

SERUM LIPID ABNORMALITIES AND THE ATRIAL PACING TEST

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Estimations of serum lipid and lipoprotein patterns were made in 32 patients with an abnormal response to an atrial pacing test, and compared with similar estimations in 32 patients giving a normal response

to the atrial pacing test. The frequency of serum lipid abnormalities was not significantly different in the two groups. These results were compared with the reported nature and frequency of lipid and lipoprotein abnormalities in patients with angiographically proved coronary artery disease, and the implications of these results are discussed.

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CORONARY ARTERIOGRAPHY has been used as a test for structural abnormalities in coronary arteries for over 10 years. It has been shown recently (Heinle *et alii*, 1969) that in patients with angina and angiographically proven coronary artery disease there is a high overall

incidence of hyperlipoproteinæmia, compared with patients with a normal response to coronary arteriographic tests. However, although coronary arteriography is a useful test in the accurate diagnosis of coronary artery disease, it is time-consuming and requires sophisticated equipment and a skilled team to obtain good results (Logue and Hurst, 1969).

The atrial pacing test is now emerging as a valuable test in a wide variety of cardiac disorders, but in particular, in the diagnosis of myocardial ischæmia (DeSanctis, 1971). It is particularly useful in evaluating patients with atypical chest pain (Brooks and Cutforth, 1971). This test has a number of advantages which make it preferable to the exercise test, as it is "a way of exercising the heart without exercising the patient" (Balcon *et alii*, 1968). It is also a simpler test than coronary arteriography, being easier and quicker to perform, less uncomfortable for the patient, and accompanied by less morbidity and mortality.

In this study we have assessed serum lipid and lipoprotein abnormalities in a group of patients with a positive response to an atrial pacing test and compared these with a group of patients giving a negative response to an atrial pacing test.

METHODS AND MATERIALS

Sixty-four patients were studied. These were patients who had had an atrial pacing test performed within the previous six months. The atrial pacing test was carried out for a variety of reasons. In most cases, it was used to evaluate atypical chest or epigastric pain. It was also performed on a group of fit young medical students, and on a group of patients with a previously recorded myocardial infarction who gave an abnormal result to a resting electrocardiographic examination. There were also a number of patients with electrocardiographic abnormalities, such as recurrent paroxysmal atrial tachycardias or Wolff-Parkinson-White syndrome, on whom the test was performed. The method of performing the test and the criteria for a positive result have been described previously (Brooks and Cutforth, 1971).

Blood was taken from patients after an overnight fast. The serum cholesterol level was estimated on each sample according to the method of Pearson *et alii* (1953), and the serum triglyceride level was measured by the method described by Fletcher (1968). Those patients who had fasting serum cholesterol or triglyceride values outside the age-adjusted limits suggested by Fredrickson *et alii* (1967) were recalled after two weeks, and the estimations were repeated. Only those patients with repeated cholesterol or triglyceride values outside the age-adjusted limits were regarded as abnormal. Lipoprotein electrophoresis was carried out on fasting serum from each of these patients using gelatinized cellulose acetate, in accordance with the modified technique of Colfs and Verheyden (1969) and with the use of the clinico-chemical classification of Pries *et alii* (1968). The lipoprotein patterns were then classified using these methods into the types designated by Fredrickson *et alii* (1967). Verification was obtained by electrophoresis using polyacrylamide gel as a support medium according to the method of Frings *et alii* (1971). This procedure was particularly useful in the exclusion of Type 3 hyperlipoproteinæmia, as described by Masket *et alii* (1969).

All patients were taking a conventional Western diet and maintained a steady weight between successive blood collections. There was no evidence of thyroid disease, diabetes mellitus, nephrotic syndrome, paraproteinæmia or other condition known to be associated with secondary hyperlipoproteinæmia in any of the patients.

RESULTS

Of the 64 patients who had an atrial pacing test performed (Table 1), 44 had normal serum lipid patterns. Of these 44 patients, 21 gave a positive result to the atrial pacing test and 23 a negative result. Of the remaining 20 patients, 11 gave a positive result to the

atrial pacing test. Six of these patients had a Type 2 lipoprotein pattern and five had a Type 4 lipoprotein pattern. Nine patients gave a negative result to the atrial pacing test and had serum lipid abnormalities. Seven had a Type 2 lipoprotein pattern and two had a Type 4 lipoprotein pattern. There was no significant

TABLE 1
Atrial Pacing Test—64 Subjects

Lipids	Positive Response to Atrial Pacing Test	Negative Response to Atrial Pacing Test	Total
Normal..	21	23	44
Type 2	6	7	13
Type 4	5	2	7

difference in the frequency of abnormal lipoprotein patterns between the patients with a positive result to the atrial pacing test and those with a negative result.

