

# Intraoperative Hypertension

An increase in BP >20% of patient's baseline. Hypertensive urgency is SBP>180/DBP>120, and hypertensive emergency is BP>180/120 with evidence of end organ dysfunction. A potentially life threatening emergency that requires simultaneous diagnosis and treatment.

## ANESTHETIC CONSIDERATIONS:

- **Etiology**
  - **Preload: full**
  - **Contractility: increased**
  - **Afterload: increased**
    - Pain
    - Awareness
    - Bladder distention
    - Underlying disease
      - Essential HTN
      - CNS: increased ICP (SAH, ICH), CVA, post CEA hypertension
      - CVS: aortic dissection, acute LV failure, acute MI, essential HTN
      - GU: acute or chronic renal failure, renovascular disease, renal parenchymal disease and ESRD
      - Endocrine: pheochromocytoma, hyperthyroidism, hyperadrenalism (Conns), Cushings (hypercortisolism)
      - Obstetrics: PIH
      - Drugs: cocaine, vasopressors, MAOIs, ketamine, withdrawal syndrome (discontinuation of alpha blockade, beta blockade)
- **Prevention**
  - Careful pre-operative assessment
  - Rule out awareness and pain (deepen anesthetic, administer analgesic)
  - Anesthetic plan to prevent hypertension (in patients at risk)
  - Ensure euolemia prior to induction
  - Continue perioperative anti hypertensive therapy if hypertensive preoperatively
- **Manifestations**
  - Isolated hypertension
  - End organ dysfunction:
    - CVA
    - Hypertensive encephalopathy
    - papilledema
    - Major vascular dissection
    - MI
    - CHF
    - Renal failure
- **Management**
  - Possible emergency situation, simultaneous diagnosis and treatment
  - Increase FiO<sub>2</sub> to 100%, notify surgical team, ask for help
  - Recycle NIBP and reevaluate vitals
  - Treat suspected underlying cause while ruling out other possibilities
  - Rapid titration of anti hypertensive agents if manifestations of end organ dysfunction
    - Do not correct >25% of preoperative value
    - Loose goal is DBP ~100-105mmHg

## ANESTHETIC GOALS:

- Simultaneously diagnose and treat a potentially life threatening emergency.
- Prevention and detection of early manifestations and sequelae

## ETIOLOGY

- H. Increased preload
  - Hypervolemia
    - A. Iatrogenic (excessive fluid administration)
    - B. Nephrotic syndrome
    - C. Na retention and resultant H<sub>2</sub>O retention
- I. Increased contractility
  - Inotropic therapy
- J. Increased afterload/SVR
  - Sympathetic stimulation
    - A. Pain
    - B. Bladder distention
    - C. Anesthetic awareness
    - D. Underlying comorbidities (see list above)

## HISTORY AND PHYSICAL

- Confirm results – repeat vital signs, check level of transducer
- Check for tachycardia vs bradycardia as affects DDx (hypertension and bradycardia – rule out increased ICP)
- Check for ssx intraoperative awareness and/or pain
  - Tearing
  - Movement
  - Diaphoresis
  - BIS monitor (controversial!) / EEG
  - Response to deepening anesthetic and/or administration of analgesia
- Pre-op hematocrit
- CVP if available

- Foley output or bladder palpation
- Manifest as:
  - Mental status changes
  - Visual changes
  - Hemiplegia and ICH (hemorrhagic CVA)
  - Chest pain and acute MI
  - Acute CHF
  - Pulmonary edema
  - Oliguria and renal failure
  - Abdominal pain

#### MANAGEMENT

##### Pre-op

- Correlate art line with NIBP early
- Administer antihypertensives pre induction as necessary (esp prior to stimulation i.e. laryngoscopy)

##### Intraop

- Anticipate stimulating events intraop:
- Ensure adequate oxygenation/ventilation to maximize end organ O<sub>2</sub> delivery
  - Switch to 100% FiO<sub>2</sub> if severe hypotension
- Verify true hypertension
  - Palpate pulses
  - Do NIBP measurement
- Examine patient
- Turn off vasopressors (if applicable)
- Consider antihypertensive medications (labetalol, hydralazine, nitroglycerin, nitroprusside)
- Correct underlying cause
  - ABG for acidosis, electrolyte abnormalities, anemia, etc.; ECG for arrhythmia or ischemia; consider TEE

#### COMPLICATIONS

- End organ dysfunction
  - CNS: CVA, ICH, papilledema, hypertensive encephalopathy
  - CVS: acute MI, CHF – systolic or diastolic dysfunction, aortic dissection
  - GU: renal failure and oliguria
  - GI: splanchnic hypoperfusion and abdominal pain

#### REFERENCES

- Miller 7<sup>th</sup>, Kaplan 5<sup>th</sup>
- UpToDate: hypertensive urgency and emergency