MEDICAL MEMORANDA

α -Haemolytic Streptococcus Causing Lethal Autoallergic Heart Disease

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A case is reported which was diagnosed clinically as primary myocardial disease (Harvey *et al.*, 1964), but at necropsy antibodies directed against α -haemolytic streptococci cross-reacting with heart muscle sarcolemma were found. This phenomenon has so far been described for only group A streptococci (Kaplan and Svec, 1964; Zabriskie and Freimer, 1966).

Case Report

A 41-year-old man without previous illness was admitted to hospital with signs of cardiac decompensation. He complained of paroxysmal nocturnal dyspnoea, severe palpitations, exertional dyspnoea at work, and episodes of fever during the previous three months. Cardioliipin flocculation, C.F.T. positive. Treatment with glycosides, steroids, and high doses of penicillin improved his condition. Two months later he was readmitted because of renewed extreme dyspnoea and cough. He was febrile (37.8°C) and his tonsils were enlarged and infected. The E.C.G. showed left axis deviation and left bundle-branch block, the B.P. was 125/95 mm Hg, and he had moist sounds over both lung fields.

Laboratory tests were: E.S.R. 56-92 mm/hr (Westergren), A.S.O. titres <200 U, carbohydrate reactive protein and latex tests normal range. Blood cardioliipin and pallidum C.F.T.s positive, cardioliipin flocculation negative. In the C.S.F. the cardioliipin C.F.T., spirochaete agglutination, treponema immobilization test, and Wassermann and Meinicke's clearing reaction were all negative; V.D.R.L. microtest ++, spirochaete protein reaction + + + +.

Treatment with lanata glycosides, digitoxin, and diuretics did not produce any improvement. Tonsillectomy was carried out and he was given 1.6 megaunits of phenoxyl-n-propylpenicillin potassium daily and 1 megaunit of clemizol penicillin G every other day. Ten days later he went into cardiac arrest with ventricular fibrillation and died.

Necropsy Findings.—General heart hypertrophy (weight 800 g), dilatation of all cardiac chambers, extensive endocardial fibrosis in both ventricles, slight scarring of the mitral valves and slight thickening of the chordae tendineae, no disorder of the coronary arteries. Microscopical examination: slight interstitial fibrosis of the myocardium, very few Aschoff bodies, fatty degeneration of the myocardium.

Immunological Analysis.—Washed rabbit antihuman IgG: slow human IgG precipitates (Wachsmuth and Lachmann, 1969) were bound to sarcolemma sites of the heart muscle. This binding was quantitatively inhibited by human IgG. Cultures from the muscle yielded Gram-negative bacilli and α -haemolytic streptococci but no group A streptococci. The isolated α -haemolytic streptococcus strain was found to be similar to *Streptococcus viridans* or to a non-dextran-forming *Str. sanguis* (Streptococcus Reference Laboratory, London, No. STR 70/1321), was serologically negative for groups A, A₁, etc., to S, and was highly resistant to the two penicillins used and to bacitracin. Antibody produced by the α -haemolytic streptococci in rabbits was bound at sarcolemma sites of normal and the patient's heart muscle as shown by immunofluorescence. Antisera absorbed with the streptococci gave negative results. Heat-inactivated α -haemolytic streptococci were bound to the heart muscle sarcolemma, as shown by phase contrast microscopy by staining with haematoxylin-eosin and by fluores-

cence microscopy (using fluorescein-labelled α -haemolytic streptococci) (Wachsmuth, 1970). No binding of streptococci of other groups was seen and there was none in normal heart muscle. Preincubation of the patient's heart muscle sections with homogenate of normal heart muscle inhibited binding of streptococci.

Comment

The clinical diagnosis made on admission was primary myocardial disease with functional disturbances and cor bovinum. There was no evidence of rheumatic heart disease. Because of a history of occasional febrile incidents chronic tonsillitis was suspected and a tonsillectomy was performed. Ten days after the operation the patient died after decompensation with acute breakdown of heart muscle function. This suggested an allergic reaction similar to a booster effect following reinfection with bacteria to which he had been previously made allergic, giving a serological picture of non-specific positive syphilis. The latter drew attention to an isoautoimmune phenomenon because there were no indications for the existence of a syphilitic infection either clinically or at necropsy. The immunological investigations showed a cross-reactivity between α -haemolytic streptococci isolated from the patient's heart muscle and normal heart muscle sarcolemma (mixed agglutination, binding of rabbit antistreptococcus IgG to human sarcolemma). The cross-reacting human antibody was found at the sarcolemma sites in high concentration. The α -haemolytic streptococcus strain was serologically different from all known streptococcus groups, which finding agrees with the normal antistreptolysin titre.

The findings suggest an autoallergic disease initiated by an infection with the α -haemolytic streptococcus strain. From the histological results it appears that the type III reaction (Coombs and Gell, 1968) (the damage by toxic complexes as judged by the number and size of Aschoff nodules) was minimal in comparison with the type II reaction (the cytotoxic reaction as judged by the amount of antibody bound to sarcolemma sites). Since antiheart muscle antibody and complement are cytotoxic for cultured contracting heart muscle cells (Thompson and Halbert, 1971) it seems reasonable to assume similar effects in vivo which might then have caused a compensatory hypertrophy of the patient's heart at low antibody concentration.

When the tonsillectomy was performed more antigen—that is, α -haemolytic streptococci—might have entered the circulation causing a booster effect, which after accumulation of enough antibody crossreacting with the sarcolemma intoxicated the heart muscle via type II reaction, hence causing death.

We suggest that sera of patients with rheumatic fever (Zabriskie *et al.*, 1970) and of those with evidence of cardiac disease having serologically positive but non-specific syphilis reactions and negative antistreptolysin titres should be checked for autoantibodies crossreacting with heart muscle sarcolemma.

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