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Interventions and Management

Interventions and Management
1.Research methodology: A bibliometric review using the spastic hand as an example

Xingyi Ma, Wendong Xu

Editorial J Hand Surg Eur Vol . 2024 Dec 12:17531934241305802. doi: 10.1177/17531934241305802. Online ahead of print.

Abstract
Bibliometric review involves systematically analysing the academic literature on a particular topic, enabling researchers to better understand the trajectory and future trends of a specific research field. This study uses various bibliometric tools to analyse relevant research on the spastic hand over the past two decades, aiming to identify key contributors, hotspots and emerging trends. The results show that early studies focused on cerebral palsy, stroke and botulinum toxin treatment, while recent advancements highlight surgical procedures such as neurectomy and soft tissue transfer. Future research should enhance international collaboration and the use of neuroimaging and electrophysiological techniques to gain a deeper understanding of the neural mechanisms underlying spasticity, optimize surgical procedures and explore novel treatments for spastic hand.
PMID: 39668618

2. Effect of selective dorsal rhizotomy on neuromuscular symptoms, muscle morphology, and motor function in children with spastic cerebral palsy

No authors listed

Dev Med Child Neurol. 2024 Dec 12. doi: 10.1111/dmcn.16201. Online ahead of print.

No abstract available
PMID: 39668133

3. Short-term selective dorsal rhizotomy responders among children with bilateral cerebral palsy

No authors listed

Dev Med Child Neurol . 2024 Dec 12. doi: 10.1111/dmcn.16209. Online ahead of print.

No abstract available
PMID: 39668118

4. Incidence of Avascular Necrosis of the Femoral Head Post Hip Reduction Surgery in Children With Cerebral Palsy

Edidiong Essiet, Chinedu Egu, Samuel Akintunde, Mohammed Qasim Rauf

Review Cureus . 2024 Dec 8;16(12):e75348. doi: 10.7759/cureus.75348. eCollection 2024 Dec.

Abstract
Avascular necrosis (AVN) of the femoral head confers a risk of morbidity amongst cerebral palsy (CP) patients. Meanwhile, the proportion who develop AVN post hip reduction surgery is unclear, and the risk factors are not established. To estimate the incidence and risk factors for AVN post hip reduction surgery in CP patients, we reviewed and analysed literature from Medline, Embase, and Web of Science repositories between January 1, 1990, and August 31, 2024. The included publications were reviewed for the incidence and risk factors in this cohort of patients. Findings were appraised using the methodological index for non-randomised studies, and scores and results were descriptively analysed. Given the marked heterogeneity of retrieved data, results were reported as standardised values, including the mean weighted incidence rate. A total of 1619 hip reduction surgeries were performed on 1045 CP patients across 12 retrospective studies with 424 cases of AVN. The mean age at surgery ranged from 7.3 to 16.2 across studies. The mean incidence was 0.482% ± 0.06945 per person-year. Most patients were in gross motor function classification system V, with a preoperative mean Reimers index of 54.11-80%. The average methodological items for non-randomised studies score was 10.08/16 ± 0.28 for all studies (n=12). AVN has a definite relationship with hip reduction surgery. The low methodological quality of reviewed studies informs the need for well-designed prospective randomised controlled studies to understand the mechanics of this relationship in terms of age of surgery and Reimers hip migration index, guide surgical timing, and patient selection.
PMID: 39654598

5. GUIDANCE study: guided growth of the proximal femur to prevent further hip migration in patients with cerebral palsy-study protocol for a multicentre randomised controlled trial

Renée Anne van Stralen, Merel Charlotte Rosalie Roelen, Sophie Moerman, Melinda Maria Eva Helena Witbreuk, M Adhiambo Witlox, Arno Ten Ham, Denise Eygendaal, Max Reijman, Jaap Johannes Tolk

Randomized Controlled Trial BMJ Open . 2024 Dec 11;14(12):e091073. doi: 10.1136/bmjopen-2024-091073.

