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 ↑ over baseline BP that + target organ damage, + vascular damage on funduscopic 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 2H 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.

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

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,

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) 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.


- 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 ↑ 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