Thirty-two patients gave a positive result to the atrial pacing test. The mean age of the group was 54 years,

TABLE 2
Effect of Age

Lipids	Positive Response to Atrial Pacing Test		Negative Response to Atrial Pacing Test	
	Age Under 50 Years	Age Over 50 Years	Age Under 50 Years	Age Over 50 Years
Normal..	6	15	14	9
Type 2	3	3	2	5
Type 4	1	4	2	—
.. ..	10	22	18	14

and the age range was from 33 to 75 years. There were 21 men and 11 women. Eleven (34%) of these patients had consistently abnormal serum lipid and lipoprotein patterns. Only two types of lipoprotein abnormality were represented, Types 2 and 4.

TABLE 3
Effect of Sex

Lipids	Positive Atrial Pacing Test		Negative Atrial Pacing Test	
	Male	Female	Male	Female
Normal..	13	8	15	8
Type 2	6	—	4	3
Type 4	2	3	2	—
Total	21	11	21	11

Thirty-two patients gave a negative result to the atrial pacing test. This group comprised 21 men and 11 women and the mean age was 44 years. The age range was from 21 to 68 years. Fourteen of the 18 patients aged less than 50 years were males. Nine patients (28%) had consistent abnormalities of serum lipid and lipoprotein patterns.

There was no apparent relationship between age, lipoprotein abnormality and the result of the atrial pacing test (Table 2). The frequency of lipoprotein abnormalities in the younger patients with a positive response to the atrial pacing test was not significantly different from that of older patients with a positive response to the test or for all patients with a negative response. Similarly, there was no apparent relationship between sex, lipoprotein abnormality and the result of the atrial pacing test (Table 3).

DISCUSSION

When these results are compared with those reported by Heinle *et alii* (1969), who used coronary arteriography as the test for coronary heart disease, quite marked differences can be seen. Of the patients with a positive response to the atrial pacing test, 11 (34%) had abnormal lipoprotein patterns, compared with 54% of patients with angiographically recorded coronary artery disease studied by Heinle *et alii* (1969). The frequency of lipoprotein abnormalities in the patients aged under 50 years with positive results to atrial pacing tests (40%) was much lower than in patients aged under 50 years with abnormal results to coronary arteriographic examinations (80%).

There are two probable reasons for the difference in our findings compared with those using coronary arteriography. These are that: (i) coronary arteriography detects more abnormalities than the atrial pacing test among patients with lipid abnormalities; (ii) the atrial pacing test may reveal more abnormalities in patients with normal serum lipid patterns than coronary arteriography. It is probable that both these explanations are important in producing the different patterns obtained by the two tests.

The atrial pacing test and coronary arteriography are not alternative investigations. The atrial pacing test is a non-specific test of myocardial function and may give abnormal results in patients with a variety of cardiac diseases (DeSanctis, 1971). Thus, patients with non-critical coronary artery disease may give a negative result to the test. On the other hand, coronary arteriography demonstrates only the structure of the coronary arteries and is a specific test for coronary artery disease. As coronary artery disease is the only cardiac condition associated with serum lipid abnormalities, the findings on coronary arteriography would be expected to be

abnormal more frequently in patients with serum lipid disturbances than the result of the atrial pacing test.

These explanations for the differences between the groups of patients with angiographic abnormalities and abnormal results to atrial pacing tests are made on the assumption that different methods of lipoprotein electrophoresis and estimations of serum lipid levels have not produced any overall difference in the frequency of diagnosis or classification of the lipoprotein disorders. If this is accepted, then these results underline the fact that the atrial pacing test, like the exercise tolerance test, is a test of myocardial function and is not a test for the presence or absence of coronary atheroma.

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We live in a drug-oriented society, where the "pill" is the queen and magician in all the various activities of life, from birth control to finding our Lord. However, we learn every day from pharmacology that no drug, not even our dear friend "the aspirin", is devoid of noxious side effects which are likely to become more and more dangerous when they are taken over prolonged periods of time, developing dependency, addiction, serious physical and mental pathologies. It is difficult to believe that psychedelic drugs will prove to be without side effects on a short or long run, while it is easy to anticipate that the beautiful pseudomystical feelings they produce will soon be turned into a compulsory need for more and more drug, with progressive weakening of the human individuality. This is obvious, I think, by the evidence of what is going on in the streets of our cities. The pseudoathlete who deludes himself into thinking he will become a champion through amphetamine intake finds himself in a psychophysical mess at the end of the run, even if he has won.—S. F. Brena, "Pain and Religion", 1972, Charles C. Thomas, Illinois, U.S.A., 46.