

Long-term Functional Outcome Following Selective Dorsal Root Rhizotomy for Spastic Cerebral Palsy – A
Natural History-Matched Prospective Cohort with 15 Years Follow-up

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Introduction

Spastic cerebral palsy (CP) can result in a wide spectrum of disability. Selective dorsal root rhizotomy (SDR) has been shown to improve spasticity in CP, although the long-term benefit of this procedure on motor function remains unclear given the improvement expected from the natural history.

The goal of this study was to compare the evolution of motor function in SDR patients to their expected evolution based on Canadian developmental curve normograms.

Methods

We performed a retrospective analysis of prospectively collected data. Patients who underwent SDR at our center between 1994 and 2016 were analysed. Pre-operative GMFCS and GMFM-88 assessments were performed by a qualified physiotherapist and recorded on video. Follow-up GMFM-88 were then performed at 1, 2, 3, 5, 10 and 15 years post-operatively. GMFM-88 scores were converted to GMFM-66 using a validated method and plotted against a GMFM-66 normogram stratified by pre-operative GMFCS. A linear mixed model analysis was then used to compare SDR patients to their expected evolution based on natural history.

Results

197 patients were eligible for inclusion. The median age at the time of surgery was 4.8 years (range 2.9-9.3). Median pre-op GMFM-66 was 52.1 (range 36.4-76.8). Crude median post-op GMFM-66 was 56.2, 61.8, 61.2 and 66.7 at 1, 5, 10 and 15 years respectively. The SDR cohort had statistically significantly higher GMFM-66 scores for all GMFCS classes. The 10-year advantage GMFM-66 over the expected natural history was 6.6 ± 3.8, 8.3 ± 2.5 and 4 ± 2.4 for GMFCS 1 & 2, 3 and 4 respectively. Given the published minimum clinically important difference of 1.3, these results are both statistically and clinically significant. This represented a percentile increase of 20, 40 and 25 respectively.

Conclusions

Patients who underwent SDR show a statistically significant and clinically meaningful improvement in motor function compared to their expected natural history. This improvement is maintained at 10 years post-operatively.

Learning Objectives

Discuss the effectiveness of selective dorsal root rhizotomy in spastic cerebral palsy

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