Analytics4Medicine

To better: Define, Diagnose, Measure, and Manage Hypertension

Hypertension Clinical Decision Support Tool

Analytics4Medicine- because in science truth is a moving target
Questions

Is elevated BP a sign, a definition or a diagnosis of Hypertension (HTN)?
  When and where is elevated BP significant?
  Are office-based BPs the best measurement for diagnosis and follow-up?
  What is uncontrolled HTN, apparent resistant HTN, resistant HTN, masked HTN?

Is Hypertension a definitive diagnosis?
  Is it a Singular Disease?
  If not, does it require a different nosology (disease classification)?

Why can one group have 2-3X the stroke rate with the same level of BP?
  Do renin and aldosterone matter?  Is BP level or renin/aldosterone level more important?

Most of us think HTN is easy to manage, if only the patients would take their meds.
  Why is the control rate 48.3% in the US?  Is it unimportant?  ……
Is Hypertension Important or not?

Overview:
1. Common Problem (103.3 Million people in US)
2. Significant Morbidity/Mortality (500,000 deaths/year)
3. Expensive ($318 - $444 Billion/year) ($1,048/hypertensive/year)
4. Consumes a significant amount of provider management time (42 Million visits/year).
5. Poorly Defined (45% mislabeled, 20-22% misdiagnosed)
6. Poorly Managed (only 48.3% are at goal 140/90)
What is usual care?

▪ If the BP is above goal in the office, we have them come back 2 or 3 times
▪ If it remains elevated, we make the diagnosis of HTN and start with lifestyle changes
▪ After that fails, we start a diuretic (Are they the same?)
▪ If that fails, we try in any order ACE, ARB, CCB and add them to maximal tolerated doses following the Guidelines
▪ There is no systematic workup for secondary causes
▪ This approach fails in over half the patients (48.3% controlled)
Where do we go wrong?

1. Definition & Measurement

- An office diagnosis of “uncontrolled HTN” is unreliable
  - Uncontrolled HTN = apparent resistant HTN (aHTN) + true resistant HTN (rHTN)
  - Apparent resistant HTN (aHTN) is white coat HTN (a false +), defined as high in office and normal at home. 20-45% of patients are mislabeled with a problem they don’t have.
  - rHTN is defined as BP over goal on 3 or more anti-hypertensives (one is a diuretic) treated for more than 1 month.

- Once a day measurement misses-
  - 20% with AM masked HTN (false -) normal in office but high at home in AM, and misses 22% with PM masked HTN, normal in AM but high in PM

- Better- Diurnal home BP monitoring- measure twice a day at the peaks of daily BP (8AM-Noon and 4PM -8PM)
DIURNAL BP VARIATION - PEAK BPs

Circadian Variation in Hemodynamics and Catecholamine Levels

G. Bakris MD Medscape Education

*Norepinephrine levels have been reduced by 3.5 times for uniformity of scaling. Adapted from Mulcahy D. Blood Press Monit. 1996;1(suppl 1):S13–S16.
Where do we go wrong?

2. Diagnosis

- HTN is treated as a singular disease
  - If BP is over goal = a diagnosis of Hypertension
  - High BP is a sign – it is not a diagnosis. Primary HTN (Box 5) means you ruled out the other 50 causes.

Better- The 50+ secondary causes or mechanisms of HTN can be systematically sorted out using a 9-category Renin-Aldosterone (RAS) classification system. Laragh 1972
Where do we go wrong??

3. Control

- **Lifestyle issues**
  - Obesity, drugs (oral contraceptives, NSAIDs, alcohol) sedentary lifestyle

- **Compliance / Adherence**
  - Patient & Provider compliance to a relatively asymptomatic problem is suboptimal

- **Diagnostic inertia**
  - Failure to look for secondary causes (>20% of patients)

- **Therapeutic inertia**
  - Failure to increase meds when goals aren’t reached or match mechanism of HTN to drugs

- **Fatigue - a large time commitment**
  - #2 office visit, > 42 Million visits/year, consumes > 14,000,000 provider hours/year

SOLUTION- There is an app for that,

The A4M HTN Clinical Decision Support Tool (CDST)

- Educational Material (for Lifestyle issues)
- Home BP monitoring with automated every 10-day follow up (for better definition, measurement, & compliance)
- Diagnostic Matrix (to systematically sort >50 causes of HTN)
- Drug sequencing algorithm (to match the mechanism of HTN, to the mechanism of action of the anti-hypertensive drugs: Aldosterone Antagonists for hyperaldosteronism. Diuretic sequencing for low renin HTN. ACE for high renin HTN. Amiloride for ENaC disease, etc. (Ref: Egan)
- Templated Virtual Visits (to cut management time > 50%)

The CDST improves Access, Quality & Cost
TeAM-HTN PILOT STUDY- CDST RESULTS

- BP control rates improved from:
  - 0% to 58% in resistant HTN (rHTN) & 76% for uHTN.
- Provider Time Management was reduced by
  - 17% for rHTN & 76% for uHTN (45% had aHTN)
- 45% had abnormal renin or aldosterone levels (Triggers workup)
- Home BP monitoring is critical to define true population rates of control
  - 45% mislabeled with HTN by office measurement (White coat HTN)
  - >20% misclassified as normal with once-a-day measurement (Masked HTN)

TeAM-HTN- Technology Assisted Management of HTN. Military Medicine Oct 2020
CDST ADVANTAGES – The Triple AIM

- **Access** - Reduces Provider Management Time
  - Improves Access for other visits (> 7,000,000 million provider hours/year)
  - Increases Billing for those additional services

- **Quality** - Improves the rates of BP control:
  - Makes the diagnosis - giving Better Outcomes - Happier Patients - Better HEDIS Quality Indicators - Less legal liability

- **Cost** -
  - Reduces CV events: saving $1,048/Hypertensive/year (after 5-10 years)
  - Frees up provider time immediately
  - Potentially lowers drug costs (with progressive single drug elimination)
  - ROI >20:1
ABBREVIATIONS

HTN: Hypertension
aHTN- apparent resistant HTN- White-coat HTN
rHTN- true resistant HTN- uncontrolled on 3 or more meds > 1 month
uHTN- uncontrolled HTN- high BP in the office (aHTN + rHTN)
HEDIS: Healthcare Effectiveness Data & Information Set
ACE: Angiotensin Converting Enz. Inhibitor
AA: Aldosterone Antagonist
ENaC- Epithelial Sodium Channel
ROI- Return on Investment

References:
To schedule a demo or set up a risk-free pilot test

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