Introduction: Up to one-third of patients with cerebral palsy (CP) develop hip migration. Current standard care for early hip migration is bilateral adductor-psoas tenotomy; however, the failure rate is relatively high with 34%-74% of patients with CP requiring secondary hip surgery. Using temporary medial hemiepiphysiodesis of the proximal femur (TMH-PF), the morphology of the hip can be changed. This technique aims to reduce further hip migration and the need for secondary surgical management. Further research is necessary to determine the benefit of TMH-PF in addition to adductor-psoas tenotomy. The hypothesis of this study is that TMH-PF combined with adductor-psoas release decreases the chance of progressive hip migration and the need for secondary hip surgery, compared with adductor-psoas release alone.
Methods and analysis: The GUIDANCE study is an open-label multicentre randomised controlled trial. Patients with CP aged between 2 and 8 years, with spastic CP-Gross Motor Function Classification System IV or V, hip abduction ≤40° and hip migration of 30%-50% can be included in this trial. They will be randomised into a control arm (adductor-psoas tenotomy) or an intervention arm (adductor-psoas tenotomy+TMH PH). The primary outcome will be treatment failure at 5-year follow-up. At 2-year follow-up a preliminary analysis will be performed. Secondary outcomes will be differences in patient-reported outcome measures (CPCHILD and CPG pain score), range of motion, radiological measurements including head shaft angle and hip migration percentage and three-dimensional (3D) morphological changes to the proximal femur. Furthermore, an analysis will be performed to identify predictors for treatment failure in both treatment arms.
Ethics and dissemination: The GUIDANCE study should provide evidence on the effectiveness of TMH-PF in addition to adductor-psoas tenotomy in children with CP with early hip migration. If beneficial, larger hip reconstructive procedures can be delayed or prevented, providing a distinct benefit for these vulnerable children. The study's strengths lie in its methodological framework, incorporating randomised allocation and intervention assessment. The main limitation is the inability to blind the treating physician or the researcher for the treatment arm the participant is allocated to. The results of the GUIDANCE study will be presented at scientific meetings and published in international peer-reviewed journals. The aim is to publish the results at 2 years follow-up and 5 years follow-up and to publish the results of the analysis on the 3D morphology of the hip after TMH-PF. Individual de-identified participant data that underlie the results from the GUIDANCE study and the study protocol will be shared if requested.
Trial registration number: Clinical Trial Registry number: NCT06118736. Registered on 3 November 2023.
PMID: 39663160

6. Longitudinal relationship between hip displacement and hip function in children and adolescents with cerebral palsy: A scoping review

No authors listed

Dev Med Child Neurol . 2024 Dec 12. doi: 10.1111/dmcn.16208. Online ahead of print.

No abstract available
PMID: 39668126

7. Modeling the distribution and progression of motor ability among children with cerebral palsy: An analysis of three reference centile sets

Rachel Sanderlin, Charlotte Schluger, Joe Wu, Francis Ang Eusebio, Amy L Roberts, Laura Prosser

Heliyon . 2024 Nov 22;10(23):e40615. doi: 10.1016/j.heliyon.2024.e40615. eCollection 2024 Dec 15.

Background: Reference centiles describing gross motor function in children with cerebral palsy (CP) are used in clinical and research settings to guide treatments and evaluate interventions. However, it is unknown how existing references generalize to populations in novel settings.
Aims: The aim of this study is to evaluate the cross-sectional and longitudinal performance of three reference centiles to describe the motor function of children with CP aged 2-12 years at a large urban US pediatric hospital through a retrospective observational study.
Methods: and Procedures: We assessed cross-sectional performance by ranking our clinical population by quartile distributions described by the references. We assessed longitudinal performance by analyzing the distribution of prediction errors and correlations between predictions and observed scores.
Outcomes and results: For cross-sectional distribution, the reference centiles by Hanna more closely described our population than those by Duran. For longitudinal progression, prediction error was less than 6 GMFM points for most records at 24-, 12-, and 6-month time scales for all three sets of reference centiles, but higher at a 48-month time scale. Prediction errors increased at younger ages and higher motor ability.
Conclusions and implications: Despite differences in cross-sectional performance, all three reference centiles achieved similar longitudinal performance and are sufficient for most clinical and research uses. Caution should be used when applying these curves to locations with different standards of care.
PMID: 39660208

