Hypertension in Athletes

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Disclosures

None
Objectives

1. Identify the process for evaluating and diagnosis hypertension (HTN) in athletes

2. Discuss non-pharmacologic and pharmacologic treatments of HTN in athletes
Definitions

- 2 or more properly measured BPs, 2 separate visits
- Adult $>18$ yo, $<60$ yo
  - SBP $>140$, DBP $>90$
- Adult $>60$ yo
  - SBP $>150$, DBP $>90$
- Stages
  - Pre-HTN $120-139/80-89$
  - Stage 1 $140-159/90-99$
  - Stage 2 $>160/>100$

JNC8 guidelines
Pediatric HTN

Pediatric Hypertension

- **Normal**: <90\(^{th}\) percentile
- **Pre-HTN**: 90\(^{th}\) to <95\(^{th}\) percentile
- **Stage 1**: 95\(^{th}\) to <99\(^{th}\) percentile plus 5mmHG
- **Stage 2**: >99\(^{th}\) percentile plus 5mmHG
BP and Exercise

- SBP ↑ with endurance + dynamic exercise
  - i.e. running, swimming, soccer practice

- DBP ↑ with static or resistance exercise
  - i.e. weight training, lineman drills

- Sports: most have some combination of both
Epidemiology

- HTN in athletes not well studied
- D1 athletes ~ 3% EBP
  - Obs studies - Football athBP compared with non football ath
    - N=114 ncaa football- 47% pre-htn, 14% stage 1 htn
    - In season weight gain, famhx htn
    - N=504 – NFL vs age matched non-nfl
      - EBP 13.4% vs 5.5%
- Case reports – weight lifters measured at 480/350
  - 31 aortic dissections
PPE

- Primary setting for measuring athletes BP
  - EBP most common CV abnormalities found in PPE’s

- Proper Measurement (ACSM PPE monograph)
  - Obtain 2 BP’s if elevated
  - Properly sized cuff, proper environment
  - Seated, feet on floor, resting ideally for 5 min prior
  - Avoid
    - caffeine 60min prior, smoking 30min prior, 1 hr since exercise
  - Pediatric ath, if elevated in arm, check leg (coarctation)
PPE HPI

- Identify cause of EBP that may be transient
  - Tobacco
  - Caffeine
  - Stimulant Use
  - Medication use
  - Supplement use
  - Illicit drugs, alcohol
  - Famhx

- Re-check BP within a few weeks

- If EBP in PPE may continue to participate
  - Cont EBP on Re-check, Dx of HTN
Sports Clearance
(ACSM, AAFP, AMSSM, AAP)

- Pre-HTN or Stage 1 HTN w/o end organ damage
  - Ie. CP, visual changes, SOB, renal abn, headache
  - May participate without Restrictions

- Pre-HTN athletes – recheck BP annually

- Stage 1 athletes – Treat appropriately, routine BP monitoring

- Stage 1 HTN with end organ damage
  - May NOT participate until BP controlled
Sports Clearance (ACSM, AAFP, AMSSM, AAP)

- Stage 2 HTN (BP >160/100)
- May NOT participate until BP well controlled
- Two consecutive BP’s <140/90 2 wks apart
  - Goal < 60yo 120/80, > 60 yo <150/90

- If NOT participating, may do light aerobic exercise but NO resistance training
HTN Workup

**HPI**
- Prior BPs
- Prior tx of BP
- Meds/supps
  - NSAIDS
  - Estrogens
  - Roids
  - HGH
  - EPO
  - Cocaine
  - Sympathomimetics
  - Excessive sodium
- Sleep Apnea sx

**FamHx**
- HTN
- Premature CV death
- Pheo, renal dz, DM, gout

**Lifestyle**
- Smoking
- Diabetes
- Dyslipidemia
- Obesity
- Inactivity

**Stress**
**Secondary Causes**

- Renovascular disease
- Primary renal disease
- OCPs
- NSAIDs
- Stimulants
- Pheochromocytoma
- Hyperaldosteronism
- Cushing’s syndrome
- Sleep apnea
- Coarctation of aorta
- Hypothyroidism
- Hyperthyroidism
- Hyperparathyroidism
PE Components

- Fundoscopy
  - Hemorrhage
  - Papilledema
  - Cotton wool spots

- Neck
  - Palp, auscultate carotids
  - Thyroid

- Heart
  - Size, rhythm, sounds

- Lungs
  - Rhonchi, rales

- Abdomen
  - Renal masses
  - Bruits
  - Femoral Pulses

- Extremites
  - Pulses, edema

- Neuro assessment
  - Visual disturbances
  - Focal weakness
  - Confusion
HTN Workup

- **Labs**
  - CBC, CMP (glu, renal), TSH, Lipids

- **Medication/Supplement changes**
  - Halt suspicious agent and recheck

- **ECG**
  - Recommended with new Dx of HTN
  - Athletes have normal ECG changes
    - Bradycardia, sinus arryth, early repol, LVH
  - “White coat” HTN
    - 24 hr BP monitoring

"White coat" HTN
Pediatric HTN

- New Diagnosis of HTN
  - Needs renal evaluation
    - Labs, US, pedi-renal referral
    - Particularly if pre-pubertal
  - Needs Echocardiogram
Treatment

- Non-pharmacologic
  - Weight loss
    - 10 lbs (4.5kg) ↓ SBP 5-20mmHg
  - Sodium Restriction
    - 2-4gm/day ↓ SBP 2-8mmHg
  - DASH Diet (high fruits/veg, low fat dairy, low red meat)
    - ↓ SBP 8-14mmHg
  - ETOH Restriction
    - ↓ SBP 2-4mmHg
  - Aerobic Exercise
    - ↓ SBP 4-9mmHg
  - Stress Management
Medical Therapy

- Ideal treatment, controls BP w/o compromising exercise performance
- Permissible under rules of governing body of sport
  - WADA restriction
  - NCAA Banned Substances
Medication Options

- **Diuretics**
  - Prohibited, volume depletion, electrolyte abnormalities

- **Beta-blockers**
  - Decrease HR and exercise tolerance, prohibited

- **ACE-I/ARBs (lisinopril, losartan)**
  - Permissible, no impact on exercise capacity

- **Dihydropyridine CCBs (verapamil)**
  - Permissible, no impact on exercise capacity
Medications

- Close follow up, bi weekly
  - Monitor BP
  - Treatment compliance
  - Side effects
  - Effects on sport performance
  - Lab monitoring

- Persistent HTN
  - If persists >6-12 mos or not responding to Tx -> Echo
  - LV abnormalities form of end organ damage

- Meds continued during competition
Summary

- EBP most common CV finding in athletes (PPE)
- Appropriately measure and re-measure BP
- Once HTN diagnosed, clearance depends on stage and end organ damage
- Identify history, meds, supp etc. issues for reversible causes
- Rule out secondary causes if indicated. Referrals for Pedi ath
- Try lifestyle modifications first
- Medication treatment with ACEI/ARB/CCBs
Selected References


Thank you