HYPERTENSION IN ATHLETES

What is it?
Hypertension is the most common cardiovascular condition in athletes and can affect athletes of all ages. Primary hypertension, hypertension without a known cause, is responsible for 95% hypertension cases.

Primary hypertension often improves with lifestyle modifications. Athletes that do not respond to lifestyle modifications may need to start antihypertensive medication therapy to help decrease blood pressure.

Sports medicine physicians routinely manage hypertension in athletes. They can determine when it is safe for athletes to return to play with or without restrictions.

Risk factors
- Gender (more males than females have high blood pressure)
- Family history
- Obesity
- Glucose intolerance (pre-diabetes, diabetes)
- Stress
- Diet high in salt intake
- Excessive alcohol consumption
- Tobacco abuse
- Drug abuse (cocaine, stimulant use, anabolic steroids)

Diagnosis
- Ensure properly fitting blood pressure cuffs are being used
  - A cuff that is too large may lead to lower than normal blood pressure values
  - A cuff that is too small may lead to high than normal blood pressure values
- (3) different readings should be obtained on three different days to confirm values
- Definition for hypertension varies depending on age
  - Age-adjusted measures are necessary for diagnosing hypertension in children and adolescent athletes
- Your physician may ask if you are using other substances or medications that can increase your blood pressure such as:
  - Nonsteroidal anti-inflammatory medications (NSAIDs)
  - Stimulants (caffeine, ADHD medications, pseudoephedrine, decongestants)
  - Herbs or supplement usage
  - Anabolic steroids
- You may need additional testing including:
  - EKG or echocardiogram
  - Blood/lab work (urinalysis, basic metabolic profile (BMP), TSH (thyroid test))
- Stages of hypertension:
  - Pre-hypertension (blood pressure 120-139 / 80-89)
  - Stage 1 hypertension (blood pressure 140-159 / 90-99)
  - Stage 2 hypertension (blood pressure >160 / >100)

Treatment:
Goal to achieve blood pressure below 140/90 or 130/80 if have other diseases present (heart disease, diabetes, high cholesterol)

Lifestyle modifications
Dietary changes: Studies have shown a link between sodium chloride (salt) intake and hypertension. A moderate reduction in sodium intake can lead to a small reduction in blood pressure.
- DASH diet: The DASH eating plan encompasses a diet rich in fruits, vegetables, and low-fat dairy products. This diet along with the consumption of dietary potassium, calcium, and magnesium consumption have an inverse association with blood pressure
- Avoid fast food and lunch meats
- Weight loss: Over half of individuals with hypertension are overweight. A weight reduction as little as 5% can lead to decreased blood pressure. Weight loss is the most effective non-pharmacologic measure to reduce blood pressure.
- Exercise: regular exercise decreases risk of developing hypertension. Regular aerobic exercise can decrease blood pressure in about 4 weeks.
  - Should perform exercise 5-6 sessions/wk with goal of each session being about 30-40 minutes
  - Preferred types of exercise include: walking, jogging, swimming, cycling, dancing

**Medication therapy**
Common antihypertensive medications include thiazide diuretics, Renin–angiotensin system blockers, calcium channel blockers, alpha receptor blockers, and beta blockers. Summaries including side effects and potential risks of taking these medications are included below.

**Thiazide diuretics** (ex: hydrochlorothiazide)
- Lower blood pressure by decreasing plasma volume (blood fluid volume), cardiac output, and systemic vascular resistance
- These are first line medications for amateur athletes including elderly patients and African American patients.
- Side effects can include electrolyte imbalances (low potassium, low sodium), muscle cramps, dehydration, orthostatic hypotension, and sexual side effects in males.

This medication cannot be used by athletes subjected to drug testing. Diuretics may dilute the urine and mask concentrations of other drugs, steroids, or banned substances.

**Renin-angiotensin system blockers** (ex: lisinopril, enalapril, benazepril, quinapril)
- Lower blood pressure by blocking vasoconstriction (constriction of blood vessels directly causing increased blood pressure) and sodium (salt) retention.
- Generally used as a first line medication in active athletes. It has no major effect performance (energy metabolism or VO2 max).
- Most common side effects include dry mouth, cough, and hyperkalemia (elevated potassium)
- Should be avoided in women of childbearing age - contraindicated in pregnancy.

**Calcium channel blockers** (ex: amolodipine, nifedipine)
- Decrease calcium levels in vascular smooth muscle (blood vessel muscles) leading to generalized vasodilation (relaxation of blood vessels)
- Generally used as a first line medication in active athletes. Well tolerated and effective in athletes including African American patients.
- No major negative effects on performance (energy metabolism or VO2 max).
- Common side effects include lower extremity edema (foot swelling), vascular headaches, reflex tachycardia (elevated heart rate when medication is discontinued)

**Alpha receptor blockers**
- Block alpha receptors causing smooth muscle relaxation leading to vasodilation (vessel dilation)
- Typically a second or third choice option secondary to side effects.
- No major effect on training or performance (energy metabolism or VO2 max)
- Side effects include orthostatic hypotension (low blood pressure upon standing), first dose syncope (fainting)
- Alpha receptor blocker should be used with caution in athletes over age 55.

**Beta blockers**
- Reduces heart rate and the heart’s contraction force leading to lower blood pressure
- Not recommended in athletes unless they have an underlying medical condition requiring this class of medications (example: heart disease)
- May lead to decreased athletic performance (decreased VO2max, decreased heart rate). Banned in precision sports (golf and shooting sports) due to its calming effects.
- May lead to sexual dysfunction in males.

**Injury Prevention**
Hypertension can be prevented by maintaining a healthy weight, eating a healthy diet, and exercising regularly.

**Return to Play**
Returning to sport or activity while using antihypertensive medications depends if the athlete’s blood pressure is controlled and if the athlete has other underlying medical conditions.

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**References**