REHABILITATION MEASURES AFTER PEDIATRIC STROKE

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Abstract; *The purpose of this focused review is to compile the most recent literature on pediatric stroke neuromotor interventions and summarize evidence for use by rehabilitation providers and researchers. Terms including stroke, pediatric, and neuromotor were searched with appropriate MeSH terms. Information was collected regarding interventions conducted and outcome measures used for each article. Interventions and outcome measures were organized based on ICF components (Body Structure and Function, Activity, Participation, and Environmental Factors).*

Key words: *childhood stroke, stroke risk scales, prehospital stage.*

INTRODUCTION

Pediatric stroke is defined as an injury to a child's central nervous system caused by an occlusion or rupture of a blood vessel in the brain or spinal column before or after birth,[1] which can result in lifelong motor, cognitive, communication, and sensory impairments[2,3]. Treating these deficits through rehabilitation is important; however, few treatment guidelines specific to pediatric stroke exist.

Motor impairment is primarily addressed through neuromotor rehabilitation provided by an interprofessional team of occupational, physical, and speech-language therapists who collaborate to improve functional activity capacity and performance as well as participation in life's activities.

The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, and by secondary musculoskeletal problems[10]. Because children diagnosed with CP may present with a broader range of impairments and activity limitations, it is unclear if the current evidence-based rehabilitation treatments for CP may or may not be optimal for a more specific diagnosis of pediatric stroke. The systematic reviews authored by Novak and colleagues highlight evidence for CP treatments, but are not specific to stroke.

Following pediatric stroke, oftentimes rehabilitation treatment focuses on ameliorating the co-occurring motor body structure and function impairments (eg, spasticity, motor delays, sensory deficits) although evidence suggests that neuromodulation technologies (eg, brain stimulation), which directly target the actual neurological body function and structure impairment, may be more effective.

METHODS

Data extracted from eligible studies included the first author's last name, publication year and country, age and sex of participants, stroke etiology, mechanism, and location (if available), primary and/or secondary outcomes, and neuromotor treatment provided.

Results were filtered for children between birth-16 years old. All references from identified articles and reviews were screened for potential inclusion. The search procedures and methods were overseen by an experienced librarian.

RESULTS

After duplicates were removed, the initial search yielded 3635 articles. One hundred and fifty-eight articles met criteria for full-text review. The full-text review led to the exclusion of 133 articles for 1) stroke not specified (n = 18), 2) absence of neuromotor treatment (n = 132), or 3) adult focus (n = 7). Searches of the reference lists yielded an additional article that met inclusion criteria. Hence, the literature search resulted in 18 articles meeting criteria: 3 case studies, 6 randomized controlled trials, and 4 studies with either feasibility, cost-utility, retrospective, longitudinal, or qualitative designs.

The interventions were classified into an ICF category according to the study's neuromotor treatment description. In some cases, overlapping made it difficult to distinguish between ICF components- this was especially true for participation and environmental when considering neuromotor treatment. For example, a day-camp setting facilitated an environment that allowed participation for children with disabilities in an inclusion camp setting. Because of this intersection, we combine the components of participation and environment in this review. In addition, some studies incorporated neurophysiological measures as primary outcome measures, but also collected neuromotor secondary outcome measures. These studies were organized within the ICF framework according to article's description of the neuromotor treatment.

CONCLUSION

A medical diagnosis of cerebral palsy may not be informative enough to recommend specific brain stimulation or neuromodulation treatments. Children will need diagnostic imaging to provide that information. Standard of care will likely shift in a similar direction towards personalized and precision rehabilitation and neuromodulation as research and technology advance.Researchers should provide detailed information around their inclusion/exclusion criteria as well as additional information related to sample characteristics to determine the applicability of results to specific patient populations. There may be some impact of mechanism or location of injury on who responds and who does not respond to specific treatments.

Healthcare providers involved in the care of children after stroke should be aware of the current and forthcoming literature regarding neuromotor interventions. Across disciplines, there are providers responsible for referring children to appropriate rehabilitation services, as well as therapists and clinicians responsible for treatment planning and assessing progress.

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