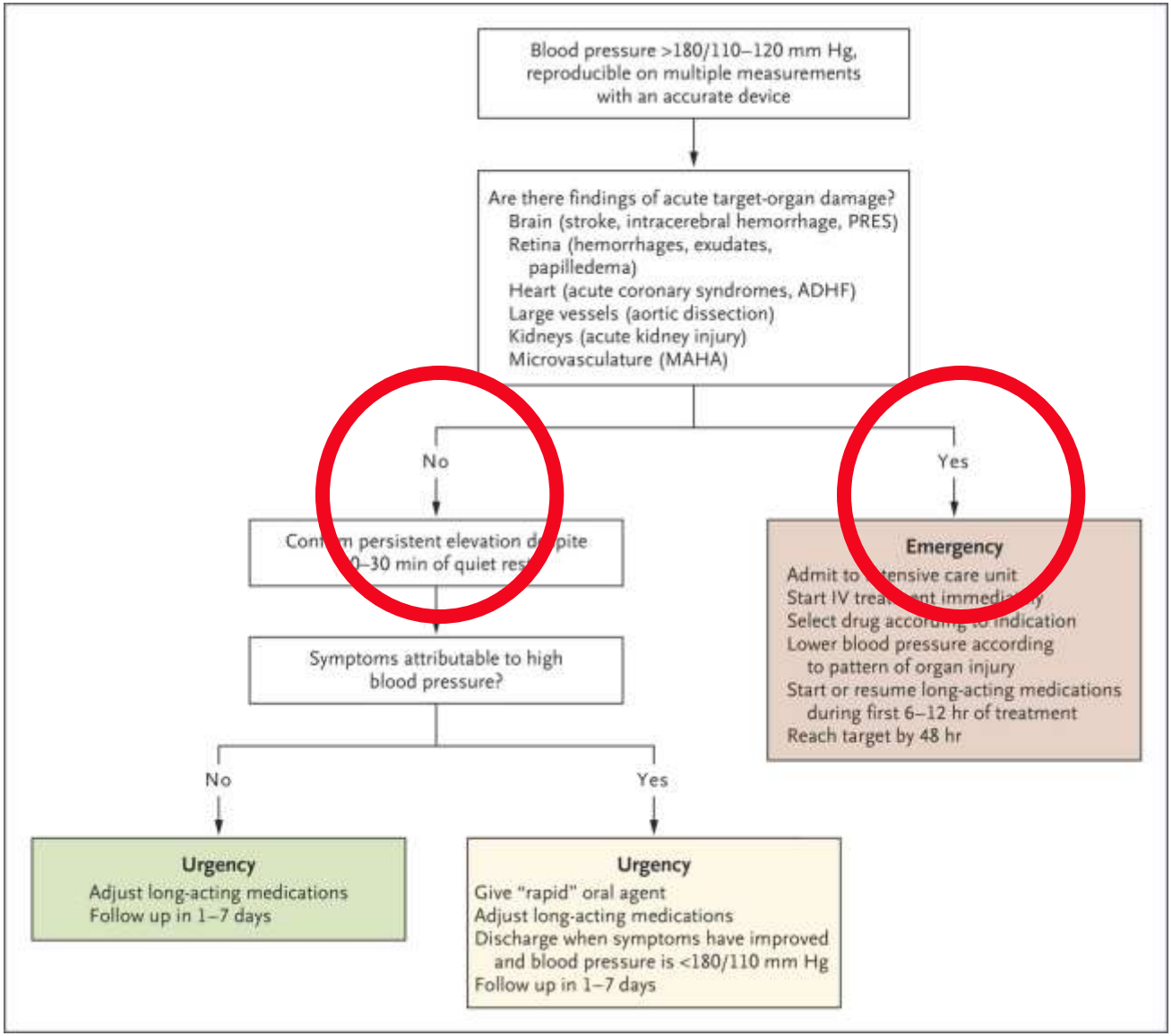

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Evaluation and Management of Hypertensive Emergencies

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- **Classification and clinical manifestations**
- **Evaluation**
- ***Therapeutics***

Autoregulation of Cerebral Blood Flow: Implications for Hypertensive Emergencies

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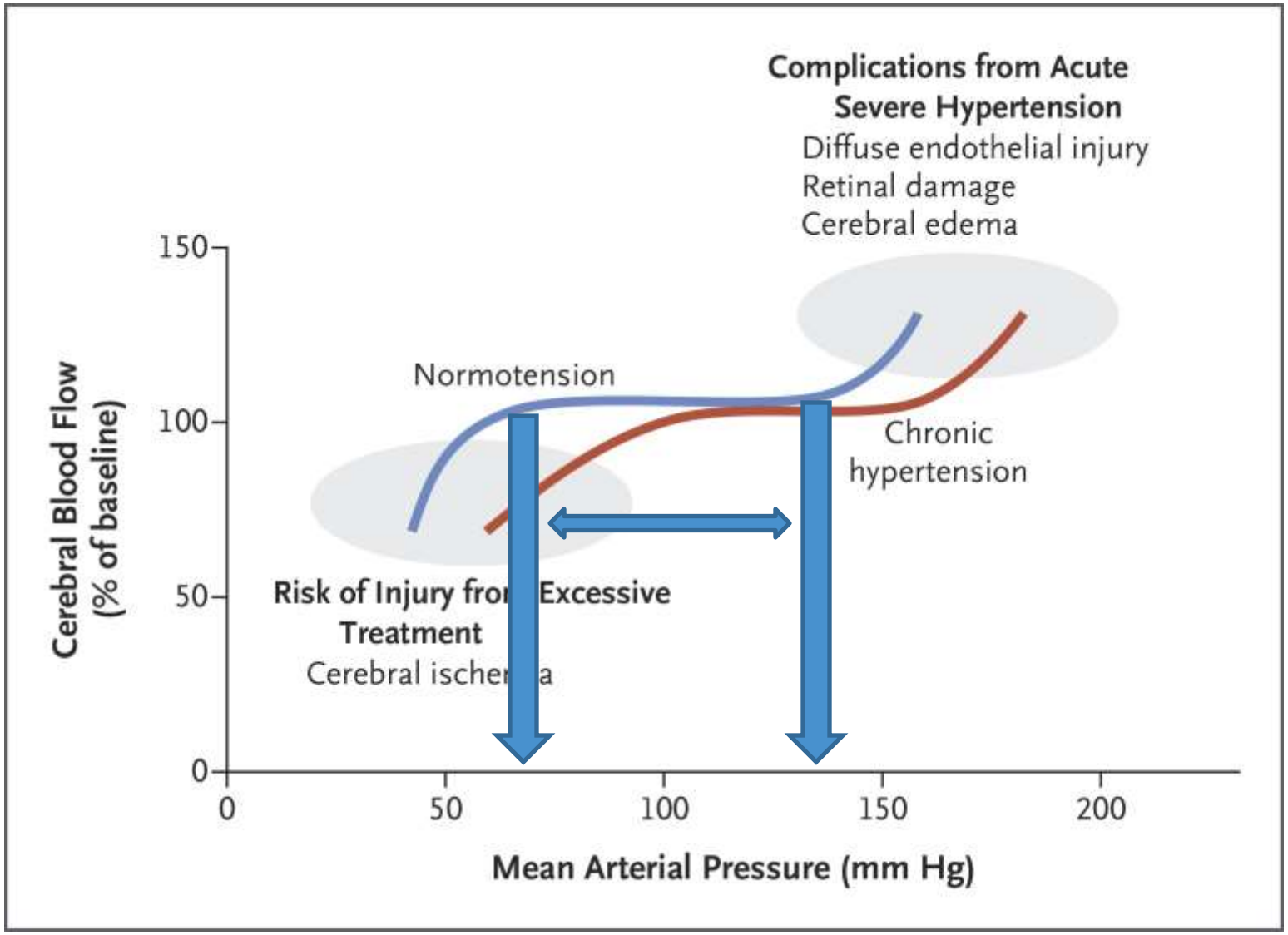

