

Management of Accelerated Hypertension (Updated in 2017)

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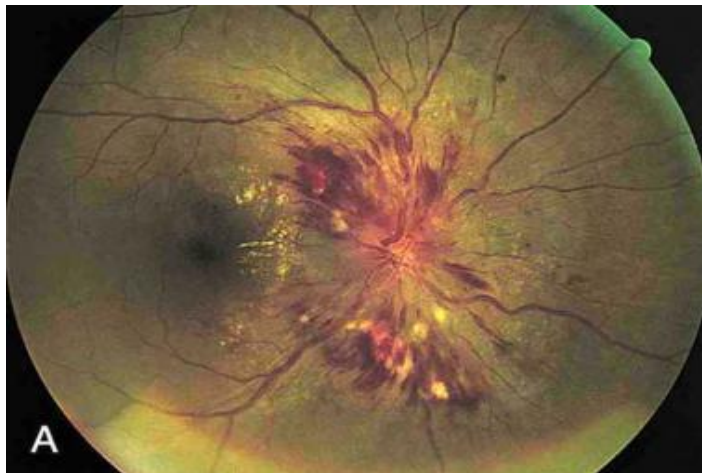
Agenda

- Definition of Accelerated HTN
- Pathophysiology & Etiology
- Prognosis
- Diagnosis & DD
- Management
- Complications
- Guidelines

Definitions

- **Accelerated hypertension** is a recent \uparrow over baseline BP that + target organ damage, + vascular damage on fundoscopic examination, such as flame-shaped hemorrhages or soft exudates, but **without papilledema**
- **Hypertensive Urgency** is systolic BP >220 mm Hg **or** diastolic BP >120 mm Hg with **no target organ damage.**
- **Malignant hypertension** should have papilledema (old)

Papilledema. Note the swelling of the optic disc, with blurred margins.



Definitions

- **Modern" definition for malignant hypertension**

It is hypertensive emergency, in the **absence of retinopathy**, with acute elevated BP + damage to a minimum of 3 different target organs

- Hypertensive emergencies necessitate immediate therapy to decrease BP within minutes to hours.
- In contrast, no evidence suggests a benefit from rapidly reducing BP in patients with hypertensive urgency.

Pathophysiology and Etiology

- **1%** of essential hypertension develop malignant HTN , but the reason is unknown.
- The characteristic vascular lesion is **fibrinoid necrosis** of arterioles and small arteries, which causes the end-organ damage.
- RBC are damaged as they flow through vessels obstructed by fibrin deposition, resulting in microangiopathic **hemolytic anemia**.
- Beyond a mean BP of 110-180mmHg the **autoregulation** (vasoconstriction) of cerebral blood flow is lost → hyperperfusion and cerebral edema, which causes **Hypertensive encephalopathy**.

Pathophysiology and Etiology

- Incidence of malignant HTN and hypertensive encephalopathy has ↑ from 2000 to 2011, but morbidity & mortality have ↓ because of the potent current antihypertensives
- Other causes of malignant hypertension include
 - Any form of 2nd hypertension;
 - Complications of pregnancy;
 - Drugs as cocaine, monoamine oxidase inhibitors (MAOIs), or oral contraceptives; and the withdrawal of alcohol, beta blockers, or alpha stimulants

Prognosis

- Before the advent of effective therapy, the life expectancy was **< 2 years**, deaths result from stroke, renal failure, or HF.
- The survival rate at 1 year was < 25%, and at 5 years, < 1%.
- However, with current therapy, including **dialysis**, the survival rate at **1 year is > 90%**, and **at 5 years = 80%**.

Prognosis

- After multivariate analysis, the only significant risk factor was the **mean proteinuria value** during follow-up.
- The chances of renal survival in patients with a mean proteinuria value **< 0.5 g/24 hr** were 100% at 5 years and 95% at 10 years.
- **Age**, baseline **creatinine** level, and follow-up **systolic BP** to be independent predictors of survival.

Accelerated Hypertension Clinical Presentation

- History
- Physical Examination
 - A thorough physical examination should be conducted, with the focus on the
 - a) cardiovascular and
 - b) central nervous systems and on
 - c) the retinal examination

Differential Diagnoses

- Acute Kidney Injury
- Aortic Dissection
- Eclampsia
- Hyperthyroidism
- Renal Artery Stenosis
- Thrombotic Thrombocytopenic Purpura (TTP)
- Aortic Coarctation
- Chronic Kidney Disease
- Hypercalcemia
- Pheochromocytoma
- Subarachnoid Hemorrhage

Accelerated Hypertension Management

a) Laboratory Studies

- CBC count
- Electrolytes (including calcium),
- Blood urea nitrogen (BUN), creatinine, glucose,
- urinalysis.
- Other laboratory studies
 - Measurements for cardiac enzymes,
 - Urinary catecholamines, & vanillylmandelic acid (VMA) and
 - Thyroid-stimulating hormone (TSH)

