ECG Abnormalities in Turkish Patients with Sarcoidosis

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Abstract

Electrocardiographic (ECG) abnormalities are more common in patients with sarcoidosis than healthy indivudials.The most common ECG findings reported are arrhythmias, conduction defects and repolarization changes. We retrospectively reviewed the medical records of 150 sarcoidosis patients attending Istanbul University, Cerrahpasa Medical Faculty, Internal Medicine Department. Electrocardiographic abnormalities were detected in 13.3 % percent of stage I patients (14/105), 50 % of stage II (17/34), and 4.7 % of stage III patients (2/7). There were no abnormalities in stage 0 patients.

INTRODUCTION

Sarcoidosis is a systemic granulamtous disease of unknown origin. Since the lungs and thoracic lymph nodes are almost always involved, most patients report acute or insidious respiratory problems, variably accompanied by symptoms affecting the skin, eyes, or other organs. Pulmonary involvement often leads to diffuse fibrosis that may result in fatal right-sided heart failure. Primary cardiac involvement is not often recognized clinically, although it may be demonstrated at autopsy 20 to 30 % of cases, most of which show generalized sarcoidosis ([1], [2]).

Electrocardiographic abnormalities are more common in patients with sarcoidosis than healthy individuals. The most common ECG findings reported are arrhythmias, conduction defects and repolarization changes.

MATERIAL AND METHODS

We retrospectively reviewed the medical records of 150 sarcoidosis patients attending Istanbul University, Cerrahpasa Medical Faculty, Internal Medicine Department. Twelve-lead ECG records were evaluated with two cardiologists blinded to each other.

RESULTS

There were 99 females and 41 males and the age range was 20-67 with a mean of 41.5. patients were categorized according to chest radiographic stage. Four (2.7 %) patients were in stage 0, 105 (70 %) in stage I, 34(22.7 %)in stage II, and 7 (4.7 %)in stage III. There were 33 patients (22%) with abnormal ECG findings. The abnormal ECG findings and their distribution according to disease stage are seen in Table 1. Electrocardiographic abnormalities were detected in 13.3 % percent of stage I patients (14/105), 50 % of stage II (17/34), and 4.7 % of stage III patients (2/7). There were no abnormalities in stage 0 patients. Frequency of ECG disturbances is higher in stage II sarcoidosis patients.

Figure 1

Table 1: Stage of disease and distribution of ECG abnormalities

ECG abnormality	Stage 0	Stage I	Stage II	Stage III	Total
ST-segment depression	0	2	3	0	5 (% 3.3)
Negative T-wave	0	2	3	0	5 (% 3.3)
Ventricular premature beat	0	0	2	1	3 (% 2)
Supraventricular premature beat	0	0	1	0	1(% 0.7)
First degree heart block	0	0	2	0	2 (% 1.3)
Early repolarization	0	3	1	0	4 (% 2.7)
Sinus bradycardia	0	1	0	0	1(% 0.7)
Sinus tachycardia	0	3	3	1	7 (% 4.7)
Supraventricular tacycardia	0	1	0	0	1 (% 0.7)
Increase in P-wave amplitude or duration	0	1	1	0	2 (% 1.3)
Q-wave	0	1	1	0	1(% 0.7)
Left ventricular hypertrophy	0	2	2	0	4 (% 2.7)
Right bundle branch block	0	1	1	0	2 (% 1.3)
Left anterior hemiblock	0	3	1	0	4 (% 2.7)
Intraventricular conduction deficit	0	0	2	0	2 (% 1.3)

Stage of disease and distribution of ECG abnormalities

DISCUSSION

Clinically evident sarcoidosis involving the heart is uncommon, affecting 2 to 7% of patients with sarcoidosis ([1], [3]). However, occult involvement is much higher (> 20%) ([4,5]). Several necropsy series cited pathological evidence for cardiac involvement in 19.5 to 78% of sarcoid patients ([1]). Sarcoidosis appears to be relatively common in northern

Europe, North America, and Japan. There's no information about frequency of sarcoidosis in Turkey.

Cardiac involvement is the leading cause of death due to sarcoidosis in Japan, accounting for 77 to 85% of deaths; in contrast, in the United States, 13 to 50% of sarcoid deaths have been attributed to myocardial involvement ([6,7]). Unfortunately, cardiac sarcoidosis is often not recognized antemortem because symptomatic involvement of other organs may be lacking, and sudden death may be the presenting feature. The presence of unexplained cardiomyopathy or arrhythmias in an otherwise healthy young patient should alert the clinician to the possibility of myocardial sarcoid. The presence of cardiac signs or symptoms in a patient with sarcoidosis mandates an aggressive investigation for cardiac sarcoidosis.

Cardiac involvement may occur at any point during the course of sarcoidosis, may occur in the absence of pulmonary or systemic involvement, and may be a presenting feature. Although the disease is often clinically silent, cardiac sarcoidosis is a leading cause of death among patients with sarcoidosis, with an attributable mortality rate of up to 50 to 85% in autopsy series ([1,2,3,4]). Arrhythmias or conduction defects are the most common causes of death due to cardiac sarcoidosis ([1, 5, 7]). Rapidly progressive, ultimately fatal, congestive heart failure may be the presenting feature. Recurrent, massive pericardial effusions or constrictive pericarditis account for < 3% of cardiac deaths ([1]).