8. Pediatric Constraint-Induced Movement Therapy: Current Practices and Implementation Barriers

Sophia C Larson, Alyssa E Smith, Bhooma R Aravamuthan, Hunter G Moore, Kaylin A Antonoff, Sharon Ramey, Catherine R Hoyt

OTJR (Thorofare N J). 2024 Dec 11:15394492241300607. doi: 10.1177/15394492241300607. Online ahead of print.

Abstract
Hemiplegic Cerebral Palsy (CP) is the most common pediatric motor disability, characterized by unilateral motor weakness. Pediatric Constraint-Induced Movement Therapy (pCIMT) improves affected extremity function but faces variable clinical integration. This study assessed U.S. providers' awareness and use of pCIMT, educational practices, and barriers to broader implementation for more eligible children. Overall, 148 providers specializing in pediatric stroke or hemiplegic CP completed surveys on pCIMT familiarity, implementation challenges, and support for evidence-based practices (EBP). Participants indicated high pCIMT competency. Although 75% reported regional pCIMT availability, only 14% indicated that pCIMT is accessible to all children who could benefit. Reported barriers included therapist and family availability, cost, and institutional limitations. Despite valuing EBP, participants reported minimal workplace support for its use. The study revealed significant barriers to pCIMT accessibility and implementation. Further research is needed to address these challenges and improve clinical adoption of EBP, such as pCIMT.
Plain language summary
Understanding How to Get a Targeted Movement Intervention to All Children With One-Sided Weakness in the United StatesHemiplegic Cerebral Palsy (CP) affects movement on one side of the body and is the most common pediatric movement disorder. Pediatric Constraint-Induced Movement Therapy (pCIMT) improves the use of the affected limb, but it is not widely used. We wanted to understand why and figure out where and how it is being offered. We surveyed 148 professionals in health care and academia about their awareness of pCIMT, what makes it hard to use, whether pCIMT is offered near them, and about workplace support for evidence-based treatments. The survey also asked how pCIMT is typically provided, including how long treatments last, type of constraint, and constraint wearing schedule. Most providers reported awareness of and local availability of pCIMT. However, they reported that not all children who might benefit from it had access. The main obstacles that were identified were finding enough time for therapists and families, the cost of treatment, and limits set by health care facilities. In addition, pCIMT programs were reported to vary widely in how they were structured and delivered, which could affect how well they work. Workplaces generally supported evidence-based practices but did not always make them a top priority. Better understanding provider’s perspectives about pCIMT, how it is currently offered, and obstacles to availability can aid in the identification of implementation strategies to address the challenges that make it difficult for providers to offer widely. Future research can investigate the impact of educating therapists about its benefits and how it can be covered by insurance/ Medicaid; the use of flexible guidelines for pCIMT programs that can be adapted to different settings and patient needs; and specialized training.
PMID: 39659237

9. Pain in Children and Adolescents with Cerebral Palsy: A Cross-sectional Survey Study

Lena A Bischoff, Anne Tscherter, Sandra Hunziker, Sebastian Grunt, Nicole T Graf, Christoph T Künzle, Philip J Broser

Neuropediatrics . 2024 Dec 9. doi: 10.1055/a-2474-6503. Online ahead of print.

