Correlation between functional classification of children with cerebral palsy and intracranial ultrasound and magnetic resonance imaging findings

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Introduction: The aim of this population-based study was to evaluate the characteristics of cerebral palsy (CP) and associated impairments in relation to the predominant pattern of magnetic resonance imaging classification system (MRICS) that was analogously applied to infant cranial ultrasound (CUS). [1,2]

Patients and methods: The study included children from the Surveillance of Cerebral Palsy in Europe (SCPE) C28 RCP-HR - Register of cerebral palsy in Croatia, born 2004-2007. History data, motor functions, accompanying impairments and neuroimaging were evaluated in 227 children with brain MRI, of which 185 also had CUS.

Results: 56% of the children had bilateral, 34% unilateral spastic, 9% dyskinetic and 1% ataxic CP. According to the Gross Motor Function Classification System (GMFCS), 62.05% had milder motor impairment (GMFCS I-III) and 37.85% severe (GMFCS IV-V). CUS showed white matter injury in 60%, grey matter injury in 12%, maldevelopments in 8%, miscellaneous changes in 14%, while 6% were normal; MRI showed significant agreement (κ = 0.675, p < 0.001). Neuroimaging findings of maldevelopment and predominant grey matter injury were associated with more severe CP, but 7% of children with CP had normal MRI.

Conclusions: Functional outcomes and accompanying neuroimpairments in children with CP correlate strongly to the predominant neuroimaging patterns. The best outcomes were in children with predominant white matter injury. Because of compatibility of CUS and MRI findings, CUS is recommended for children at increased risk of CP if MRI is not available. Based on neuroimaging finding, we can predict the type and grade of the neuromotor impairment, that is important for the design and plan interventions and therapeutic procedures, and represents secondary CP prevention.