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Autoregulation of Cerebral Blood Flow: Implications for Hypertensive Emergencies

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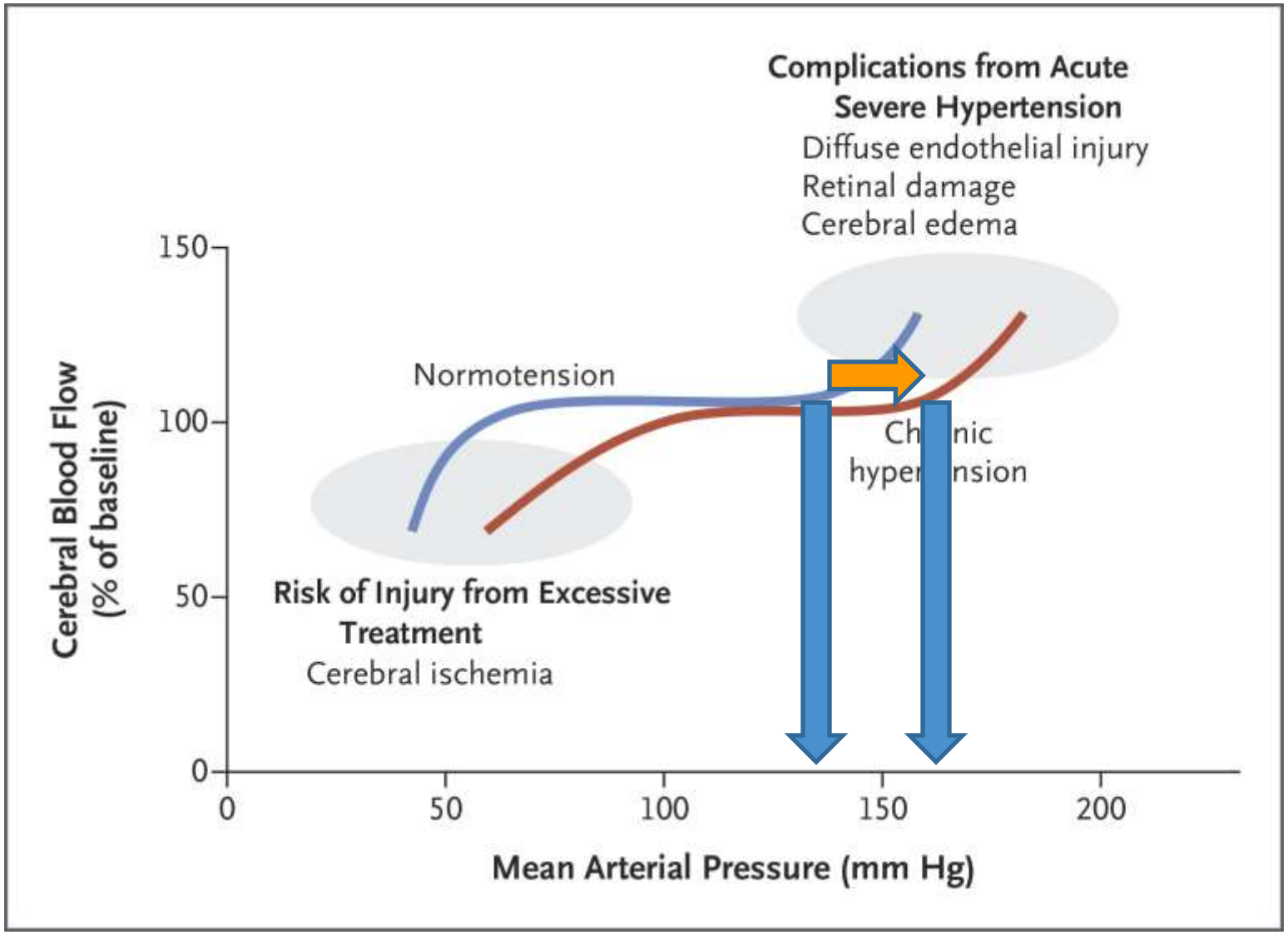

