CASE REPORT

Abdominal coarctation in a hypertensive female collegiate basketball player

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The purpose of the preparticipation examination is to identify health conditions that might adversely affect an athlete while participating in sport. Hypertension is the most common. This case report details a female basketball player found to be hypertensive, and complaining of fatigue, at her preparticipation physical examination. Presentation, diagnostics, treatment, and final outcome of coarctation involving the abdominal aorta are summarised.

Preparticipation sports physical examinations have become routine for many institutions at the high school and collegiate level. Their main purpose is to identify health conditions that might adversely affect an athlete while participating in a particular activity. Raised blood pressure is the most common medical condition recognised.^{1 2} The following case report details a female basketball player found to be hypertensive, and complaining of fatigue, at her preparticipation physical examination. Presentation, diagnostics, treatment, and outcome coarctation of the abdominal aorta are summarised.

CASE REPORT

The patient was an 18 year old female collegiate basketball player who presented for her preparticipation physical. She denied any previous disqualifications from athletics for medical reasons. Her medical history was noteworthy for untreated high blood pressure of unknown duration or cause. She took no medicines except for over the counter treatments, and had no drug allergies. She had never been in hospital. On her pre-examination questionnaire, she reported that occasionally she would "tire with constant activity". She denied syncope, dizziness, and chest pain with exercise. There was no history of sudden death before age 50 in her family. She had no history of cardiac murmurs.

On initial physical examination, no abnormalities were recorded objectively. Blood pressure was 150/82 in the left arm and 144/96 in the right arm. Heart rate was 68. She measured 5 foot 11 inches and weighed 136 pounds. The patient was cleared to play basketball, scheduled for blood pressure rechecks, and asked to follow up at the health centre in two weeks.

At the follow up visit, the patient remained asymptomatic. Her blood pressure was 144/90 in the left arm and 146/90 in the right arm. Cardiac examination revealed a regular rhythm with a transmitted bruit heard at the apex. Abdominal examination found a bruit auscultated along the aorta to the umbilicus. It continued toward the iliac arteries and dissipated at the level of the femoral arteries. Further, the bruit was most audible at the left renal artery. The patient had diminished femoral and pedal pulses. Coarctation of the aorta was suspected.

INVESTIGATIONS

A chest radiograph was within normal limits except for rib notching. Complete blood count, electrolytes, serum urea nitrogen and creatinine, and thyroid stimulating hormone were within normal limits. Urinalysis showed 300 mg/l protein. Electrocardiography showed sinus bradycardia with occasional premature atrial contractions. Echocardiography revealed mitral valve prolapse, no mitral insufficiency, and an ejection fraction of 69%.

One month after the initial presentation, an aortogram was performed. It confirmed the diagnosis of abdominal coarctation, which was about 10 cm in length and 6 mm in diameter at its greatest stenotic segment. The left renal and coeliac arteries were mildly stenotic. Internal mammary and intercostal arteries were dilated. The superior and inferior mesenteric arteries were patent, and the distal abdominal aorta and iliac arteries were normal. Inflow to the common femoral arteries was from the inferior epigastric and internal mammary arteries via retrograde flow (fig 1).

MANAGEMENT

Antihypertensive treatment was initiated with atenolol 50 mg a day. A vascular surgeon was consulted, who recommended operative repair in view of the high morbidity and mortality associated with hypertension. The patient and her family sought a second opinion at a major medical centre. She was again advised to have surgery, and underwent a thoracoabdominal bypass graft about nine months after her initial presentation.

After the operation, the patient progressed very well. After seven weeks her only restriction was to avoid heavy upper body exercise. She refrained from exercise because of considerable abdominal wall pain and indicated a lack of interest in serious organised sports. She still receives antihypertensive treatment.

DISCUSSION

There has been much debate about the purpose and actual value of preparticipation sports physical examinations. Opponents have cited the lack of standardisation of such examinations, as well as their inefficient and incomplete nature, as reasons for their inadequacy as screening tools.³ However, they offer an opportunity to uncover conditions that may predispose an athlete to injury. Furthermore, adolescents have often lost contact with primary care. At this stage of development, sequelae of previously undiagnosed or neglected chronic disease may be silently present. Athletes have a raised body awareness, allowing them to know when their athletic ability is impaired.⁴ This may be useful in the diagnosis of rare and concerning conditions.

Hypertension is easily screened for in the initial assessment of the athlete. Coarctation of the aorta is the most common cause of hypertension in infants and children.⁵ Most coarctations are in the proximal descending thoracic aorta near the ligamentum arteriosum. Conversely, coarctation of

Figure 1 Aortogram showing abdominal aorta coarctation with renal artery stenosis.

the abdominal aorta is rare, only 0.5–2.0% of those clinically recognised.⁶ By convention, coarctation refers to the congenital cases of aortic stenosis, and there is much debate on the true cause of the disease.⁷ One theory is that the defect is caused by unequal fusion of the two primitive dorsal aortas which normally fuse during the first month of development. A second theory offers an inflammatory cause similar to Takayasu's disease or neurofibromatosis or fibromuscular dysplasia.^{7,8} Because of this disagreement, abdominal coarctation has recently been termed middle aortic syndrome.

According to Annett *et al.*,⁴ abdominal coarctation usually presents at about 20 years of age, and, although the most common clinical presentation is hypertension, bruits are often heard over the abdomen. Repeated raised blood pressure results in our patient prompted a more thorough physical examination. Subsequently, bruits were appreciated that radiated superiorly. Although the patient complained of general fatigue, she also had significant collateralisation on the arteriogram, which may explain her relative lack of symptoms specific to lower limb ischaemia.

The best method of diagnosis remains aortography which also defines the sites of stenosis, allowing the degree of concomitant artery stenosis and haemodynamic significance to be determined.⁹ It has been reported that, in 80% of cases of abdominal coarctation, there is renal artery stenosis causing raised plasma renin and subsequent hypertension. At present, operative repair is recommended for hypertension not controlled by drugs. Our patient had only a mildly stenotic left renal artery and a suprarenal coarctation. As stated previously, our indications for operative repair were to

Take home message

Hypertension in young athletes is rare, and in this population secondary causes should be ruled out. Abdominal coarctation may present with hypertension, fatigue, and a bruit over the abdominal aorta. Surgery is indicated to avoid the long term sequelae of hypertension.

ensure definitive management of hypertension and prevention of long term sequelae.

Coarctation of the abdominal aorta must always be considered in patients with hypertension, abdominal bruits, diminished pulses, and symptoms of fatigue. There have been few reports of this condition in the sports medicine literature. It is often observed that hypertension is the isolated clinical feature of abdominal coarctation. The preparticipation sports physical is an excellent opportunity to identify risk factors for severe underlying medical conditions that may affect not only performance but also long term health.

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