Atrial Septal Defect in a Female College Basketball Player

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CASE REVIEW

It is estimated that 200,000 competitive athletes would need to be screened for cardiovascular abnormalities to identify just one who could be at risk for sudden cardiac death. The detection of cardiovascular abnormalities is difficult due to its rare occurrence. The Mayo Clinic reported that significant cardiac abnormalities were found in only 0.39% of 2,739 athletes screened. There are several causes of cardiac death in athletes. Hypertrophic cardiomyopathy, the most common, occurs in about one-third of athletes with cardiac abnormalities, followed by congenital abnormalities such as Marfan’s syndrome. Early detection of cardiovascular disease through preparticipation screening, however, will in many instances permit timely therapeutic interventions that may prolong life.

The following case study concerns a student-athlete with an atrial septal defect—a hole in the wall separating the right and left atria of her heart. This went undetected except for an echocardiogram performed on team members of the women’s college basketball team. The athlete could have participated with this condition and exhibited only early fatigue or a lack of conditioning. Ultimately this could have resulted in heart failure, a fact that makes her performance throughout high school all the more remarkable.

Case Study

An 18-year-old female college basketball player was found to have a large atrial septal defect (ASD) during a routine preparticipation echocardiogram. Her right ventricle was enlarged and there was a pattern of right ventricular overload. The athlete was asymptomatic in terms of exercise tolerance and had no family history of coronary disease or sudden death syndrome. She had no personal history of palpitations, chest pain, syncope, or exercise intolerance. Her blood pressure was measured at 102/70. Auscultation showed that the second heart sound was accentuated, split, and fixed. There was no diastolic murmur, rub, or gallop. Her treadmill test was unremarkable. This condition

Causes of Sudden Cardiac Death in Young Athletes

Most common
- Hypertrophic cardiomyopathy
- Idiopathic left ventricular hypertrophy
- Congenital coronary artery anomalies

Less common
- Ruptured aortic aneurysm
- Myocarditis
- Dilated cardiomyopathy
- Arrhythmogenic right ventricular dysplasia
- Aortic valve stenosis
- Tunneled left anterior descending coronary artery
- Atherosclerotic coronary artery disease

Rare
- Wolff-Parkinson-White syndrome
- Long QT syndrome
- Mitral valve prolapse
- Commotio cordis
- Drugs
- Unknown/other
had gone undetected throughout her high school sports career and also by a physician assistant during a physical examination prior to the echocardiogram. The in-depth cardiac screening was scheduled yearly only for the men’s and women’s basketball teams.

This congenital heart lesion was determined not to be an imminent threat, but given the level of exertion this athlete would undergo, it was decided that she should refrain from basketball or any other sustained form of physical exertion. When this problem is identified before the age of 20 and corrected, the long-term outlook is extremely favorable. Surgery was recommended and the athlete chose to pursue this course. It was expected that she would need a 3-month recovery period prior to returning to competitive sports, but that she may be able to engage in aerobic exercise as soon as 6 weeks post-op.

Surgery was performed 1 week after diagnosis. A portion of the pericardial sac was resected and utilized to patch the septal defect. The athlete spent the next 3 weeks at home and refrained from any exercise to the upper body. Her only activity was to walk for up to an hour every day as tolerated. At 2 weeks post-op she was cleared to return to campus, but exhibited insomnia and a reduced aerobic capacity. She was taken to the hospital with acute symptoms of nausea, vomiting, decreased BP, lightheadedness, and pain between the scapulae. She was admitted to the hospital with cardiac effusion and placed on the anti-inflammatory medication Prednisone.

The athlete soon returned to campus and resumed gradually increasing walking activities. However, she returned to the hospital and was placed in the ICU with cardiac effusion at 4 weeks post-op. One week later she was cleared to return to shooting drills, free-throw practice, and noncontact passing drills with the basketball team. Her dosage of Prednisone was also tapered at that time.

The athlete was seen by the cardiologist for a follow-up visit 9 weeks post-op. She was asymptomatic, with a normal cardiac and pulmonary exam. An echocardiogram showed the pericardial effusion to be completely resolved and perfectly normal with no residual ASD. A stress test was also normal. The athlete was cleared to return to full activities without restrictions, including basketball practice as tolerated. At 12 weeks and 3 days post-op, she was fully cleared to participate in competition after an unremarkable cardiopulmonary examination. The next evening she scored 10 points with 12 rebounds, 2 assists, and 3 steals. Her only symptom for the rest of the season was periodic pain due to direct contact with the sternum. This resolved fully by the end of the season. She would complete the season and later be named to the conference All-Rookie Team.

That fall a preseason examination showed complete closure of the ASD. Her stress test was normal and she has no residual sequelae from the ASD. It was determined that given the results of her most recent echocardiogram and stress test, they would not need to be repeated throughout the rest of her college athletic career.

**Discussion**

An atrial septal defect is an opening in the wall of the heart separating the left and right atria. The most common type occurs in the middle of the atrial septum and accounts for 70% of all defects. It is twice as common in females and occurs during fetal development. Patients with atrial septal defect are usually asymptomatic in early life, but there may be some physical underdevelopments and a tendency for respiratory infections as adults.

Although not documented to be a cause of sudden cardiac death, it can have adverse effects on the athlete. It has been shown that cardiopulmonary exercise capacity is significantly impaired by atrial septal defects despite only minor subjective complaints. Symptoms may include shortness of breath, atrial fibrillation, and eventually, if not properly treated, heart failure. Also exhibited are lifelong right ventricular and pulmonary artery volume overload and pulmonary hypertension.

**Signs of Potential Cardiac Pathology**

- Fingernail clubbing
- Cyanosis
- Syncope
- Fatigue
- Dyspnea
- Auscultated pericardial rub, murmurs, or clicks