Prevalence and Types of Resting Electrocardiography (ECG) Findings in Persons with Multiple Sclerosis (PwMS)

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Background

Cardiac rate, rhythm, and structural changes are documented in multiple sclerosis (MS) and are attributed to autonomic dysregulation, poor mobility, cardiovascular risk factors, and certain disease modifying therapies (DMTs). Small studies reported exercise-induced autonomic response of the heart via electrocardiography (ECG) changes. Few case reports documented ECG changes as an initial presentation of MS, or as a reaction to intravenous steroids, or a DMT known to affect the atrioventricular (AV) node, namely fingolimod, a sphingosine-1-phosphate receptor (S1PR) modulator. Understanding ECG patterns in a large MS cohort in relation to different variables is still lacking.

Objective(s)

1: To provide preliminary data on the prevalence of heart rate, rhythm and structural changes via ECG in a large MS cohort

2: To understand their relationship to different demographics, clinical, and patient specific characteristics

Methods

Retrospective Chart Review
N=500

Inclusion Criteria
Confirmed ECG interpretation from medical charts at a resting state

Exclusion criteria
• Acute illnesses
• Exacerbation of thyroid diseases
• Traumas
• Allergic reactions
• Exacerbation of Coronary artery diseases
• ECG stress test
• ECG done throughout monitoring of fingolimod initial treatment
• Being on medications known to affect heart rate (e.g., stimulants, beta blockers, antiarrhythmics)

Statistical analysis
• Aim 1: Descriptive statistics were performed.
• Aim 2: Fisher’s exact tests were conducted for categorical variables and Mann-Whitney U or Kruskal-Wallis tests for non-normally distributed tests.

Results

A
86% Relapsing forms
14% Progressive Forms

B
ECG Findings Prevalence

55.9±12.7 years old, 75% female, 83% white

C

Figure 1. Description of data from our preliminary chart review: (A): population descriptive statistics, (B): Percentage of available and positive ECG findings, (C): Prevalence of positive ECG findings in a descending order.

Conclusions

Thirty-seven percent of study subjects (age= 55.9±12.7, 75% females, 83% white) had forms of ECG alterations. Bradycardia was the most predominant finding (33%) versus tachycardia (25%). No differences were observed in different DMTs compared to fingolimod. Bundle branch blocks (BBBs) were seen in 12% with right BBB being the most prevalent. Structural ECG data were reported in 28% of the recordings, with left atrial enlargement being the most frequently documented finding. Increased age showed higher prevalence with structural changes, mainly left atrial enlargement with left ventricular hypertrophy; however, there were no significant pairwise differences after applying Bonferroni corrections for multiple comparisons.

Conclusion: Investigating ECG alterations in large MS populations can help in understanding the autonomic dysregulation interplay with other variables observed in MS.

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