Ventricular tachycardia in a patient with toxoplasmosis

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A patient with dysrhythmia and serological evidence of toxoplasmosis is described. Paroxysmal ventricular tachycardia is reported for the first time in this condition; it was possibly benefited by specific therapy.

Toxoplasma gondii was first reported to cause toxoplasmosis with myocardial involvement in adults by Pinkerton and Henderson in 1941. Since then, many reports of myocardial involvement, either during acute generalized toxoplasmosis (Bengtsson, 1950; Wertlake and Winter, 1965; Menon and Simpson, 1966) or as the prominent feature of the disease (Kass *et al.*, 1952; Paulley *et al.*, 1954; Potts and Williams, 1956; Hakkila, Frick, and Halonen, 1958; Niedmann *et al.*, 1962; Adams, 1962; Reid, 1962; Ward *et al.*, 1964; Durgé, Baqai, and Ward, 1967; Harvey, McLeod, and Turtle, 1966; Shee, 1964; Mullan, Henry, and Beverley, 1968; Arribada and Escobar, 1968) have been noted. Lymphadenopathy is the commonest adult manifestation of toxoplasmosis (Beattie, 1958).

The diagnosis of toxoplasma myocarditis during life is difficult and must rest on a compatible clinical picture, exclusion of other causes of similar illness, and evidence of toxoplasma infection by the demonstration of *T. gondii* in accessible tissue or by positive serological tests (Cathie, 1955a; Beattie, 1958; Jacobs, 1962).

We describe here a patient with suspicious serological evidence of toxoplasmosis and a myocardial lesion, the latter manifesting as paroxysmal ventricular tachycardia and syncopal attacks.

History

A 45-year-old tree-feller, from Maldon, Essex, was found to have runs of ventricular ectopic beats during admission for removal of the right submaxillary gland due to calculus obstruction in February 1969 (Fig.).

Since June 1968, he had experienced attacks of mild left-sided chest pains, worse on inspiration. The pain did not prevent his working until June 1969, when it became worse and associated with dyspnoea on exertion. He was afebrile, and a transient left basal lung shadow was found on chest x-ray. A course of ampicillin did not relieve his pain or his dyspnoea. He was then referred to the outpatient clinic, where alternate ventricular ectopic beats were discovered in his electrocardiogram at a time when he complained of palpitation. These were not relieved by procainamide 250 mg 6-hourly.

In October 1969, he was admitted to the Chelmsford and Essex Hospital because of persistent palpitations, headache, syncopal attacks, and vague abdominal pains. His blood pressure was 140/80 mmHg. The only abnormal physical findings comprised xanthelasma on the upper eyelids, alternate ventricular ectopic beats, and a liver palpable two fingers breadth below the costal margin. There was no clinical, radiographic, or cardiographic evidence of ventricular hypertrophy. Lung x-ray and FVC and FEV₁ were normal. Blood counts, erythrocyte sedimentation rate, blood urea and electrolytes, transaminases, protein electrophoresis, cholesterol, glucose, antistreptolysin titre, liver function tests, liver biopsy, and protein-bound iodine were all normal. Urine and blood culture were sterile. Wassermann and Kahn tests, agglutination tests for salmonella and brucella, and the Paul-Bunnell test were negative. No lupus erythematosus cells were detected in his blood. Urinary excretion of 5-hydroxy-3-indole acetic acid and vanillyl mandelic acid were within normal limits. Skeletal x-ray survey was normal. The toxoplasma dye test titre in October 1969 was 1/1024. Procainamide 500 mg 6-hourly abolished the ectopic beats and when discharged he had lost his symptoms.

The patient remained well until towards the end of November 1969, when he was readmitted after several attacks of loss of consciousness, during one of which his pulse rate was reported by his general practitioner to be 30 a minute, and during that attack his recovery coincided with the return of his normal heart rate. On

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FIG. *Electrocardiograms recorded on 5 February 1969 during an admission for submaxillary gland surgery, on 24 November 1969 after an admission for repeated episodes of loss of consciousness, and on the 7 January 1971, one year after a course of pyrimethamine and sulphadiazine therapy.*

admission his jugular venous pressure was raised (5 cm) and his heart rate was approximately 160 a minute. The rhythm on electrocardiogram was paroxysmal ventricular tachycardia (Fig.). This was not affected by lignocaine 75 mg intravenously, but responded to procainamide, later combined with sodium phenytoin therapy 100 mg t.d.s. The cardiac failure responded to diuretic therapy. Cerebrospinal fluid, obtained by lumbar puncture, and electroencephalography were normal. The toxoplasma dye test titre remained at 1/1024. In December 1969 he started treatment with pyrimethamine and sulphonamide (pyrimethamine 50 mg initially, then 25 mg a day for one

month; and sulphadiazine 1 g 6-hourly for three months). The rhythm remained stable, and the toxoplasma dye test titre in February 1970 fell to 1/512, but by then his cardiac failure necessitated the addition of spironolactone therapy.

In April 1970 he was readmitted for recurrence of paroxysmal ventricular tachycardia and faintness. Propranolol 40 mg 6-hourly and procainamide 500 mg 3-hourly abolished the tachycardia and he was maintained on diuretic therapy. The electroencephalogram and agglutination tests were repeated and were normal. The toxoplasma dye test titre was now only 1/256. He has

remained well since then, apart from occasional palpitation and slight dyspnoea (Fig.).

