

Repetitive Nerve Stimulation in Brachioradialis Muscle

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Abstract The repetitive nerve stimulation (RNS) test is a test that used for the diagnosis of neuromuscular disorder especially myasthenia gravis, in the present study we assessed the RNS of brachioradialis in the diagnosis of myasthenia gravis. The RNS of the radial nerve was performed with recording electrodes over the anconeus and brachioradialis muscle in 50 patients with the diagnosis of myasthenia gravis then the Percentage of normal and abnormal results were calculated for both anconeus and brachioradialis and the difference between them compared with using paired t-tests. Based on this study there is no significant difference between RNS of the anconeus and brachioradialis muscles, and we can use from the brachioradialis for the diagnosis of myasthenia gravis as anconeus muscle.

Keywords Repetitive Nerve Stimulation, Brachioradialis, Myasthenia gravis

1. Introduction

Repetitive nerve stimulation (RNS) also known as Jolly's test is a useful test used to assess disorders of the neuromuscular junction. This test should be done whenever there is a possible diagnosis of pre and post synaptic disorder including myasthenia gravis, Lambert – Eaton and botulism and botulism [1, 2]. This test was done on decremental or incremental of compound muscle action potential (CMAP) in the peripheral nerve [3, 4]. It is positive in 90% of patients with generalized myasthenia gravis, and in 30–60% of patients with ocular MG [5]. Usually, the most used muscles for this test are the hypothenar muscle, anconeus, trapezius and facial muscles and this test usually more positive in proximal muscles than distal muscles in myasthenia gravis according to the pattern of weakness in this disease [6, 7]. in this study we evaluate the RNS of the brachioradialis and compare it with the anconeus muscle.

2. Material and Methods

The myasthenia gravis diagnosed according to history, physical examination, the electrophysiological test including RNS and single-fiber electromyography (EMG), autoantibodies to the acetylcholine receptor or muscle specific kinase (Musk) [8, 9]. The distribution of weakness in proximal and distal muscles is different that cause the results of this test also distinct in this muscles [10]. In our study 50 patients known case of myasthenia gravis whose diagnosis was confirmed according to a neurological

examination, electrophysiological test and autoantibodies to the acetylcholine receptor were selected. This study approved by the research ethics committee and all patients provided written informed consent before participation, the Mestinon due to interfering with neuromuscular transmission was discontinued for 12 h before the test and the Skin temperature was at least 32°C within the start of RNS test in all patients. RNS of the radial nerve was performed with trains of 10 stimuli at 3.5 Hz with recording electrodes over the anconeus and brachioradialis muscle by the experienced neurologist in all of the patients. Abnormal RNS was defined as a decrement in amplitude equal to, or more than, 10%. Percentage of normal and abnormal results were calculated for both anconeus and brachioradialis and the differences between two muscles were compared using paired t-tests. SPSS 22 was used for statistical analyses and $p < 0.05$ was considered as a significant level.

3. Results

The 50 patients known case of generalized myasthenia gravis were studied, 16 male and 34 female (age range 18-63 years, mean age = 41.6 years). RNS of radial nerve was positive in 24(48%) patients with recording in the brachioradialis and 26(52%) patients with recording in the anconeus that there is no significant difference between 2 groups. The mean age of the patients have a positive jolly test in anconeus was 40 years and the means age in patients with the negative test was 43 years that don't observe a significant difference (p value=0.345). The mean age in the patients with the positive test in brachioradialis was 40 years and in the patients has a negative jolly test in brachioradialis was 44.92 that there is no significant difference in this means (P Value = 0.219). The patients have positive RNS test in brachioradialis were 6(25%) male and 18(75%) female and

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in the patients have a positive jolly test in anconeus were 6 male (23%) and 20(77%) female. In this study, 22 patients have a positive test in two muscles, and 22 patients have a negative jolly test in two muscle.

4. Discussion

In this study, the jolly test was performed in the anconeus and brachioradialis muscles of 50 patients with generalized myasthenia gravis. In this study, the anconeus muscle tests were more sensitive than brachioradialis, but there is no significant difference between them. Kennett and Fawcett in the study that assessed the RNS test of anconeus and hypothenar muscles in patients with generalized myasthenia gravis reported that jolly test was positive in 13 of 25 patients compared to 4 patients that positive in hypothenar muscle [11]. The RNS test of proximal nerve and facial muscles is more sensitive than distal nerve in patients with the neuromuscular disorder. In another study by Ohetal show the RNS study of proximal muscle including trapezius, deltoid and orbicularis oculi were more sensitive than hypothenar muscle [12]. In conclusion, our study indicates that the brachioradialis muscle can be used in the evaluation of myasthenia gravis and the rate of positive jolly test similar in brachioradialis and anconeus in patients with generalized myasthenia gravis.

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