Early Screening for Cerebral Palsy: A Systematic Review

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INTRODUCTION

- CP is the most common motor disability in childhood
- Preterm and ELBW infants are at increased risk for CP
- Early identification & intervention are critical to optimize neurodevelopmental outcomes & quality of life

METHODS

Comprehensive systematic review was conducted using MEDLINE (PubMed), Embase (Elsevier), & Web of Science (Clarivate)

2,283 citations were screened by two reviewers; 154 citations were identified & reviewed, with 44 studies selected for inclusion.

Inclusion criteria: preterm infants at high risk for CP, CP diagnosis prior to 12 months of age, & evaluation of early intervention

RESULTS

20 screening tools evaluated, alone or in combination with other tools.

MRI in combination with other tools such as the GMA improves predictability for CP.

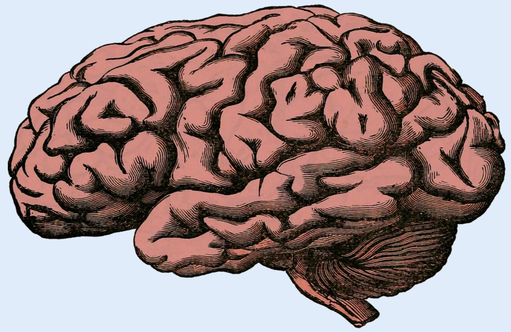
GMA was useful in predicting CP particularly in identifying high risk trajectories predictive of early neurodevelopmental outcomes.

Lower HRV & poor repertoire GM correlated with later CP diagnosis. Combining other tools such as CUS with the FMA predicted CP better than alone.

HINE & tonic responses (knee jerk response) were predictive of later CP diagnosis.

Computer-based analysis and use of deep machine learning showed good sensitivity for predicting CP with high accuracy.

Other studies explored the use of maternal serum biomarkers & found that lower mean PaPP-A and β-HCG levels were associated with CP diagnosis.



PURPOSE

- To critically evaluate the predictive accuracy & clinical utility of various neonatal screening methods in facilitating the diagnosis of CP

Category	Examples
Neuroimaging	MRI, CUS
Motor Performance	GMA, FMA
Neurologic Examinations	HINE, Knee Jerk responses
Technological Tools	Computer-based analysis, Deep learning models
Biomarkers	Maternal serum PaPP-A, β-HCG, HRV

CONCLUSIONS

- Using a combination of neuroimaging, motor performance, and neurologic assessments significantly improves diagnostic accuracy of diagnosing CP before 1 year of age
- Tools such as the GMA and MRI are especially effective, particularly when used together & when utilized in combination with other screening tools

IMPLICATIONS FOR PRACTICE AND RESEARCH

- Further validation is needed for new technologies
- Early identification enables timely intervention, which may improve developmental outcomes & reduce long-term disability in this high-risk population