Aim: This study aims to investigate the prevalence, intensity, and location of pain in children and adolescents with cerebral palsy (CP) and analyze pain-related symptoms and participation restrictions.
Methods: Children and adolescents aged 2 to 16 years diagnosed with CP were invited to participate in a pain survey. The questionnaire was based on the German Pain Questionnaire for Children, Adolescents and Parents (DSF-KJ). It was administered to children (2-11 years) by their caregivers, while adolescents (12-16 years) were asked to complete the questionnaire themselves or with the help of their caregivers.
Results: Fifty-seven of 133 children and adolescents with CP (43%) reported having pain in the past 12 months, of whom 17 (30%) reported chronic pain. Patients with Gross Motor Function Classification System (GMFCS) IV-V reported more frequent pain ($p = 0.003$) and higher pain intensity ($p = 0.011$). Lower extremity pain was the most common. Twenty-three percent of participants with pain did not receive any treatment. Pain often restricted participation, specifically by reducing sports activity in patients with GMFCS I-III, focusing attention on patients with GMFCS IV-V, and activities with the family in both GMFCS level categories.
Interpretation: Pain is common in children and adolescents with CP and frequently restricts their participation. Therefore, it must be consistently recorded and addressed during the consultation. The goal of treatment should be not only to reduce pain but above all to increase participation.
PMID: 39653115

10. Cross-cultural validation in Greek and reliability of the Eating and Drinking Ability Classification System in children with cerebral palsy

Angeliki Zarkada, Rigas Dimakopoulos, Terpsithea Germani, Angeliki Zavlanou, Arietta Spinou, Helen Skouteli

J Paediatr Child Health . 2024 Dec 9. doi: 10.1111/jpc.16739. Online ahead of print.

Aim: To investigate the reliability and validity of the Greek version of the Eating and Drinking Ability Classification System (EDACS) in children with cerebral palsy (CP).
Methods: The sample of the study included children with CP, aged 3-18 years and classified into Levels I-V of the Gross Motor Function Classification System (GMFCS). Parents of children with CP and speech and language therapists (SLTs) with a minimum of 5 years of clinical experience were recruited. Inter-rater reliability (IRR) between SLTs and between SLT and parent was evaluated using intraclass correlation coefficient (ICC). Validity was evaluated by investigating the potential association between the EDACS and Communication Function Classification System (CFCS) and GMFCS, using ordinal logistic regression.
Results: One hundred twenty-one children with CP (mean age 8.2 ± 4.1), 72 males, GMFCS Levels I-V were included in the study. Ninety-one parents of children with CP (mean age 8.8 ± 4.2), 54 males and 8 experienced SLTs, assessed the eating and drinking abilities of the children. The IRR between SLTs was excellent (ICC = 0.94), and between SLTs and parents was high (ICC = 0.90). Both CFCS and GMFCS were positive predictors for EDACS.
Conclusions: The Greek version of EDACS is a valid and reliable tool and it can be used to classify eating and drinking ability in Greek children with CP.
PMID: 39654134

11. Inter- and intrarater reliability of the Eating and Drinking Ability Classification System in Sweden

Eva Sjöstrand, Elisabet Rodby-Bousquet

Disabil Rehabil. 2024 Dec 13:1-5. doi: 10.1080/09638288.2024.2439011. Online ahead of print.

Purpose: To evaluate inter- and intrarater reliability, of the Eating and Drinking Ability Classification System (EDACS) for children and adults with cerebral palsy (CP) in Sweden.
Methods: Four speech and language pathologists rated EDACS from videos of 30 individuals with CP, 3 to 62 years, (mean 21 y, 10 m, SD 18 y, 6 m), six at each level of the Gross Motor Function Classification System (GMFCS). Inter- and intrarater reliability were estimated using Intraclass Correlation Coefficient (ICC) with 95% confidence interval.
Results: Interrater reliability was excellent, ICC 0.98 (95% CI 0.95-0.99) for EDACS levels I-V and ICC 1 for need for support, as was intrarater reliability, ICC 0.97 (95% CI 0.93-0.98) for EDACS levels I-V and ICC 0.99 (95% CI 0.99-1) for need for support.
Conclusions: When rated by speech and language pathologists, EDACS shows excellent inter- and intrarater reliability for children and adults with CP. EDACS can identify eating and drinking ability and need for support in individuals at all GMFCS levels.
Plain language summary
When rated by speech and language pathologists, Eating and Drinking Ability Classification System shows excellent inter- and intrarater reliability for children and adults with cerebral palsy in Sweden.Eating and drinking ability and need for support differ between individuals at Gross Motor Function Classification System levels I to V.
PMID: 39668731