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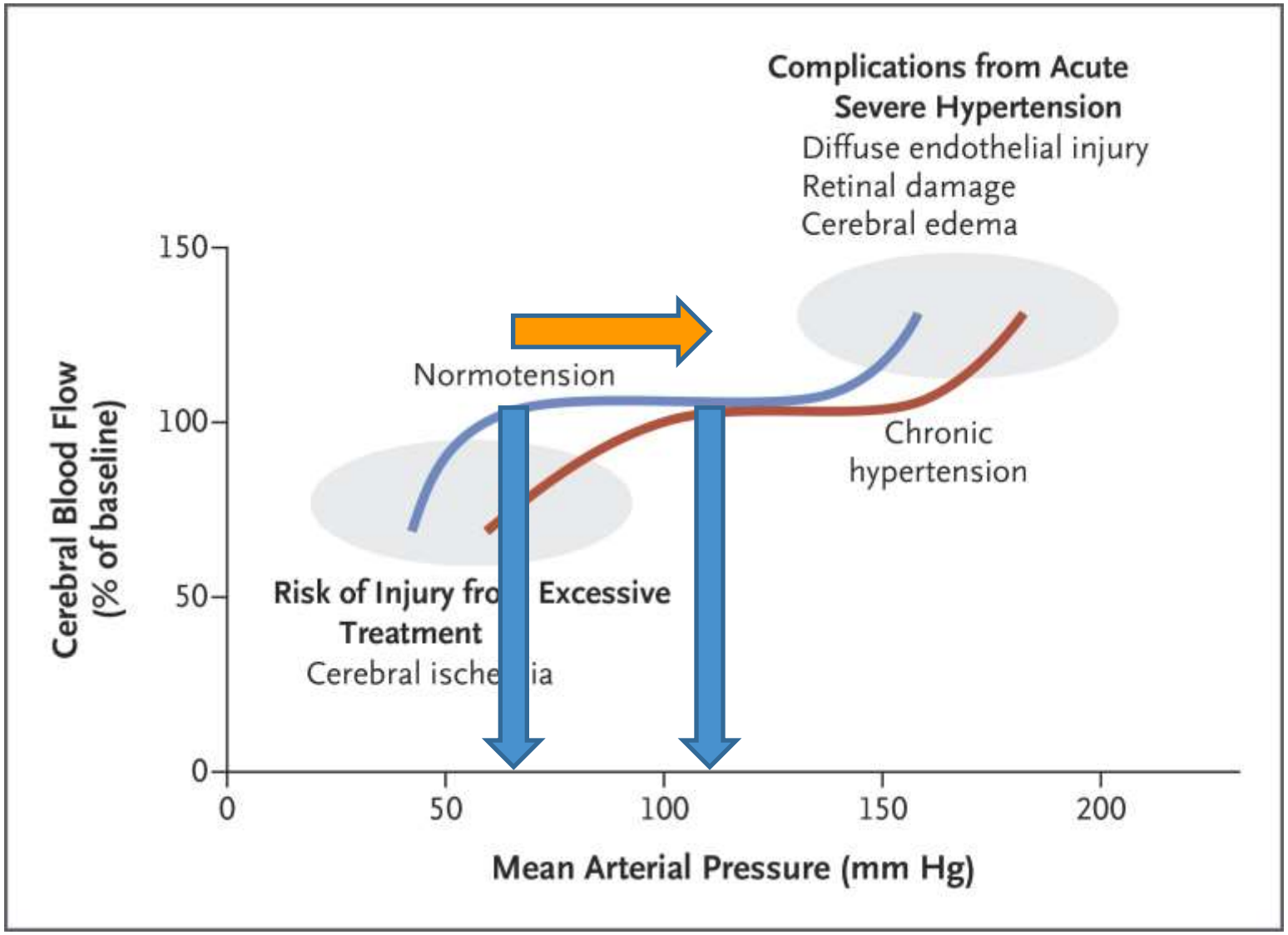

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Autoregulation of Cerebral Blood Flow: Implications Hypertensive Emergencies

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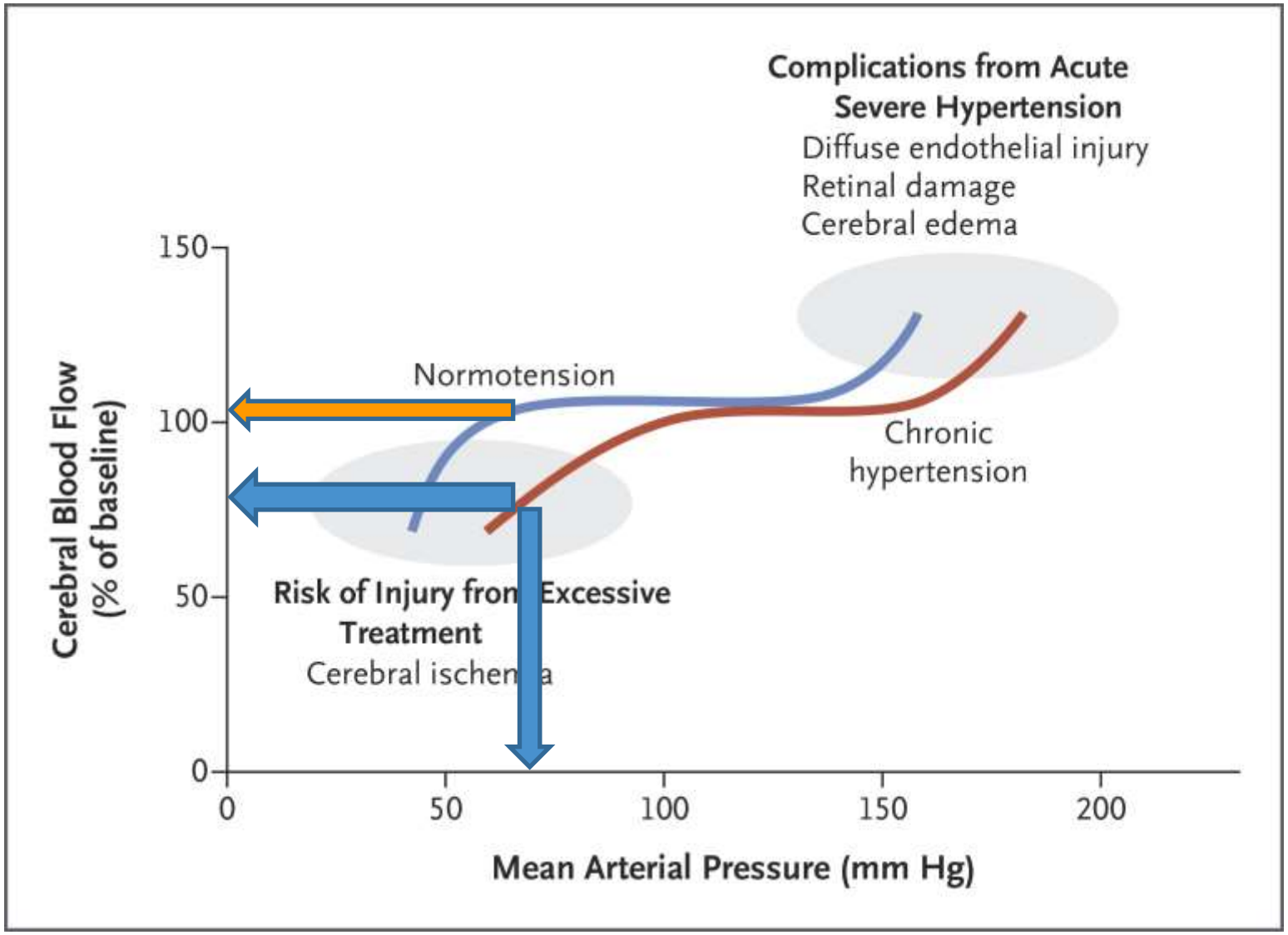

