Predictability of Cerebral Palsy and its characteristics through neonatal cranial ultrasound in a high-risk NICU population

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Abstract

The aim of the study is to evaluate the predictive value of various types of brain injury detected by ultrasound in the neonatal period for the occurrence of cerebral palsy and its characteristics in a large cohort of high-risk infants.

Thousand twenty one consecutively NICU-admitted high-risk infants were assessed up to the corrected age of at least 2 years. CP was categorized into spastic or non-spastic, bilateral or unilateral and mild, moderate or severe CP. Different types of brain injury were identified by serial cranial ultrasound (US) during the NICU stay: white matter disease (WMD), haemorrhage, cerebral infarction, deep grey matter and parasagittal cerebral injury.

There is a significant overall association between different types of brain injury and gestational age. Only 5 percent of the children with normal US develop CP. In the presence of any abnormal US image the likeliness to develop CP is at least 7 times higher. Within the group of infants with WMD and haemorrhage the degree of brain involvement has a clear impact on the occurrence of CP. Concerning the characteristics of CP: deep grey matter lesion predict non-spastic CP versus spastic CP(OR=32, $P<0.001$). Cerebral infarction and haemorrhage grade IV are strong predictors of unilateral spastic CP versus bilateral spastic CP (OR= 49 and 24 respectively, $P<0.001$). Deep grey matter lesion is a significant predictor for severe versus mild and moderate CP (OR=5).

Conclusion: Neonatal US is a useful tool in predicting CP and its characteristics.