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The Functional Outcomes of Botulinum Toxin Injection for Adult Neurological Patients

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Introduction

Patients with stroke have encountered different forms of physical disability due to spasticity. Botulinum Toxin has been used in treating spasticity for patient with stroke in the past decade. Many studies showed its effectiveness in improving muscle tone and range of motion in upper and lower limbs. The functional outcome like walking efficiency was rarely reviewed. Energy expenditure in term of oxygen consumption has been proven to be a reliable measure to document the walking efficiency of patient with movement disability.

Objectives

This study is to review the use of oxygen consumption test in documenting the walking efficiency for patients with stroke undergone spasticity management with Botulinum Toxin injection.

Methodology

Patients with stroke with increased lower limbs spasticity ($MAS \geq 2$) were recruited. All of them should be able to walk independently for at least 10 minutes without orthoses and walking aids. Patients were selected for Botulinum Toxin injection to lower limbs by the doctors. Oxygen consumption was measured using a portable gas analyzer (K4b2, COSMED srl., Italy) at pre-, 1 month and 3 months post- injection. During the test, patients were asked to walk for 10 minutes at their natural speed through a specified walkway and the oxygen uptake was measured with the machine. Data was analyzed using statistical test of repeated measured ANOVA.

Result

Results: Eighteen subjects were recruited in this study with mean age 41.2 ± 12.9 years old. All of them showed improvement in oxygen consumption after Botulinum Toxin treatment. The mean oxygen uptake during walking decreased from pre-injection 0.655 0.445 ml/kg/m to 1 month post-injection 0.573 0.328 ml/kg/m,

and 3 months post-injection 0.523 ± 0.288 ml/kg/m, with statistically significant improvement ($p=0.009$). Moreover, subjective feeling of patients also indicated ease of walking after the treatment. Conclusions: The oxygen consumption could objectively and accurately reflect the change in the functional outcome of Botulinum Toxin treatment in adults with post-stroke lower limbs spasticity. The oxygen consumption of adults with post-stroke lower limbs spasticity was much decreased after Botulinum Toxin treatment which indicated that the adults could walk in a more effective way after the injection.