

Correlating corneal arcus with atherosclerosis

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A corneal arcus (or arcus senilis) is a white or gray opaque ring surrounding the outer edge of the cornea. This ring, sometimes hereditary, usually appears in people over the age of 50. This ring, research has shown, could be directly correlated to the amount of cholesterol in the patient's body. Knowing the exact dimensions of the arcus and the corresponding levels of Cholesterol that is calcified in the patients tendons and organs could yield an effective method of estimation when determining someone's risk for coronary heart disease.

A study was conducted by a joint research effort by the National Institute of Health and The University of Illinois in order to explore this relationship. 17 patients with recorded familial hypercholesterolemia (hereditary high cholesterol count) were referred for participation in this study. The patients first had their Achilles tendon's measured using CT scans (called xanthoma). The width was defined as the greatest distance from the most medial part to the most lateral part of the tendon. The values for both the left and right Achilles tendons were averaged and recorded as their respective tendon score. The tendons were measured because their width dictates the amount of calcified cholesterol on the tendon and is also indicative of the amount of cholesterol in other parts of the body, particularly the arteries.

After the CT scans on the tendons, the patients then had an Ultrafast CT scan series on their hearts and thoracic aortas to check for cholesterol accumulations. This series was conducted without contrast agents and scored according to established methods for this type of examination. The patients coronary artery score represents the sum of the left main, left anterior descending, left circumflex, right and posterior descending coronary arteries. The aorta score represents the sum of the aortic root and the remainder of the ascending aorta. This was done as a means to provide data that can

support the ability of arcus measurements to be an indicator of life-threatening cholesterol buildup.

After these measurements, the patients then had their eyes photographed with a 85mm camera at a magnification of 1:1. These pictures were reviewed by a team of 3 ophthalmologists and 1 internist. The pictures were then examined with a clear overlay detailing 8 sectors. If the observable arcus matched up with one of the 8 sectors on the grading sheet, the eye received its arcus score according to that sector.

All the raw data, scores for the tendon, heart, and arcus measurements, and the individual patients data were put into tables in an effort to illustrate the correlation between arcus size and cholesterol level. The study reached the conclusion that there is a link between arcus size and the amount of tissue cholesterol deposits in the body. As the trend suggested, the patients exhibiting large corneal arcii also had advanced atherosclerosis (cholesterol buildup in arteries). The researchers also concluded that arcus examinations in patients younger than 50 years old could be used to check for hyperlipidemia (elevated fat content in blood). Final consensus is that either arcus measurement or a positive xanthoma measurement can raise suspicion of hypercholesterolemia, and both in tandem can soundly diagnose hypercholesterolemia and possible atherosclerosis.

Sources:

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