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Evaluation and Management

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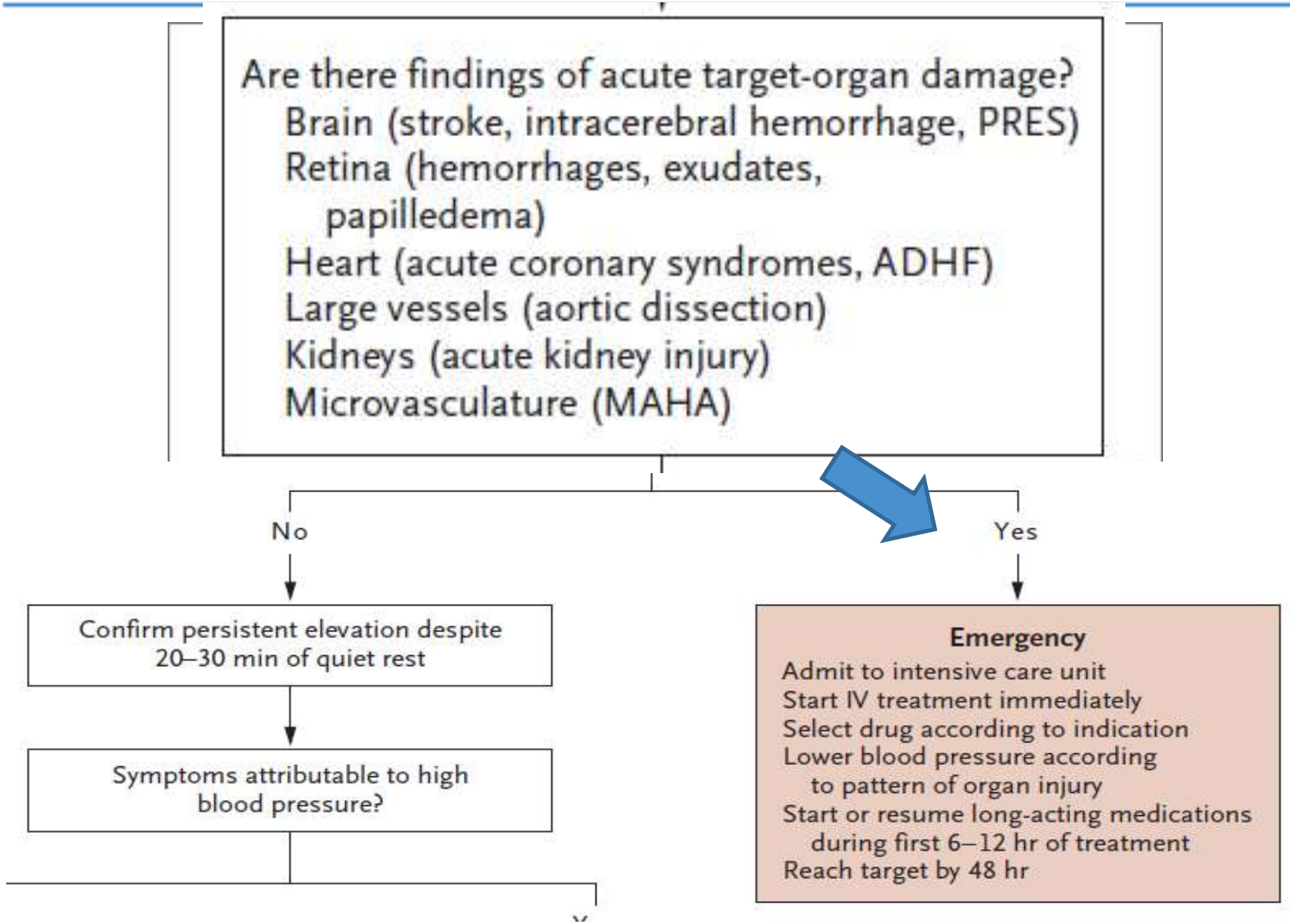

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Treatment Considerations for HTN Emergency

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- Location of treatment
- How to monitor BP
- How fast to lower BP
- What is the target

ACC/AHA/ASH HTN Guidelines 2017

Treatment Considerations for HTN Emergency

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- **Location of treatment**

COR	LOE	Recommendations
I	B-NR	1. In adults with a hypertensive emergency, admission to an intensive care unit is recommended for continuous monitoring of BP and target organ damage and for parenteral administration of an appropriate agent (Tables 19 and 20).[S11.2-1,S11.2-2]

ACC/AHA/ASH HTN Guidelines 2017

Treatment Considerations for HTN Emergency

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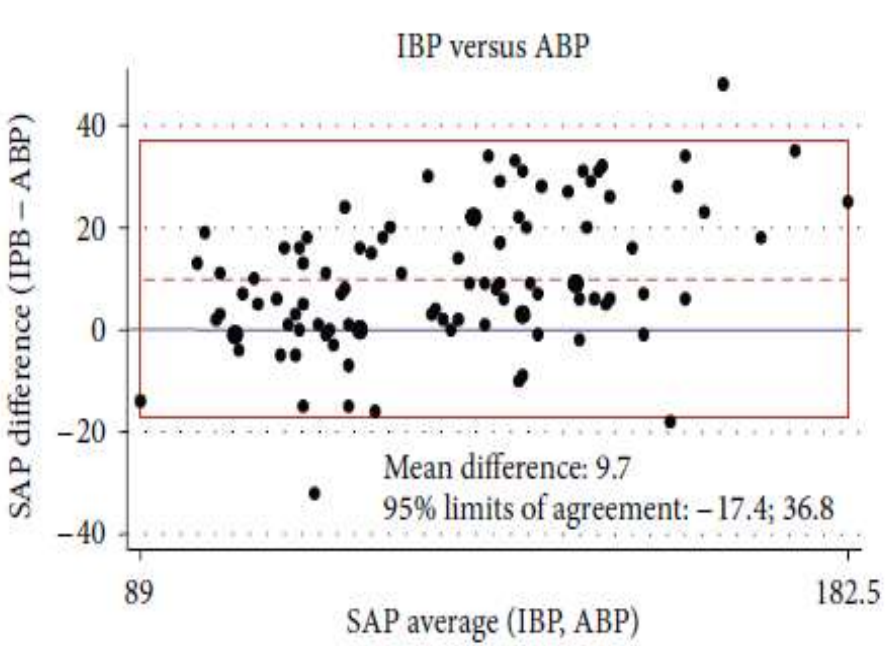
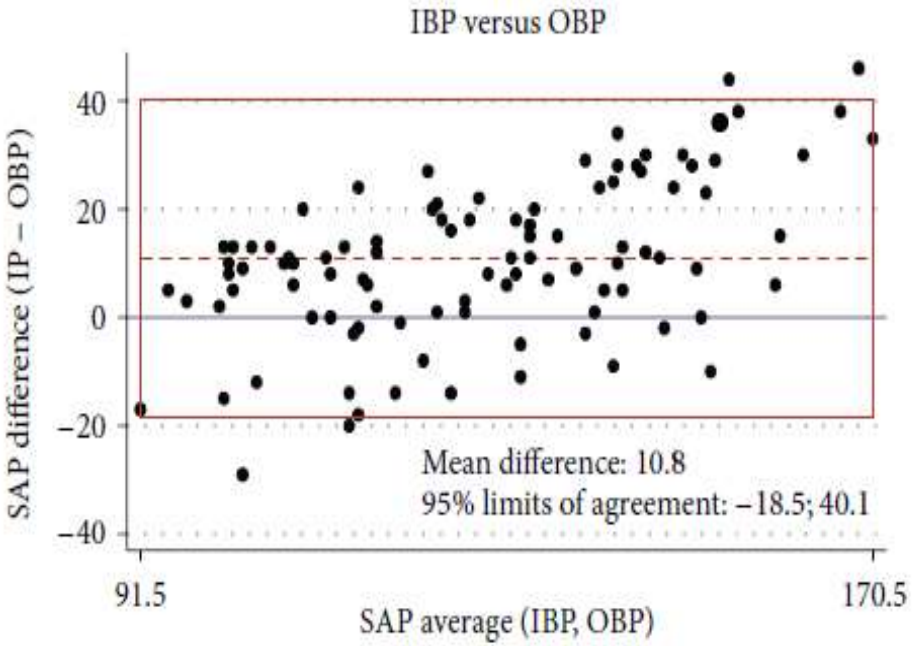
- **Location of treatment**

