Peri Operative Hypertension- A Review

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Abstract
Peri operative blood pressure variation are common phenomenon during elective and emergency surgical interventions. Hypertension may be diagnosed, for the first time, during peri operative period. Risk factors like anxiety, stress, medications, smoking and alcohol can produce fluctuations in BP readings. During, Peri operative period, BP reading can reach, alarmingly high, causing acute target organ dysfunction and complications. A thorough assessment and timely medications can influence good prognostic outcome in this group. Also this group, require periodic follow up for possible, transformation to Essential hypertension.

Introduction
Blood pressure variability is a common phenomenon during peri operative period, especially pre operative period. Often the physicians are sought for management of high blood pressure in these groups. The blood pressure variability can reach up to Systolic BP of ≥ 200 mm of Hg and diastolic BP of above 100mm of Hg. So these patients are under risk for the acute target organ dysfunction which can involve heart, kidney, CNS and retina. These patients need thorough assessment and timely medication to prevent complications.

Risk Factors
Primary HT
Anxiety, depression
Smoking, Alcohol
Sleep disturbances
Drugs-- Sympatho mimetics like pseudo ephedrine, Xylo metazoline
Clonidine withdrawal, Erythropoietin
NSAIDS. Steroids
Drugs abuse—Cocaine, Amphetamine

Pathogenesis
Increased Systemic vascular resistance plays important role in peri operative HT. Catecholamine surge, vasomotor reactivity during peri operative period may be responsible for blood pressure variability. Rebound hypertension may be important factor in certain cases of post operative patients. Certain surgeries are likely to encounter acute hypertension. These include:

Incidence
25% of patients undergoing noncardiac surgery may be under risk for peri operative hypertension. High blood pressure may be noticed or diagnosed for first time in some these individuals
cardiac surgery, major vascular surgery (eg, carotid endarterectomy, aortic surgery), neurosurgery, head and neck surgery, renal transplantation, and major trauma (ie, burns or head injury).
Renin angiotensin aldosterone system (RAAS) has considerable influence on BP Changes during peri operative period.
Environmental influences like, physical inactivity, low potassium and calcium intake can contribute for development of Hypertension.

Assessment
These patients require thorough clinical history and examination. Target historical issues for above potential risk factors. Essential hypertension may be identifiable for the first time during admission for surgical procedures. Also to look for pre exiting hypertension related target organ effects like left ventricular hypertrophy, retinopathy and renal dysfunctions. Also It is advisable to look for prior patient medical records for BP variations, recordings and medications. The concept of White coat hypertension is unclear. It can influence us for possibility of initiation of treatment with antihypertensive medications. Whether white coat hypertension, progresses to develop true Essential HT or not, is unclear. It needs larger study to conclude on this issue. Ambulatory blood pressure monitoring may be useful in this group of patients regarding presence of persistence of high Blood pressure. Also, It’s unclear regarding the duration of therapy for this category of HT. Reassess and re record the Blood pressure readings with proper sized cuff and comfortable position. Periodic BP monitoring at regular interval of 2-4 hourly is useful.
ECG AND 2 D ECHO are helpful for defining presence of LVH and Ventricular function assessment. Renal function test s are helpful for assessing for possible renal impairment.

Complications
The BP variability can produce hemodynamic changes in peri operative patients. Some of the complications include

Cardiac
Acute coronary syndrome (ACS)
Arrhythmias
Acute Left ventricular failure

Hypertensive crisis
Blood pressure variability can go upto the ranges of 200 systolic and above and diastolic pressure of 120 and more. Hence persons can be exposed to risks of target organ dysfunction like ACS, Cerebro vascular accidents (CVA), Acute kidney injury, and arrhythmias.

Non cardiac
Bleeding from operative sites
Renal impairment

Anxiety and sleepless can be issues in certain patients.

Management
It is necessary to look for reversible factors and correct these issues before surgery. With hold or delay the initiation of antihypertensive drugs, unless person is in hypertensive crisis and persistent high Blood pressure. Its essential to inform the patients to abstain from smoking, Alcoholism and inadvertent intake NSAIDS during preoperative period.

Non pharmacological therapy
Exercise, Relaxation, counselling and meditation have some influence of normalizing BP and its variations.

Pharmaco therapy
Beta blockers- beta blockers are sympatholytic drugs and hence reduce heart rate, anxiety, sudden death and overall mortality. Short acting Beta blockers like Propranolol (40-160mgs), Metoprolol (12.5 -25 mgs) in divided dosage are useful for good control of BP. These drugs are required to be continued for short time 2-4 weeks and reassess for BP status and drug requirement
Labetalol can be option in patients showing markedly elevated BP (>180/110mm of Hg) readings².

**Centrally acting Adrenergic agonist –** Clonidine (0.1 mgs, in divided dosage) is of considerable benefit in many of resistant cases of uncontrolled blood pressure patients. Many patients tolerate the procedure well, without any complication during peri operative period. side effects⁵ of these include somnolence, dry mouth, and rebound hypertension on withdrawal.

**Benzodiazepines**
Alprazolam (0.25 -1 mgs), Clonazepam (0.5 – 2 mgs) are helpful for relieving anxiety and stress. These drugs need to be continued for short period (1-2 weeks) during, peri operative period.

An approach to high blood pressure status during peri operative period

**Blood pressure > 140/90 (multiple)**

- Known Esst HT
  - yes
  - initiate anti hypertensive drugs
  - Beta blockers/cal blockers
  - /central α adrenergic diuretics
  - re record/periodic recording BP
  - look for anxiety/stress/sleep
  - present
  - manage anxiolytics
  - NPT
  - Normal BP

- No
  - persistent High BP
  - yes

**Conclusion**

Peri operative blood pressure variations are notable events both in normotensive and hypertensive groups. So optimum control of blood pressure and risk factors can influence the better prognostic outcome in this group.

**References**

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Abbreviations
BP- Blood Pressure
LVH - left ventricular hypertrophy
CVA - Cerebro vascular accident
ACS- Acute coronary syndrome
NPT- Non pharmacological Therapy
ABPM- Ambulatory blood pressure monitoring
CNS- Central nervous system
Esst HT- Essential Hypertension