THE HEART IN RHEUMATOID ARTHRITIS (RHEUMATOID DISEASE) — AN ECHOCARDIOGRAPHIC STUDY

by

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IT has been known for many years that the heart may be involved in rheumatoid arthritis. Initially rheumatoid granulomata, amyloidosis, endocarditis, subacute myocarditis and constrictive pericarditis were recognised in early clinical and post-mortem studies. More recently the echocardiogram has demonstrated pericardial effusions in up to 46 per cent of patients with rheumatoid arthritis. Many early studies were uncontrolled and therefore it was proposed to examine a series of patients with rheumatoid arthritis, correlating echocardiographic findings with clinical, electrocardiographic and radiographic features and comparing the echocardiograms of the patients with those of an age/sex matched control group.

PATIENTS AND METHODS

Thirty-three consecutive patients, between the ages of 20 and 70 years, admitted to the Musgrave Park Hospital during an acute phase of their rheumatoid arthritis and who all fulfilled the criteria of the American Rheumatism Association were studied. Within seven days of admission each patient had a cardiological assessment which included a history and examination with P.A. chest X-Ray, electrocardiogram and M-mode echocardiogram. Control echocardiograms were recorded from 20 age/sex matched control subjects.

RESULTS

Twenty-eight female and five male patients were studied. The mean age was 54 years (range 28-70 years).

The symptoms relating to the cardiovascular system are presented in Table 1. The commonest symptoms were palpitation in six patients (18 per cent) and chest pain suggestive of angina in five patients (15 per cent).

The signs of cardiovascular disease are shown in Table 2. An ejection systolic murmur was heard in 10 patients (30 per cent) and an abnormal fourth heart sound was heard in nine patients (27 per cent). No patient had a pericardial rub.

The electrocardiographic findings are summarised in Table 3. Left bundle branch block was found in only one patient (3 per cent) and localised 'T' wave changes more suggestive of ischaemic heart disease than of pericardial disease were present in two patients (6 per cent). The electrocardiogram was normal in 30 out of 33 patients.

The chest X-Ray findings are shown in Table 4. The chest X-Ray was normal in 26 patients (79 per cent). Five patients (15 per cent) had cardiomegaly defined as a cardiothoracic ratio of greater than 50 per cent. Four of these patients had symptoms suggestive of ischaemic heart disease. There was no correlation between cardiomegaly and the presence of a pericardial effusion. No patient had radiographic evidence of constrictive pericarditis.
TABLE 1  
*Symptoms in 33 Rheumatoid Patients*

| Symptom                              | Count (Percentage) |
|--------------------------------------|--------------------|
| Palpitation                          | 6 (18%)            |
| Chest Pain                           | 5 (15%)            |
| Shortness of Breath on exercise      | 3 (9%)             |
| Orthopnoea                           | 2 (6%)             |

TABLE 2  
*Physical Signs in 33 Rheumatoid Patients*

| Physical Sign                      | Count (Percentage) |
|------------------------------------|--------------------|
| Systolic Murmurs                   | 10 (30%)           |
| Diastolic Murmurs—Mitral           | 1 (3%)             |
| —Aortic                            | 1 (3%)             |
| Fourth Heart Sound                 | 9 (27%)            |
| Pitting Ankle Oedema (mild)        | 3 (9%)             |
| Pericardial Rub                    | 0 (0%)             |

TABLE 3  
*Electrocardiographic Findings in 33 Rheumatoid Patients*

| Electrocardiographic Finding        | Count (Percentage) |
|-------------------------------------|--------------------|
| Abnormal ‘T’ waves                  | 2 (6%)             |
| Left Bundle Branch Block            | 1 (3%)             |
| Unifocal Ventricular Ectopics       | 1 (3%)             |

TABLE 4  
*Chest X-Ray Findings in 33 Rheumatoid Patients*

| Chest Finding                      | Count (Percentage) |
|------------------------------------|--------------------|
| Cardiomegaly                       | 5 (15%)            |
| Pulmonary Fibrosis                 | 2 (6%)             |
| Pulmonary Emphysema                | 2 (6%)             |

The echocardiographic findings are shown in Table 5. Fourteen patients (42 per cent) had a small pericardial effusion. Three patients (9 per cent) had only anterior effusions, six patients (18 per cent) had only posterior effusions and five patients (15 per cent) had both anterior and posterior effusions. Nine patients (27 per cent) had abnormalities of the mitral valve motion which included prolapse of the posterior cusp in one patient and shatter of mitral valve echoes in diastole in five patients (15 per cent). One of these patients had clinically evident aortic incompetence but the others were asymptomatic and did not have audible diastolic murmurs. An abnormally low diastolic closure rate (EF slope less than 5 cm/sec) was found in seven patients (21 per cent). One patient who had a history of rheumatic fever had an EF slope of less than 1 cm/sec in addition to abnormality of posterior cusp motion and left atrial enlargement, confirming a clinical diagnosis of mitral stenosis. There was an increased left ventricular diameter in five patients, all of whom had either hypertension or symptoms of heart disease. The only echocardiographic abnormality in the control group was right ventricular hypertrophy in one patient.
Although post-mortem studies have shown a high incidence of cardiac involvement in rheumatoid arthritis,1, 2 these are difficult to detect clinically—only 41 case reports of rheumatoid pericarditis had been published until 1972.7 It is, however, important to recognise these lesions as treatment may be beneficial. The echocardiogram has been shown to be a reliable and sensitive method of identifying pericardial effusions.8 The high incidence of pericardial effusions found in this series correlates well with previous studies.4, 5, 9 Most of the effusions were small and relatively localised. The greater proportion of posterior effusions is in keeping with other series,4 5, 9 The reduced EF slope found in some patients may be an indicator of reduced ventricular compliance. The unexpectedly high incidence of mitral valve shatter in diastole may indicate the presence of very mild aortic incompetence, which has not yet produced audible diastolic murmurs or haemodynamic changes. Both these groups of patients should have careful follow-up including repeat echocardiography to detect at an early stage the possible development of clinically significant heart disease. This is especially important as the progress of aortic valvular disease in rheumatoid patients can be rapid. The high total incidence of echocardiographic abnormality also correlates well with previous studies.5 In our controlled study the figure of 76 per cent abnormality was significantly higher than that in the control group which had only one abnormal echocardiogram (p < 0.001).

The high incidence of systolic murmur, which was not thought to indicate cardiac valvular pathology has been noted in other series.1 Some of the murmurs may have been due to a co-existing anaemia related to acute rheumatoid disease. The abnormal fourth heart sound was present in all patients with symptoms suggestive of heart disease but was also heard in several patients with no cardiac symptoms. Contrary to expectation there was no correlation between a reduced EF slope and the presence of a fourth heart sound.

As in previous studies the presence of a pericardial effusion did not correlate with symptoms or signs of heart disease or with electrocardiographic or radiological abnormality. This makes the detection of cardiac involvement largely dependent on the echocardiogram. Our finding of a very much higher incidence of subclinical cardiac involvement in patients with rheumatoid arthritis than in control subjects suggests that an echocardiogram should be a necessary investigation of these patients.
SUMMARY

Thirty-three patients with rheumatoid arthritis were analysed clinically and with electrocardiogram, chest X-Ray and echocardiogram. Fourteen patients (42 per cent) were found by echocardiography to have pericardial effusions, not detectable by other means. Some patients showed changes suggesting early valvular disease and these patients should have repeat echocardiography at follow-up. In conclusion the echocardiogram is a sensitive and reliable diagnostic aid for the detection of cardiac lesions in rheumatoid arthritis.

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