- **How to monitor BP**





Ribezzo et al. Sci World J 2014

Treatment Considerations for HTN Emergency

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- **Location of treatment**
- **How to monitor BP**

- ***How fast to lower BP***
- ***What is the target***
  - ***Influenced by end-organ involvement***

Treatment Considerations for HTN Emergency

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Acute aortic dissection	Immediately reduce SBP to <120 mmHg AND heart rate to <60 bpm

ESC/ESH HTN Guidelines 2018

I	C-EO	2. For adults with a compelling condition (ie, aortic dissection, severe preeclampsia or eclampsia, or pheochromocytoma crisis), SBP should be reduced to less than 140 mm Hg during the first hour and to less than 120 mm Hg in aortic dissection.

ACC/AHA/ASH HTN Guidelines 2017

Treatment Considerations for HTN Emergency

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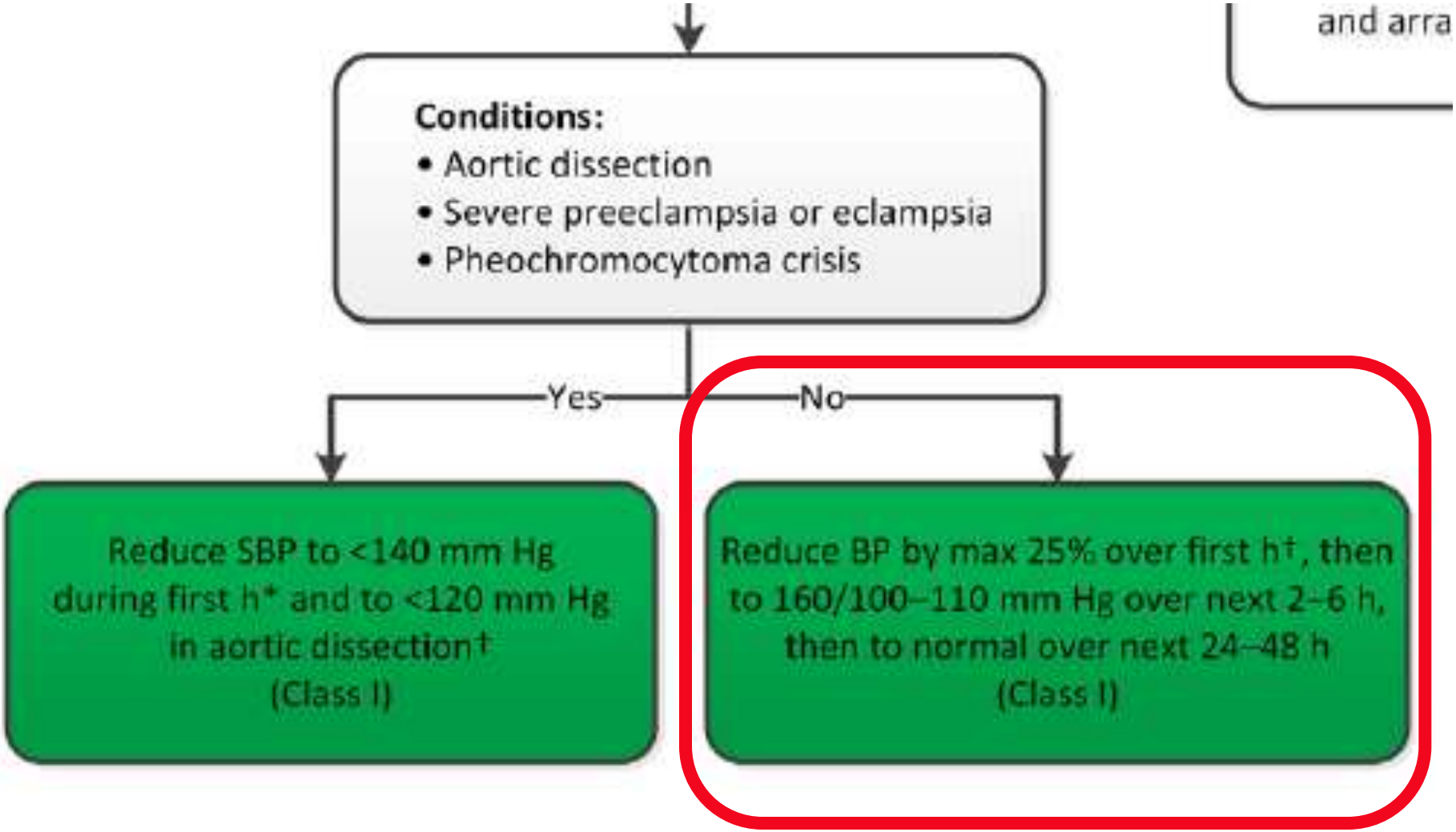

ACC/AHA/ASH HTN Guidelines 2017

Treatment Considerations for HTN Emergency

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Clinical presentation	First-line treatment	Alternative
Malignant hypertension with or without acute renal failure	Labetalol Nicardipine	Nitroprusside Urapidil
Hypertensive encephalopathy	Labetalol, nicardipine	Nitroprusside
Acute coronary event	Nitroglycerine, labetalol	Urapidil
Acute cardiogenic pulmonary oedema	Nitroprusside or nitroglycerine (with loop diuretic)	Urapidil (with loop diuretic)
Acute aortic dissection	Esmolol and nitroprusside or nitroglycerine or nicardipine	Labetalol OR metoprolol
Eclampsia and severe pre-eclampsia/HELLP	Labetalol or nicardipine and magnesium sulfate	Consider delivery

ESC/ESH HTN Guidelines 2018

Treatment Considerations for HTN Emergency

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Table 32 Drug types, doses, and characteristics for treatment of hypertension emergencies