12. Using 3D immersive virtual reality interactive tasks for upper limb rehabilitation in children with cerebral palsy: A randomized controlled trial

Héloïse Baillet, Simone Burin-Chu, Laure Lejeune, Régis Thouvarecq, Corentin Clément-Gillotin, Pascale Leconte, Nicolas Benguigui

Dev Neurorehabil . 2024 Dec 14:1-16. doi: 10.1080/17518423.2024.2438949. Online ahead of print.

Abstract
The aim of this study was to investigate the effects of the virtual reality device on the evolution of motivation, and motor, functional and kinematic parameters of the upper limb in children with cerebral palsy. Twenty children were randomly assigned in VR and control groups. VR group scored higher than the control group in the Movement Assessment Battery for Children - Second Edition (MABC-2; standardized motor skills test), exhibited an increased range of motion, and showed improved results in various movement parameters in the interaction with the 3D virtual space. All participants presented high motivation scores in the iVR sessions. This new Immertrack tool may improve the motor, kinematic parameters, and motivation in children with CP.
PMID: 39673448

13. Effect of Smart Mobile Applications in the Care of Children with Cerebral Palsy

Elahe Gozali, Rahimeh Tajvidi Asr, Kasra Kashani, Bahlol Rahimi

Review Iran Biomed J . 2024 Dec 1;28(7):3.

Introduction: Cerebral palsy is a common neurodevelopmental disease that causes motor dysfunction and affects the lives of patients and their families. It seems that the smart mobile phone application, in the care of children with cerebral palsy, creates suitable opportunities for the development of assistive technologies that can support disabled people in daily life activities by increasing awareness and recognition and have an effective role in reducing the consequences and management costs of these patients. This study was conducted with the aim of investigating the impact of smart mobile phone applications in the care of children with cerebral palsy.
Methods and materials: In this study, we conducted a search for articles published from 2018 to 2023 in databases such as PubMed, Scopus, Web of Science and Google Scholar, using MESH keywords, including "cerebral palsy", "mobile application", "mobile health", and other similar terms. After reviewing the full text of the articles, relevant data were extracted and categorized, and the findings were presented in descriptive manner.
Results: The objectives of the developed smart mobile phone applications included training caregivers of children with cerebral palsy, implementing occupational and physiotherapy approaches, and increasing the use of the affected upper limb during daily activities. Additionally, the applications aimed to enhance game-based training and empower children to communicate more effectively. Advanced tools were also incorporated for measuring the rotation percentage of the femur and pelvis, as well as for measuring hip radiography.
Conclusion and discussion: The findings of this systematic review show that despite reporting the impact of smart mobile phone applications in the care of children with cerebral palsy in developed countries, no complete studies have been conducted in this regard in our country. Hence, considering the importance of the impact of this programs on children with cerebral palsy, it is suggested that more studies are conducted in Iran in line with the design of smart mobile phone applications for training caregivers and parents of children with cerebral palsy.
PMID: 39655687

14. Factors Associated with Performance of Activities and Participation of Brazilian Children and Adolescents with Cerebral Palsy: A Cross-Sectional Study

Déborah Ebert Fontes, Kênnea Martins Almeida Ayupe, Rafaela Silva Moreira, Rosane Luzia de Souza Morais, Paula Silva de Carvalho Chagas, Egmar Longo, Ana Carolina de Campos, Aline Martins de Toledo, Hércules Ribeiro Leite, Ana Cristina Resende Camargos

Dev Neurorehabil . 2024 Dec 12:1-7. doi: 10.1080/17518423.2024.2438961. Online ahead of print.

