

Poster Presentation

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Evolution of neural function in spina bifida occulta and aperta

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Background

Spina bifida often results in dysfunction of the central and peripheral nervous system. In spina bifida, the neural tube defect may be covered by skin (SBO) or open (SBA). Fetal surgery in SBA aims to preserve central axonal projections through the meningocele (MMC) and to prevent secondary damage. The present study aimed to determine whether the natural coverage of the neural tube defect in SBO protects central axonal conduction, as could be measured by vesico-urodynamics.

Objective

To compare central and peripheral neural innervation between SBO and SBA in a longitudinal fashion.

Design/Methods

17 SBO and 16 SBA children were investigated at ages 1 and 2–4 years. In both groups the defect was at L3 (median value, range resp. L1-S1 (SBO), and Th12-S1 (SBA)). In all children, spinal segments S2-S4 (innervating anal and bladder reflexes) were located caudal to the defect. Central dysfunctional bladder innervation was defined as overactive detrusor or pelvic muscle activity during vesico-urodynamics. Absence of anal reflexes indicated peripheral neural dysfunction. Surgical detethering was electively performed.

Results

Only in 1 of 17 SBO children detrusor activity became overactive between year 1 and 2–4. The percentage of children with overactive detrusor activity declined significantly ($P < 0.01$) between years 1 and 2–4, both in SBO (from 47% to 23%) and in SBA (from 79% to 38%). Similarly the percentage of children with hyperactive pelvic muscle activity declined significantly ($P < 0.025$) in SBO (from 69% to 20%) and in SBA (from 67% to 45%). At neither time point, the percentages were significantly dif-

ferent between SBO and SBA. Concerning LMN dysfunction however, a larger fraction of SBA children had absence of anal reflexes, compared with SBO (86% vs. 31%, $P < 0.005$).

Conclusions

1. Natural covering of the spinal defect in SBO compared with SBA is not associated with improved central innervation of the bladder; 2. Signs of central bladder dysfunction decline in both SBA and SBO children between age 1 and 2–4 years; 3. Peripheral innervation is better preserved in SBO than in SBA, by a mechanism independent of central innervation.