Drug	Onset of action	Duration of action	Dose	Contraindications	Adverse effects
Esmolol	1–2 min	10–30 min	0.5–1 mg/kg as i.v. bolus; 50–300 μg/kg/min as i.v. infusion	Second or third-degree AV block, systolic heart failure, asthma, bradycardia	Bradycardia
Metoprolol	1–2 min	5–8 h	2.5–5mg i.v. bolus over 2 minutes - may be repreated every 5 minutes to a maximum dose of 15mg	Second or third-degree AV block, systolic heart failure, asthma, bradycardia	Bradycardia
Labetalol	5–10 min	3–6 h	0.25–0.5 mg/kg i.v. bolus; 2–4 mg/min infusion until goal BP is reached, thereafter 5–20 mg/h	Second or third-degree AV block; systolic heart failure, asthma, bradycardia	Bronchoconstriction, foetal bradycardia
Fenoldopam	5–15 min	30–60 min	0.1 μg/kg/min i.v. infusion, increase every 15 min with 0.05 - 0.1 μg/kg/min increments until goal BP is reached	Caution in glaucoma	
Clevidipine	2–3 min	5–15 min	2 mg/h i.v. infusion, increase every 2 min with 2 mg/h until goal BP		Headache, reflex tachycardia
Nicardipine	5–15 min	30–40 min	5–15 mg/h i.v. infusion, starting dose 5 mg/h, increase every 15–30 min with 2.5 mg until goal BP, thereafter decrease to	Liver failure	Headache, reflex tachycardia

ESC/ESH HTN Guidelines 2018

Classification and Clinical Manifestations

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- ***Hypertensive Urgency***

- **Hypertensive Emergency**

Evaluation and Management

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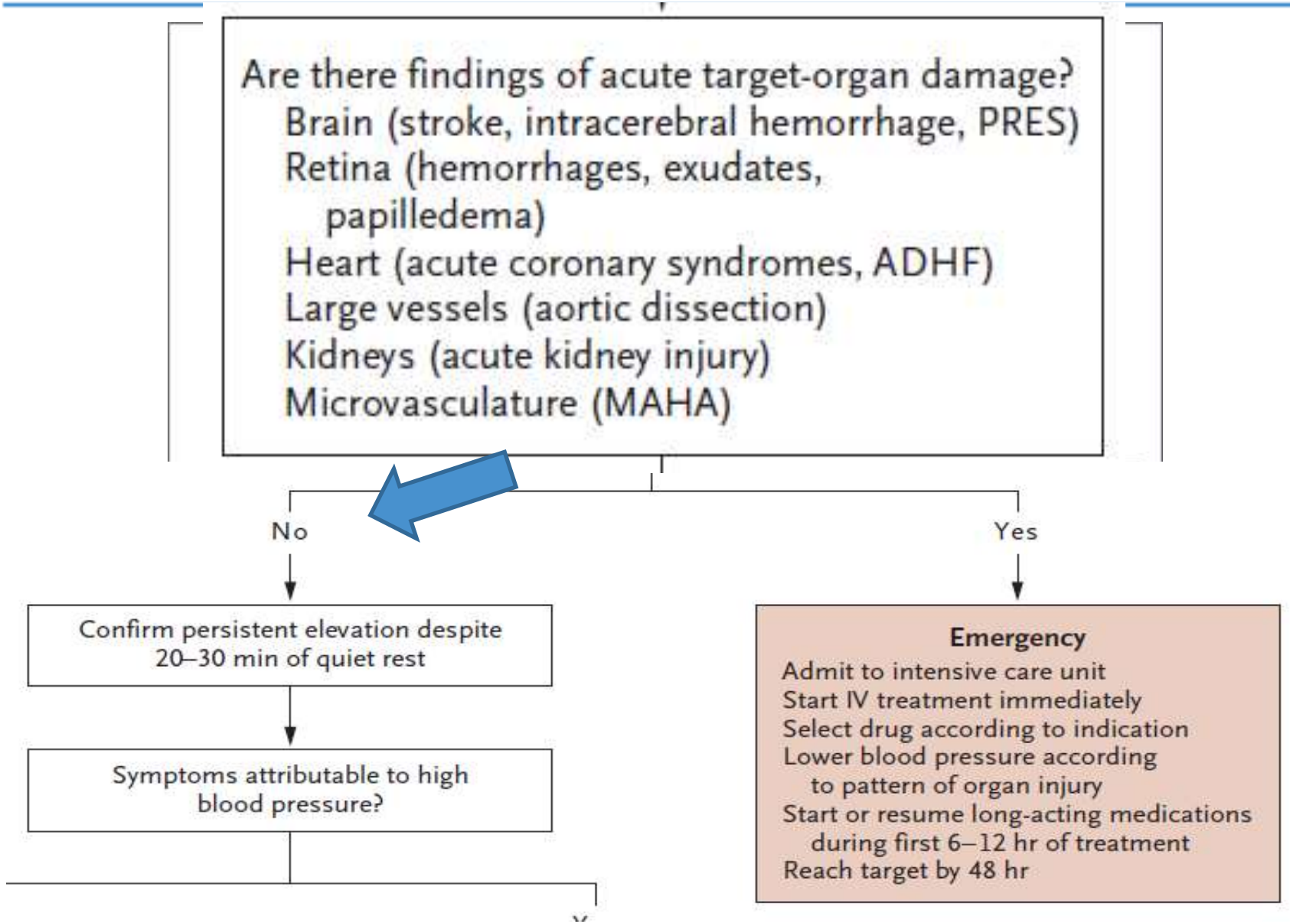

