

Neurodevelopmental Delay According to Severity in Children with Deformational Plagiocephaly

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Objective

The purpose of this study was to investigate the incidence of neurodevelopmental delay among deformational plagiocephaly (DP) children, and to confirm relationship between neurodevelopmental delay and severity of DP.

Material and methods

This study is retrospective study. Figure 1 shows flow charts of this study. Five hundred thirteen children who visited for abnormal head shape through outpatient department were recruited. To identify the children with neurodevelopmental delay among the 513 children with DP, Denver Development Screening Test (DDST) was performed in 38 children who suspected of neurodevelopmental delay. Demographic data of 38 children including risk factor for DP was collected. Cranial vault asymmetry (CVA) was measured by using caliper, and cranial vault asymmetry index (CVAI) was calculated. Thirty eight children with DP who conducted DDST were divided into two groups according to the degree of CVA; group 1 included 21 children with CVA under 10 mm, and group 2 included 17 children with CVA over 10 mm. Chi-square test and independent t-test were used for statistical analysis.

Results

There was no significant difference in demographic data between group 1 and group 2 (Table 1). Mean CVA and CVAI (5.90 ± 2.21 mm, 4.20 ± 1.51 %) in group 1 was smaller than that in group 2 (12.71 ± 3.22 mm, 8.83 ± 2.18 %), respectively ($p < .05$, Table 1). There was a significant difference in number of neurodevelopmental delay between group 1 and group 2, with 7 children of group 1 and 14 children of group 2 ($p < .05$, Table 2). CVAI in neurodevelopmental delay group (7.39 ± 3.24 %) was significantly larger than that in non-neurodevelopmental delay group (4.89 ± 1.84 %) ($p < .05$).

Conclusion

This study showed that incidence of neurodevelopmental delay was 21 (4.09%) out of 513 children with DP, which was affected by the severity of CVA. Our results suggest that children with DP should be screened and monitored for developmental delays.

Table 1. Demographic Characteristics of group 1 and group 2

Variable	Group 1 (n = 21) (CVA<10mm)	Group 2 (n = 17) (CVA≥10mm)
Age (months)	5.33 ± 6.43	5.35 ± 2.44
Gender (boy:girl)	11:10	13:4
Side (Rt.:Lt.)	14:7	8:9
Risk factors		
-Oligohydroamnios	1	1
-Breech delivery	2	3
-Twin baby	3	3
CVA (mm)	5.90 ± 2.21*	12.71 ± 3.22*
CVAI (%)	4.20 ± 1.51*	8.83 ± 2.18*

Values are presented as mean±standard deviation or number.

*The difference was significant by independent t-test (p<.05).

Group 1, Children less than 10mm in CVA; Group 2, Children over 10mm in CVA

CVA, Cranial Vault Asymmetry; CVAI, Cranial Vault Asymmetry Index

Table 2. Prevalence of neurodevelopmental delay between group 1 and group 2

	Group 1 (n = 21) (CVA<10mm)	Group 2 (n = 17) (CVA≥10mm)	P-value
Neurodevelopmental delay (+)	7	14	0.003*
Neurodevelopmental delay (-)	14	3	

Values are presented as number.

*The difference was significant by chi-square test (p<.05)

Group 1, Children less than 10mm in CVA; Group 2, Children over 10mm in CVA

CVA, Cranial Vault Asymmetry

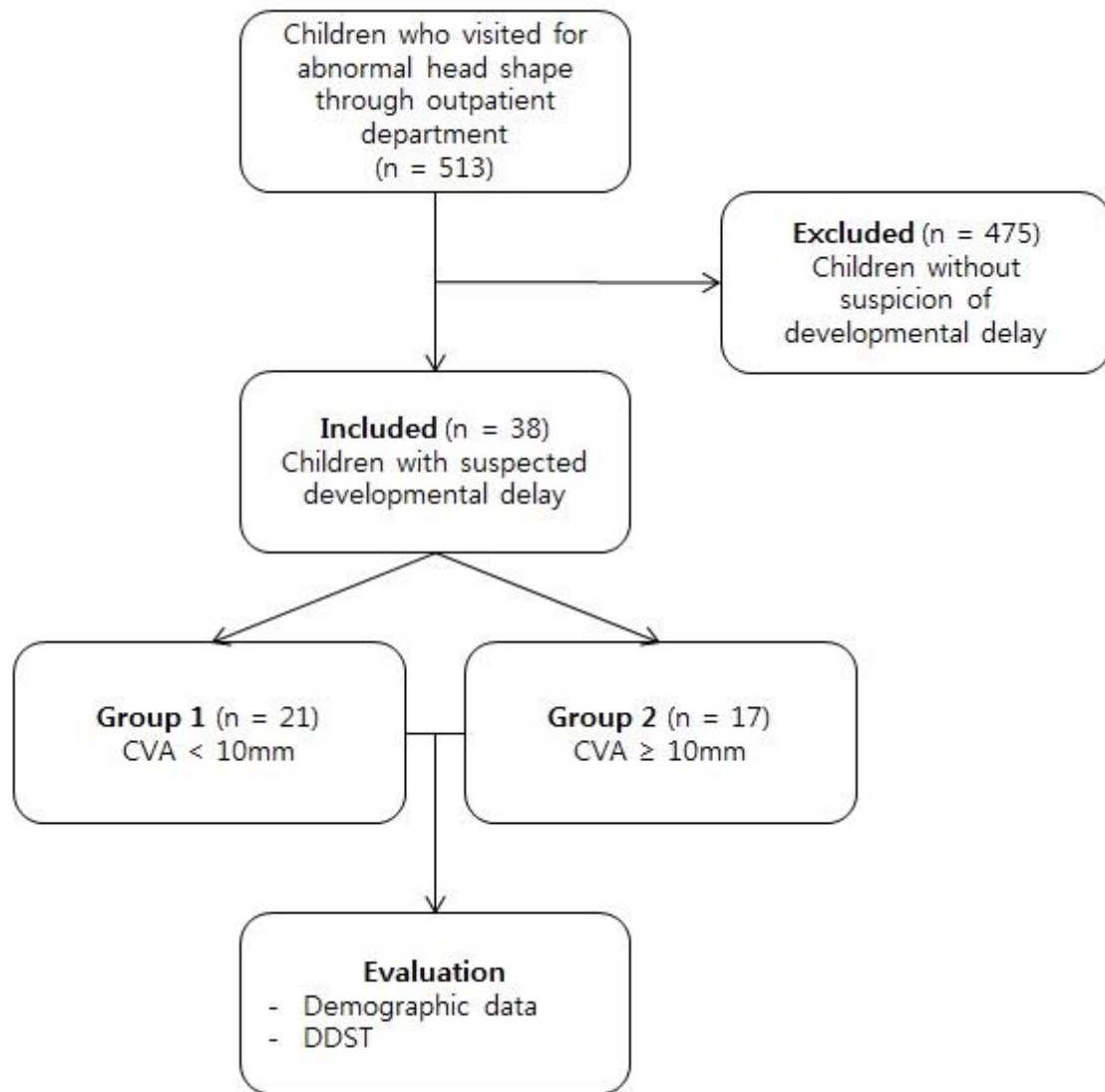


Figure 1. Study flowchart. CVA, Cranial Vault Asymmetry; DDST, Denver development screening test