Conduction disturbances and arrhythmias are the most common cardiac manifestations and reflect granulomatous infiltration within the conduction system or ventricular walls. Variable degrees of atrioventricular (AV) block, bundle branch block, nonspecific intraventricular conduction delay, premature ventricular contractions (PVCs), ventricular tachycardias, and other arrhythmias may be observed. In the necropsy series of 113 patients published by Roberts et al ([9]) , the following electrocardiogram abnormalities were noted: complete heart block (22%); complete bundle branch block (22%); ventricular tachycardia in 17%; PVCs (29%); atrial arrhythmias (16%). In a series of 300 patients with cardiac sarcoidosis from England ([10]), predominant features included ventricular arrhythmias (45%), bundle branch blocks (38%), supraventricular arrhythmias (28%), and sudden death (16%). Atrial arrhythmias likely reflect atrial dilatation secondary to ventricular dysfunction or pulmonary parenchymal involvement rather than direct atrial involvement from granulomas or scar tissue.

Confirming the diagnosis of cardiac sarcoidosis is difficult, and clinicians must frequently initiate treatment in the absence of definitive histologic proof. Serum angiotensin converting enzyme levels are insensitive for cardiac sarcoidosis.The antemortem diagnosis of myocardial sarcoidosis is difficult because ECG abnormalities or cardiac failure are nonspecific and may be related to other causes (e.g., coronary artery disease, idiopathic cardiomyopathy, or severe pulmonary sarcoidosis with cor pulmonale). Yet, because cardiac sarcoidosis is such a common cause of death among sarcoidosis patients, making the diagnosis early and promptly initiating treatment can be life-saving.

A resting ECG is an appropriate screening test to order in all patients with confirmed or suspected sarcoidosis. Abnormalities on ECG (e.g., conduction disturbances arrhythmias, or nonspecific ST and T-wave changes) can be demonstrated in 20 to 31% of sarcoid patients ([9]). In a large population survey of 963 Japanese patients with sarcoidosis, 22% had right bundle branch block, premature supraventricular or ventricular contractions, or ST-T wave abnormalities compared with 17% of healthy age- and sex-matched controls ([11]). Atrioventricular block was also a common ECG finding. Another series from northern Sweden ([12]) compared 86 consecutive patients with various stages of sarcoidosis with 86 age- and sex-matched healthy controls. Twenty-seven sarcoidosis patients (31%) had conduction or repolarization disorders compared with 12 controls (14%). A prospective study of 80 young patients with sarcoidosis and no history of cardiac complaints detected abnormalities on ECGs in 41 patients (50%), including conduction defects, abnormal repolarization, and arrhythmias ([12,13]). In a series of 84 consecutive autopsied patients with sarcoidosis, 20 had documented ECG abnormalities (i.e., PVCs, bundle branch block, first-degree heart block, or supraventricular arrhythmias) during life ([14]) . In a smaller series of 35 patients with sarcoidosis without overt cardiac involvement, six had resting ECG abnormalities, including sinus bradycardia, sinus tachycardia, or right bundle branch block ([15]). From these various series, approximately 20 to > 30% of patients with sarcoidosis appear to have detectable ECG abnormalities.

The prevalence of ECG abnormalities correlated with the severity of cardiac involvement. In one necropsy study, 15% of patients without detectable cardiac involvement had ECG abnormalities. In contrast, 42% of patients with mild cardiac

involvement (microscopically evident granulomas) and 75% of patients with severe involvement (gross evidence of cardiac granulomas or infiltration) at necropsy had arrhythmias or conduction disturbances. Furthermore, the types of ECG abnormalities differ among patients with varying degrees of myocardial involvement. For example, a higher percentage of patients with eventually fatal autopsy-proven myocardial sarcoidosis had complete heart block and ventricular tachycardia, whereas left axis deviation and ST-T wave changes were more common among patients with positive biopsies for myocardial sarcoidosis.

In accordance with literature we detected ECG abnormalities in 22 % of patients.. Electrocardiographic abnormalities were detected in 13.3 % percent of stage I patients (14/105), 50 % of stage II (17/34), and 4.7 % of stage III patients (2/7). There were no abnormalities in stage 0 patients. Frequency of ECG disturbances is higher in stage II sarcoidosis patients. Low frequency of ECG abnormalities in stage III may be a bias, since there are only seven patients in this stage.

Concerns about the relatively low sensitivity of resting ECG for detecting cardiac involvement have been raised. Furthermore, the clinical significance of nonspecific ECG abnormalities is unclear. Any abnormality on ECG should prompt further evaluation with an imaging study, to document or exclude cardiac involvement by sarcoidosis.

A prospective study including, ambulatory ECG monitorization, treadmill testing, and cardiac imaging methods, will provide more accurate and meaningful information about frequency and progression of cardiac sarcoidosis.

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