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Management of HTN Urgency

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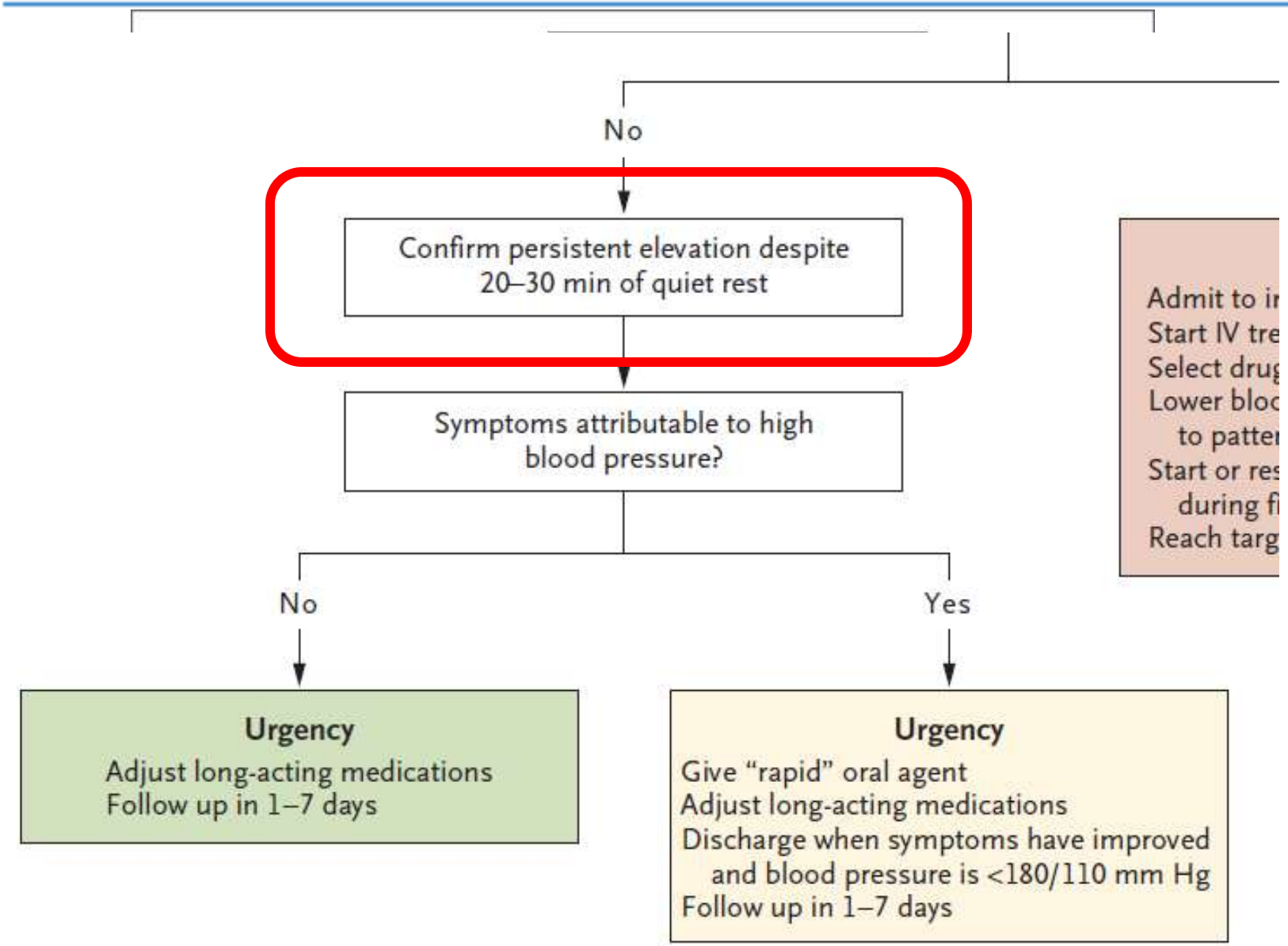

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Management of HTN Urgency

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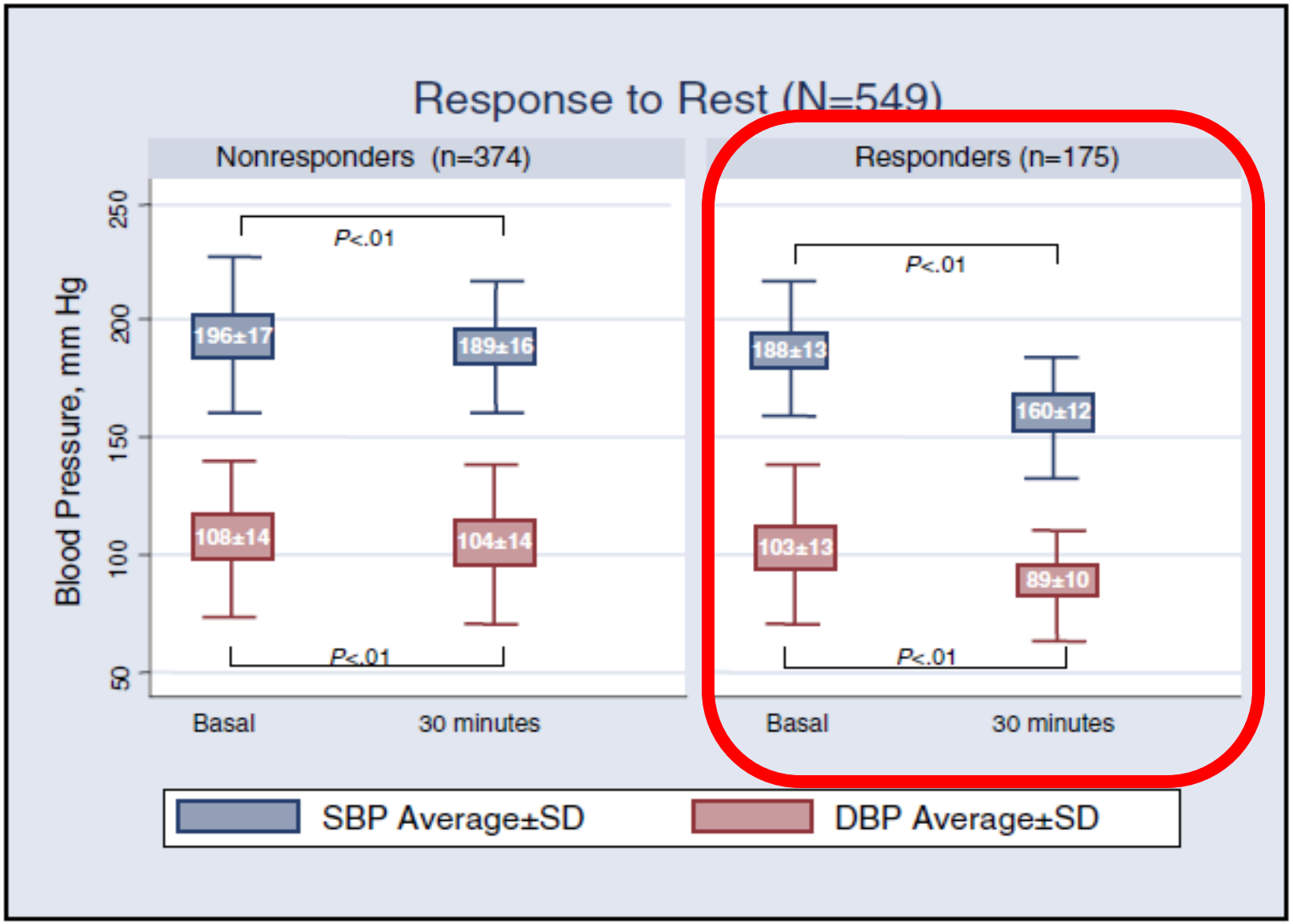

