Health & Medicine

Big Guys, Tender Hearts

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Scott Cunningham / Getty Images

A team of Columbia cardiologists is collaborating with the National Basketball Association to identify athletes who are at risk for sudden cardiac death (SCD).

Basketball players have the highest incidence of SCD among all competitive athletes in the United States, in part because of the intensity of their sport and also because

African-Americans, who dominate the sport at its highest levels, have a genetic predisposition to certain heart defects that can lead to SCD. Many high-school and college teams, as well as all thirty NBA franchises, now mandate that their players undergo routine cardiac screening. But these screening efforts have a major weakness: physicians must examine echocardiogram images of players' hearts for structural abnormalities — such as enlarged ventricles or arteries — without knowing what the healthy heart of an unusually tall and fit person should look like.

The Columbia cardiologists, led by David Engel, Shunichi Homma, and Allan Schwartz '74PS, hope to address this problem by analyzing echocardiogram results from all NBA players over the next several years. They will use the data to establish the first empirical standards of heart anatomy for men of their size and level of fitness.

Engel and his colleagues began their work last year by examining echocardiogram images from 526 NBA players who played in the 2013–14 and 2014–15 seasons. They say their analysis has already shed light on several issues that have flummoxed cardiologists in the past.

"Until now, no study had ever looked to see whether the heart necessarily grows in direct proportion to a tall person's body," Engel says. "We didn't know, for instance, if its growth might ordinarily plateau at a certain point."

Among the Columbia team's preliminary findings is that the left ventricle, or chamber, of an NBA player's heart is usually proportional to his overall body size, while the root of his aorta, which is the major artery that carries blood from the left ventricle to the vital organs, is typically smaller than might be expected, based on his height. These two sections of the heart are inspected closely by cardiologists, Engel says, because the enlargement of either can indicate a deep physiological imbalance in the heart that can result in SCD.

The researchers have also identified several race-specific variables that they say must be considered when interpreting echocardiogram images, such as the fact that the hearts of African- American men grow in a slightly different pattern than those of white men when they become enlarged.

"Knowing exactly what an African-American player's heart looks like when it is enlarged, as opposed to a white player's, is a huge step forward in screening and prevention," says Engel, whose findings appear in the journal *JAMA Cardiology*.

In addition to establishing new standards for interpreting echocardiograms, the Columbia researchers are also developing guidelines that will help physicians integrate the results of echocardiograms with those of other heart tests — like EKGs, which measure the heart's electrical activity — to ultimately determine if a player is fit to play. This is a high-stakes decision, because if a player is judged to be at risk for SCD, it usually means that his playing career is over.

Over the next few years, Engel, Homma, and Schwartz will be providing expert advice to NBA team physicians in evaluating the cardiac health of individual players. They say the diagnostic standards they are developing should also be applicable to basketball players and other tall athletes of high-school age and up. Meanwhile, they are looking for opportunities to conduct similar research on female basketball players.



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