Abstract
The aim of this study was to investigate factors related to performance in daily activities, mobility, social/cognitive skills, and responsibility of Brazilian children/adolescents with cerebral palsy (CP). Multivariate binary logistic regression analyses were performed. A total of 190 children/adolescents participated. Most participants performed below expected in mobility, which could be explained by age, locomotion ability, and anatomical distribution of motor impairment (R2 = 0.50). Performance in daily activities (R2 = 0.44) and responsibility (R2 = 0.23) were explained by age and locomotion ability. This study contributes to understanding the factors that explain the functioning of children/adolescents with CP in Brazil, a low/middle-income country.
PMID: 39665687

15. Internal Consistency and Reliability of the Filipino Gross Motor Functional Classification System - Expanded and Revised

Kelsey Maxine C Tan, Carl Froilan D Leochico, Josephine R Bundoc, Dorothy Dy Ching Bing-Agsaoay

Acta Med Philipp . 2024 Nov 15;58(20):90-97. doi: 10.47895/amp.v58i20.9172. eCollection 2024.

Background and objective: The Gross Motor Function Classification System - Expanded and Revised (GMFCS-E&R) is a valid tool commonly used by physicians, therapists, and potentially also by other healthcare workers even at the primary care and grassroots levels to facilitate immediate screening, appropriate referral, and management of children with disability needing mobility devices. As Filipinos comprise one of the largest diaspora populations, this study aimed to provide a Filipino version of the GMFCS-E&R and determine its internal consistency and inter- and intra-rater reliability.
Methods: A multidisciplinary group of rehabilitation professionals at Philippine General Hospital worked with linguists to translate the original English GMFCS-E&R to Filipino/Tagalog, the Philippines' official language. Several steps were done: authorization from the original tool developers (CanChild™); forward and backward translations; semantic analysis; content analysis; pilot testing; and submission of final version to CanChild™. Internal consistency and inter- and intra-rater reliability were determined.
Results: The Filipino GMFCS-E&R translation was formulated and underwent several modifications. The final version yielded high internal consistency (Cronbach's alpha: 0.96) and inter- and intra-rater reliability (interclass correlation coefficients: 0.895 and 0.928, respectively).
Conclusion: The Filipino GMFCS-E&R is a reliable tool for use among pediatric Filipino patients for communication, clinical decision-making, registries, and research.
PMID: 39664619

16. Experiences of participation in daily life of adolescents and young adults with cerebral palsy: A scoping review

Stacey L Cleary, Prue E Morgan, Margaret Wallen, Ingrid Honan, Nora Shields, Freya E Munzel, James R Plummer, Cassandra Assaad, Petra Karlsson, Evelyn Culnane, Jacqueline Y Ding, Carlee Holmes, Iain M Dutia, Dinah S Reddihough, Christine Imms

Review Dev Med Child Neurol . 2024 Dec 14. doi: 10.1111/dmcn.16196. Online ahead of print.

Aim: To synthesize the experiences of 15- to 34-year-olds with cerebral palsy (CP) as they participate in key life situations of young adulthood.
Method: A mixed-methods scoping review was undertaken and six electronic databases searched (January 2001 to August 2023). Participation foci and thematic outcomes were mapped to the International Classification of Functioning, Disability and Health. Results were integrated using a convergent integrated analysis framework, and data analysis completed through thematic synthesis. Themes were mapped to the family of Participation-Related Constructs.
Results: Thirty-eight publications (32 studies; 2759 participants) were included. More participants were male (n = 1435), walked independently (n = 1319), and lived with their families (n = 1171). 'Claiming my adulthood and "doing" life' was the unifying descriptor of participation, conveying the effortful work young people felt necessary to take their places in the adult world. The physical accessibility of the environment was a significant barrier to participation, as were people's negative attitudes or misconceptions about disability. A close-knit 'circle of support', typically family members, formed a supportive foundation during this period.
Interpretation: Young people with CP aim to participate fully in adult life, alongside their peers. Improved community accessibility, inclusion, and more supportive health environments would ensure they could live the lives they choose.
PMID: 39673293