His father had suffered from ischaemic heart disease. His sister was well and her toxoplasma dye test titre was 1/8, his poodle dog, aged 4 years, had no significant illness, and its toxoplasma dye test titre was 1/32.

Discussion

The reported patterns of myocardial involvement in toxoplasmosis take several forms. ST changes on electrocardiography (Adams, 1962; Bengtsson, 1950; Ström, 1951), transient QT prolongation (Kass *et al.*, 1952), supraventricular tachycardia (Harvey *et al.*, 1966; Wertlake and Winter, 1965), transitory paroxysmal nodal rhythm (Pinkerton and Henderson, 1941), atrial flutter (Ward *et al.*, 1964), atrial fibrillation (Paulley *et al.*, 1954; Hakkila *et al.*, 1958; Ward *et al.*, 1964; Menon and Simpson, 1966; Arribada and Escobar, 1968), ventricular ectopic beats (Menon and Simpson, 1966; Arribada and Escobar, 1968; Mullan *et al.*, 1968), bundle-branch block (Potts and Williams, 1956; Arribada and Escobar, 1968), and heart block (Shee, 1964; Arribada and Escobar, 1968) have been described.

The usefulness and specificity of serological data have been investigated by Bakal (1964–1965) and Cathie and Dudgeon (1953). In the United Kingdom, however, these serological dye tests are positive in 40 to 50 per cent of the adult population (Beattie, 1958; Cathie and Dudgeon, 1953; Cathie, 1954), and complement-fixation tests in 7 to 10 per cent (Cathie and Dudgeon, 1953; Cathie, 1954). The relation between the titre and clinical infection is difficult to define; Cathie isolated *T. gondii* by animal inoculation of a piece of myocardium from a patient who had suffered myocarditis and had a toxoplasma dye test of only 1/32, and a complement-fixation titre of only 1/8 (Cathie, 1955b). It is difficult to time the onset of infection, though a rising titre, the presence of high titres with a suggestive clinical picture, or the exclusion of other causes, is of help (Beattie, 1958; Cathie and Dudgeon, 1953).

We believe our patient suffered toxoplasmosis because of his high dye test titre. His cardiac manifestation could be due to ischaemic heart disease, though this was not suggested by cardiac pain, by specific ischaemic electrocardiographic changes, or by raised serum transaminase levels. Proof of cardiac involvement by toxoplasmosis during life is obviously difficult. Cysts alone (Mantz, Dailey, and Grocott, 1949; Reid, 1962; Kean and Grocott, 1945), or mild inflammatory reaction with large colonies of organisms (Pinkerton and Henderson, 1941), have been found in the myocardium with no obvious clinical evidence of heart disease. Jacobs

(1962) suggested that, though a cyst *per se* might be harmless in the myocardium, its rupture and consequent hypersensitivity reaction could contribute to inflammation in the myocardium and to the clinical picture. Myocarditis due to toxoplasmosis has been confirmed at necropsy in several instances (Pinkerton and Henderson, 1941; Kass *et al.*, 1952; Potts and Williams, 1956; Vukasovic *et al.*, 1963; Durgé *et al.*, 1967; Wertlake and Winter, 1965; Arribada and Escobar, 1968).

The response to specific therapy is variable. During the early stages the proliferating organism is relatively sensitive; the cyst form, however, is difficult to eradicate, and on rupture may activate the disease, possibly provoking a hypersensitive reaction, as already mentioned. Specific therapy is not expected to benefit chronic myocardial damage. However, 8 out of 11 patients with toxoplasma myocarditis benefited from treatment by pyrimethamine, sulphadiazine, and prednisone (Arribada and Escobar, 1968), as did one patient with Adams-Stokes attacks due to toxoplasma myocarditis (Shee, 1964), and 3 patients suffering, respectively, from acute febrile illness, lymphadenopathy with ST abnormalities on the cardiogram, atrial flutter with heart failure, and myocarditis with pericarditis, lymphadenopathy, and pleurisy after meningoencephalitis treated with sulphonamide and pyrimethamine (Adams, 1962; Durgé *et al.*, 1967; Hakkila *et al.*, 1958).

The recurrence of tachycardia without a rise of dye test titre in our patient could have been due to residual myocardial damage. Jacobs (1962) suggested that cysts incompletely eliminated were capable of further multiplication or rupture, inducing local inflammation.

In cardiac involvement, failure to respond to specific therapy is reported (Mullen *et al.*, 1968; Harvey *et al.*, 1966). Arribada and Escobar (1968) reported 2 patients who died of cardiac deterioration, despite specific therapy; both had extensive fibrosis of the myocardium. Another patient who partially recovered and then relapsed was described by Harvey *et al.* (1966); the myocardium showed thinning of muscle fibres, with interstitial fibrosis and oedema.

In view of the exclusion of other causes of myocarditis and the response, albeit incomplete, to specific therapy, we believe that our patient had suffered toxoplasma myocarditis, possibly leaving an active residual myocardial lesion together with paroxysmal ventricular tachycardia (which hitherto has not been reported). Serial serological tests and biopsy of accessible involved tissue for toxoplasma infection are warranted in view of the clinical improvement from early therapy.

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