Grassi et al. J Clin Hypertens 2008

Management of HTN Urgency

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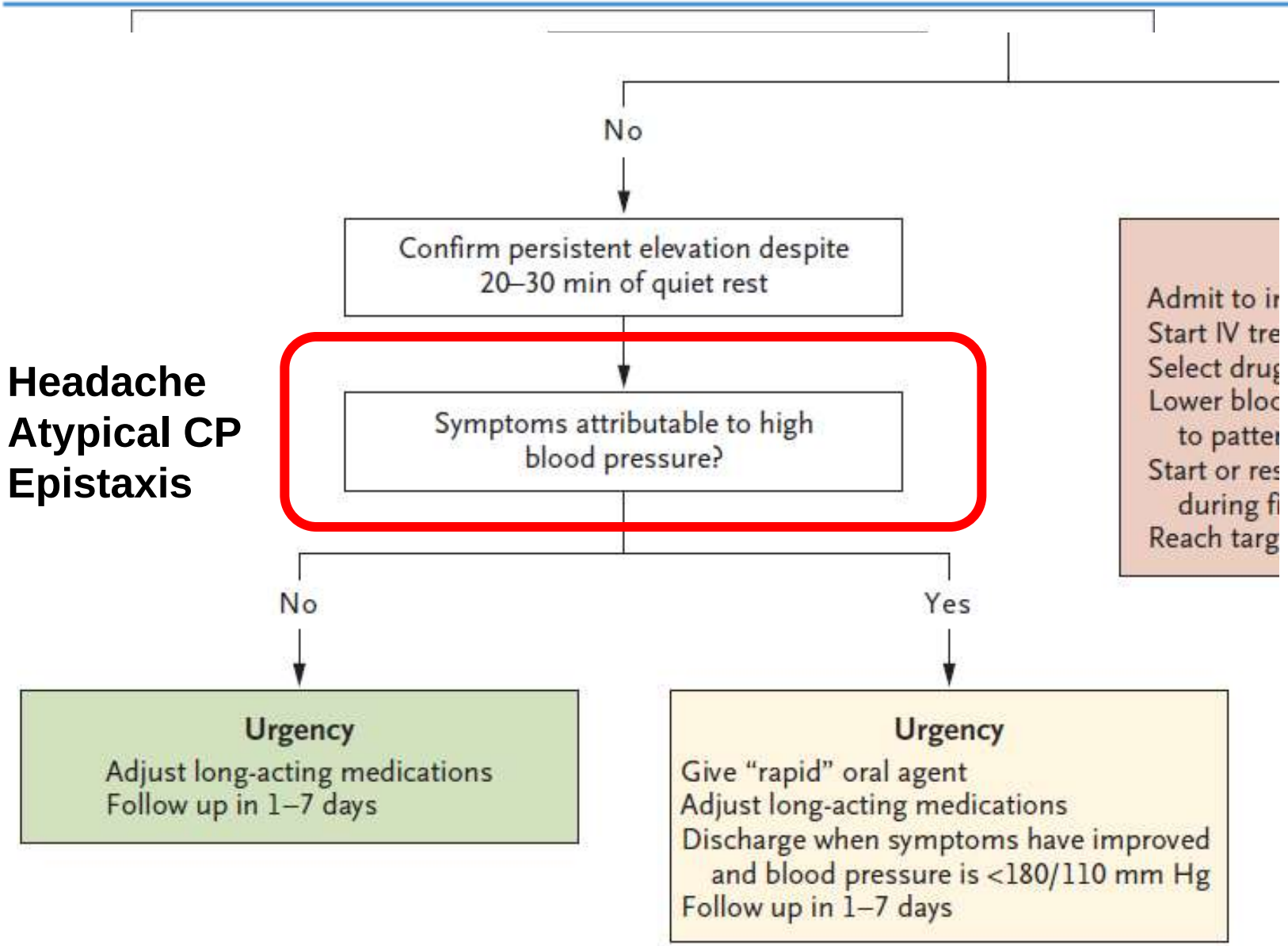
Headache
Atypical CP
Epistaxis



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Management of HTN Urgency

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- **No RCTs to guide management of inform Guideline recommendations**
- **For pts with sx, oral agent with more rapid onset of action:**
  - **Clonidine (0.1 – 0.3 mg)**
  - **Labetolol (200 – 400 mg)**
  - **Captopril (25 - 50 mg)**
  - **Prazosin (5 – 10 mg)**
  - **NTG ointment (1 – 2 inches)**
  - **AVOID po or sl Nifedipine – unpredictable BP lowering may reduce organ perfusion pressure**

Peixoto. N Engl J Med 2019, ACC/AHA/ASH 2017 HTN Guideline, ESC/ESH HTN Guideline 2018

Outcomes Associated with HTN Urgency

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Table 2. Unadjusted Outcomes of Patients With Hypertensive Urgency

Outcome	No. (%) of Patients		P Value[b]
	Referred to Hospital (n = 426)[a]	Sent Home (n = 58 109)	
MACE[c]			
7 d	2 (0.5)	61 (0.1)	.02
8-30 d	2 (0.5)	119 (0.2)	.23
1-6 mo	4 (0.9)	492 (0.8)	.83
Uncontrolled hypertension			
1 mo[d]	349 (81.9)	49 320 (84.9)	.09
6 mo[e,f]	213 (66.6)	24 819 (60.2)	.02
All-cause hospital admission			
7 d	35 (8.2)	2311 (4.0)	<.001
8-30 d	48 (11.3)	3897 (6.7)	<.001

Patel et al. JAMA Int Med 2016

Case Example

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- 58 yo woman with known HTN comes to the ED w headaches and blurred vision for 3 days
- Home meds: amlodipine, HCTZ, and lisinopril, she reports poor adherence, has not taken drugs in 3 weeks
- Average of multiple BP measurements is 242/134 mm Hg, and HR 68 bpm.
- Fundoscopy: arteriolar narrowing, flame hemorrhages, cotton-wool spots, and papilledema
- ECG: LVH, other lab tests and CXR are normal.
- CT head: no hemorrhage or infarction.
- How would you further evaluate and treat this patient?

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Case Example: Recommendations

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- **The pt has acute severe HTN complicated by end-organ involvement (retina), a HTN emergency precipitated by nonadherence**
- **Admit to ICU, immediately treat with continuous IV anti-HTN therapy guided by invasive intra-arterial BP monitoring**
- **Nicardipine or clevidipine and labetalol are the preferred agents**
- **Given her relative bradycardia, nicardipine or clevidipine would be best**
- **Target to lower BP by 20 - 25% in the first hr and to ~ 160/100 mm Hg by 6 hrs**

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Case Example: Recommendations

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- **If good response and relative hypotension does not develop, restart amlodipine and lisinopril**
- **Wean nicardipine/clevidipine over a period of 18 - 36 hours, guided by close BP monitoring**
- **Discharge once sx improve and HTN is controlled for at least 24 hrs without IV therapy, follow-up in office within 1 week**
- **No evaluation for secondary HTN unless BP remained uncontrolled at follow-up**

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