Large Athletes Not at Elevated Cardiac Risk

BY MARY ANN MOON

The cardiovascular risk profile of professional football payers—and, by implication, other very large athletes—is similar to that of the general population, according to a cross-sectional study funded by the National Football League.

It appears that high levels of physical activity offset the harmful cardiovascular effects of a body size large enough to fit the criteria for obesity, said Dr. Andrew M. Tucker of Union Memorial Hospital, Baltimore, and his associates.

Body mass index has increased significantly among offensive and defensive linemen during the past 30 years. That, taken together with sporadic premature deaths among these athletes, has raised concern that football players and other large athletes may be at increased cardiovascular risk.

Dr. Tucker and his colleagues assessed 504 active, veteran players on 12 of the 32 NFL teams using a device that measured body composition rather than BMI.

"Reliance on BMI alone as a size indicator for CVD risk may not be appropriate in NFL players because BMI does not take into account lean muscle mass," they noted.

The findings from their investigation were compared with those of an age- and race-equivalent population sample from the Coronary Artery Risk Development in Young Adults (CARDIA) study. The 504 football players, who were an average of approximately 30 kg heavier than the control group, represented 26% of the total number of veteran players at the time of the study.

"Despite their large size, the NFL group had lower mean fasting glucose compared with the CARDIA group, and there were no significant differences in total cholesterol, LDL-C, HDL-C, or triglycerides between the groups," the investigators said (JAMA 2009;301:2111-9).

As has been reported previously, "high physical activity in the player group appears to have substantially mitigated the effect of large size."

Prevalence of above-normal blood pressure did not differ significantly between black (75%) and white (82%) players. No significant link was found between players' position on the team and hypertension or prehypertension.

The athletes differed from general population in one critical respect: they were much more likely to have hypertension or prehypertension.

The combined prevalence of hypertension and prehypertension was high in all player groups, ranging from 96 of 105 (91%) in the largest players to 15 of 19 (78%) in the smallest players compared with 581 of 1,957 (30%) in the CARDIA group.

This unexpected finding has prompted an NFL-wide investigation to determine the underlying cause of players' increased blood pressure, the researchers said.

There was an array of limitations to the study, the authors noted. The limitations ranged from speculation that players may have underreported use of anti-hypertension medicines, to potential seasonal differences on blood pressure to the fact that only one automated pressure measurement was taken from the NFL group.

Smoking was self reported in both the NFL group and the CARDIA group.

The investigators disclosed no conflicts of interest. ■

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Reliance on BMI alone as a size indicator for CVD risk may not be appropriate in NFL players who have high lean muscle mass.

CLINICAL GUIDELINES FOR FAMILY PHYSICIANS

Management of Sudden Cardiac Arrest in Young Athletes

BY NEIL S. SKOLNIK, M.D., AND BRYAN BARRETT, D.O.

Sudden cardiac death is the leading cause of death in young athletes, with underlying cardiac anomalies typically the inciting factor. Hypertrophic cardiomyopathy and coronary artery anomalies represent 39% of the cases in the United States. Nonpenentrating blunt trauma that induces ventricular arrhythmia in a normal heart, known as commotio cordis, accounts for another 20% of sudden cardiac death (SCD) cases. The remaining causes include myocarditis, arrhythmogenic right ventricular dysplasia, Marfan syndrome, valvular heart disease, dilated cardiomyopathy, atherosclerotic coronary artery disease, long or short QT syndrome, Brugada syndrome, or familial catecholaminergic polymorphic ventricular tachycardia. The true incidence of sudden cardiac arrest/death in young athletes is unknown with no mandatory reporting system in place, but is estimated to be approximately 110 deaths per year in the United States.

Guidelines are most useful when they are available at the point of care. A free and concise handheld computer version of this guideline is available for download at www.redi-reference.com.