Accelerated Hypertension Management

b) Imaging

- Chest X-ray for
 - Cardiac enlargement & pulmonary edema,
 - Rib notching with aortic coarctation
 - Widened mediastinum with aortic dissection.
- Brain CT
- TEE, and
- Renal angiography, are indicated only as directed by the initial diagnosis.
- ECG and Echocardiography

Accelerated Hypertension Management

c) Approach Considerations

- Patients are admitted to an ICU for
 - Continuous cardiac monitoring,
 - Frequent assessment of neurologic status and
 - Assessment of urine output, and
 - Administration of IV antihypertensive medications and fluids.
 - Patients typically have **altered BP auto-regulation**, and overzealous reduction of BP to reference range levels may result in **organ hypoperfusion**.

Accelerated Hypertension Management

d) Pharmacologic Therapy

- The initial goal is to reduce the mean arterial pressure by **25%** over **24-48 hours**.
- An intra-arterial line is helpful for continuous monitoring of BP.
- Na and volume depletion may be severe, and **volume expansion** with isotonic sodium chloride solution must be considered.
- Secondary causes of hypertension should be investigated.

Accelerated Hypertension Management

d) Pharmacologic Therapy

- No trials exist comparing the **efficacy** of various agents
- **Nitroprusside** is the most commonly used IV drug.
- **Fenoldopam** An alternative for patients with renal insufficiency
- **Labetalol** is another common alternative, providing easy transition from IV to oral dosing.
- **Nicardipine**) IV calcium blockers seemed more effective than IV labetalol.

Accelerated Hypertension Management

d) Pharmacologic Therapy

- Esmolol or Metoprolol IV Beta-blockade
- Diltiazem, Verapamil, and Enalapril. Are also available IV
- Hydralazine is reserved for use in pregnant patients,
- Phentolamine is the drug of choice for a pheochromocytoma crisis.
- **Oral Medications** should be initiated as soon as possible in order to ease transition to an outpatient setting.

Accelerated Hypertension Management

e) Surgical Care

- **Implantation of a Carotid Baroreflex Stimulator.**
- Early phase III results from the **Rheos Pivotal Trial** on continuous carotid baroreceptor pacing for resistant hypertension with a first-generation device were equivocal on safety and efficacy,
- **Miniaturized Second-Generation Devices** The initial results appeared promising in patients with heart failure.

Patient Education

- Patients must be taught
 - An appropriate **diet** for long-term management, which is low in salt, rich in K, vegetable and fruits & induces weight loss (Dash Diet)
 - Upon discharge, patients should know the **Signs & Symptoms** that should prompt immediate notification of a physician
 - Also know the proper dosing and adverse effects of their medications.

Activity, Prevention & Consultation

- Activity is limited to **bedrest** until the patient is stable & resume **normal activity** as outpatients once BP has been controlled.
- The best way for prevention is the close outpatient follow-up for HTN treatment
- In patients with stroke, cardiac compromise, or renal failure, an **appropriate consultation** should be considered.

Complications

- Properly diagnosing hypertensive emergency and urgency is essential to proper triage and treatment;
- **Reducing BP too rapidly** can result in patient organ hypoperfusion, and target organ damage
- Note that enalapril has an unpredictable response in hypovolemic patients, uncontrolled drop in BP.
- In addition, all patients should be carefully assessed for secondary causes of hypertension,

Guidelines

JNC-7 (2003) &ESH/ESC (2013) Guidelines

- JNC-7 (2003) recommended to reduce the **mean BP** by no more than **25%** within **minutes to 1 hour**.
- If the patient is stable, BP should be reduced to **160/100-110 mm Hg** within the next 2-6 hours.
- **Short-acting nifedipine** should **not** be considered for the initial treatment because of the risk of rapid, unpredictable hypotension and ischemic events
- Once the patient's condition is **stabilized**, BP may be gradually reduced over the next **24-48 hours**.

American College of Emergency Physicians (ACEP) Guidelines (2013)

- In ED patients with **asymptomatic** markedly elevated BP, routine screening for **acute target-organ injury** (eg, serum creatinine, urinalysis and ECG)
- Screening for an elevated serum **creatinine level** may identify kidney injury that may need hospital admission
- Patients with **asymptomatic** markedly elevated BP should be referred for **outpatient** follow-up (consensus recommendation)

Conclusions

- Accelerated HTN = Malignant HTN = Hypertensive Emergency & defined as recent \uparrow in BP + Target Organ Damage
- Patients should be admitted to ICU & receive IV antihypertensive drugs
- Only 25% reduction of BP in 24-48h
- Saline perfusion to correct hypovolemia & hyponatremia
- Meticulous Follow-Up for BP & continuous use of adjusted oral antihypertensives to avoid recurrence

Thank you