17. Neurodevelopment of Critical ILL Neonates at the Age of 12 Months

Sanja Ristovska, Zoran Gucev, Valentina Dukovska

Pril (Makedon Akad Nauk Umet Odd Med Nauki) . 2024 Dec 12;45(3):25-36. doi: 10.2478/prilozi-2024-0020. Print 2024 Nov 1.

Abstract
Critically ill neonates who survive are often left with dire consequences. Cerebral palsy, other neurological and motor deficiencies, intellectual disability, and various degrees of cognitive and behavioral deficiencies all result from neonatal critical diseases. We investigated psychomotor development in 20 children with hypoxic-ischemic encephalopathy (HIE), and as newborns often have multiple comorbidities, the following as well: HIE with respiratory distress syndrome (RDS), infections, hypo and hyperglycemia and hypocalcemia. Socio-demographic, pregnancy and delivery data together with appropriate staging tools in determining the severity of HIE or RDS were utilized in this evaluation. In addition, a physical examination, Apgar score, blood gas analyses, biochemical, microbiological and ultrasound data were also part of this study. A child's psychomotor development includes four main areas: motor skills, language, cognition, and social relationships. The Griffiths Mental Development Scale (GMDS) compares different developmental domains and enables early diagnosis of deficiencies and guidance for appropriate early intervention. Six children (30%) were diagnosed with cerebral palsy. GMDS showed that at the age of one year, 50% of the children had typical development, 5% had mild disability, 20% moderate disability and 25% had severe disability. The severity of HIE, Apgar score, weak muscle tone, seizures, disturbances in glucose homeostasis, comorbidities (sepsis, infection) statistically significantly impacted the outcome. Studies with a greater number of patients are needed to support these findings and enable early interventions to avoid severe consequences of critical illness neonates.
PMID: 39667006.

Prevention and Cure

18. The role of stem cells in the management of neonatal posthemorrhagic hydrocephalus

Christodoulos Komiotis, Ioannis Mavridis

Review Childs Nerv Syst . 2024 Dec 9;41(1):40. doi: 10.1007/s00381-024-06703-2

Purpose: Neonatal intraventricular hemorrhage (IVH) is a common complication of prematurity as it affects 12.4% of preterm infants weighing under 1500 g. Posthemorrhagic hydrocephalus (PHH) is an important complication of neonatal IVH and can have serious long-term consequences such as cognitive impairment and cerebral palsy. The purpose of this review is to determine whether stem cell transplantation can play a role in the treatment of neonatal IVH mainly focusing on the prevention of the catastrophic sequelae of neonatal IVH, as well as to the improve outcome of these patients.
Methods: A literature search was performed using the PubMed/MEDLINE and Scopus databases, and after meticulous screening, eight articles were finally selected. The authors included both animal and human studies in this narrative review.
Results: Our review included eight articles, five animal studies and three human studies, including one phase 1 clinical trial, one pilot study, and one case report. Intraventricular transplantation of mesenchymal stem cells (MSCs) early after IVH diagnosis seems to prevent the development of PHH, improve myelination, and reduce periventricular cell death, inflammation, and reactive gliosis. It also seems to be a safe and well-tolerated procedure in preterm infants.
Conclusion: Animal and human study findings regarding stem cell transplantation in the treatment of IVH show promising results in reducing the risk of PHH. Further research with larger series is needed to better determine its safety and efficacy. Larger studies such as randomized controlled trials could establish the efficacy and tolerability of the treatment.
PMID: 39652204