Here, we summarize a consensus statement from 15 national organizations on emergency preparedness and management of sudden cardiac arrest in high school and college athletic programs (J. Athl. Train. 2007;42:143-58).

Screening

Up to 80% of cases of SCD are asymptomatic until cardiac arrest. Currently, the only screening method for SCD advised is a preparticipation physical including a cardiovascular evaluation based on a 12-point screening process provided by the American Heart Association (AHA). The screening searches for risk or symptoms of cardiovascular disease through individual and family history questions and a physical exam. Given the discrepancy among screening sensitivity, high false-positive rate, poor cost-effectiveness, and total cost of implementation, the AHA does not recommend screening young asymptomatic athletes with electrocardiography and echocardiography.

Management

The collapsed athlete presents a broad differential diagnosis: sudden cardiac arrest (SCA), heat stroke, heat exhaustion, hyponatremia, hypoglycemia, exercise associated collapse, neurocardiogenic syncope, seizures, pulmonary embolus, cardiac arrhythmias, valvular disorders, coronary artery disease, cardiomyopathies, ion channel disorder, and structural cardiac disease. An unresponsive collapsed athlete should be treated like a potential SCA until spontaneous breathing and a pulse are identified or cardiac rhythm is analyzed. Typically, syncope during exercise tends to be more ominous than syncope after exercise. Often these individuals have increased probability of an organic cardiac abnormality requiring further investigation.

According to the December 2005 AHA cardiopulmonary resuscitation (CPR) guidelines, athletes older than 8 years of age are treated as adults for sudden cardiac arrest. Key points in cardiopulmonary resuscitation include compression-to-ventilation ratio of 30:2 for a single rescuer, chest compressions of a rate of 100 compressions per minute with complete recoil of the chest, application of automatic external defibrillation as soon as possible for rhythm analysis, resumption of CPR immediately after initial shock beginning with chest compressions, and continue CPR for five cycles after shock prior to checking pulse or rhythm.

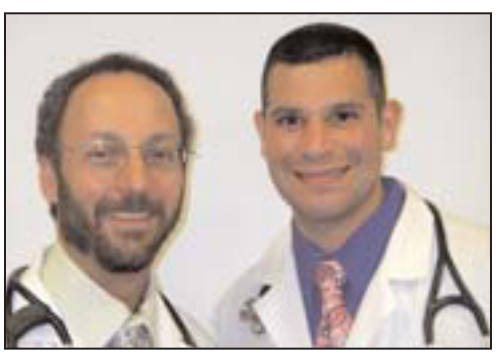
A lay rescuer should not assess for circulation, and only one shock should be delivered for the treatment of ventricular fibrillation and rapid ventricular tachycardia, as opposed to three stacked shocks in the past.

Athletes suspected of having a cervical spine injury must have the cervical spine stabilized. In the case of an unconscious athlete resulting from a contact sport injury, an unstable cervical spine must be assumed. Unstable cervical spine can lead to respiratory compromise and potentially SCA. Protective equipment such as facemasks should be removed, leaving the helmet in place prior to transportation regardless of the patient's status. Chest pads should be opened but not removed prior to transportation to provide access to the chest for CPR or defibrillation if required. A rescuer must be responsible for cervical spine stabilization at all times but should be able to disengage if defibrillation is required.

Commotio cordis, caused by impact to the chest during a vulnerable phase of ventricular repolarization leading to ventricular arrhythmia, most commonly occurs in young males. Most cases involve a projectile such as a baseball, softball, hockey puck, lacrosse ball, or direct chest contact with another person. Commercially available chest protective equipment has not been shown to prevent commotio cordis. Survival of these young athletes is strongly related to time lapse before receiving defibrillation and activation of the EMS system.

The Bottom Line

Sudden cardiac arrest is the leading cause of death in young athletes. Preparticipation physical examination is the only screening exam in asymptomatic athletes suggested by the AHA. Quick identification and treatment of SCA is essential to survival.



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