Long-Term Changes in Mobility Following Single Event Multilevel Surgery in Ambulatory Children with Cerebral Palsy

Objectives
To examine later effects of single event multilevel surgery (SEMLS) on mobility in children with CP classified in GMFCS Levels II–III. The study focuses on those in GMFCS Level II pre-operatively because they are more at risk of losing gross motor function as they enter adulthood.

Study participants and setting
A consecutive sample of 156 children with CP (99 males), GMFCS Levels I–III who had SEMLS between 1998 and 2006 at a tertiary care centre. Mean age was 10 years (SD 2.47, range 5–16) pre-operatively.

Materials and methods
Prospectively collected clinical data were abstracted from gait laboratory files of the participants pre-operatively and at a mean of 5 years post-operatively, including age at surgery, GMFCS level and mobility rating using the Functional Mobility Scale (FMS).

For those in GMFCS level III at baseline, a proportional odds logistic regression model was used to predict the probability of assistive device requirements as measured by FMS at 5 years post-SEMLS, conditional on baseline GMFCS level III.

Figure 1. The FMS is a 6-point ordinal scale that rates assistance required for mobility in the environmental settings of home, school (FMS 50m) and community (FMS 500m).

Results
Substantial agreement between pre and post-operative GMFCS levels (κ = 0.76) was shown, providing evidence of stability over time. Results of changes in FMS scores at 5 years post-operatively compared to baseline are seen in Table 1. Most change involved change up in FMS scores 1 or more levels, i.e. less assistance required.

Table 2 shows results of the longitudinal modeling for those in GMFCS III.

Table 1. Percentage of children who changed FMS levels (up, down or same). More change was seen for children originally in level III compared to those in III for FMS 5m and 50m. For 500m both groups showed equal change.

Table 2. Probability of assistive device use at 5 years post-operatively based on pre-operative use for those in GMFCS III. Shading represents clinically significant results based on numbers in categories and width of confidence intervals.

Conclusions/significance
Children in GMFCS III are at risk of declining gross motor function if they enter adulthood. SEMLS aims to maintain gross motor function and prevent that decline. This study used the FMS to show that mobility is generally stable or improved at 5 years following surgery, however a small number of children required more assistance to facilitate mobility.

References

ERC: 100971