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NEWS
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Interventions and Management

1. J Pediatr Rehabil Med. 2015 Sep 6;8(3):197-206. doi: 10.3233/PRM-150334.

Everyday movement and use of the arms: Relationship in children with hemiparesis differs from adults.

Sokal B, Uswatte G, Vogtle L, Byrom E, Barman J.

PURPOSE: In adults with hemiparesis amount of movement of the more-affected arm is related to its amount of use in daily life. In children, little is known about everyday arm use. This report examines the relationships between everyday movement of the more-affected arm and its (a) everyday use and (b) motor capacity in children with hemiparesis. METHODS: Participants were 28 children with a wide range of upper-extremity hemiparesis subsequent to cerebral palsy due to pre- or peri-natal stroke. Everyday movement of the more-affected arm was assessed by putting accelerometers on the children's forearms for three days. Everyday use of that arm and its motor capacity were assessed with the Pediatric Motor Activity Log-Revised and Pediatric Arm Function Test, respectively. RESULTS:
Intensity of everyday movement of the more-affected arm was correlated with its motor capacity (rs ≥ 0.52, ps ≤ 0.003). However, everyday movement of that arm was not correlated with its everyday use (rs ≤ 0.30, ps ≥$ 0.126).
CONCLUSIONS: In children with upper-extremity hemiparesis who meet the study intake criteria amount of movement of the more-affected arm in daily life is not related to its amount to use, suggesting that children differ from adults in this respect.

PMID: 26410062

2. Phys Occup Ther Pediatr. 2015 Sep 30:1-22. [Epub ahead of print]

Establishing Australian Norms for the Jebsen Taylor Test of Hand Function in Typically Developing Children Aged Five to 10 Years: A Pilot Study.

Beagley SB, Reedman SE, Sakzewski L, Boyd RN.

AIMS: The aim of this study was to present preliminary normative data for the Jebsen Taylor Test of Hand Function test (JTTHF) in Australian children. Normative data provide reference values for comparison of upper limb capacity when evaluating and planning treatment. METHODS: The JTTHF administration procedures and materials were standardized. One hundred and two typically developing children aged 5 to 10 years in Brisbane, Australia, were then assessed using the JTTHF. RESULTS: Five-year-old children were significantly different to all

other groups (one year age bands), and 6-year-old children were significantly different from 9-year-old children in the dominant hand. Regression modeling showed improvements of 0.9 and 0.89 s in JTTHF total time for the dominant and nondominant hands, respectively, for every 12 months of maturation in 6- to 10-year-old children. CONCLUSIONS: This paper presents preliminary JTTHF norms for Australian typically developing children 5 years, 6 to 7 years, 8 to 9 years, and 10 years of age.

PMID: 26422461

3. Phys Occup Ther Pediatr. 2015 Sep 30:1-13. [Epub ahead of print]

The Jebsen Taylor Test of Hand Function: A Pilot Test-Retest Reliability Study in Typically Developing Children.

Elizabeth Reedman S, Beagley S, Sakzewski L, Boyd RN.

AIMS: The aim of this pilot study was to evaluate reproducibility of the Jebsen Taylor Test of Hand Function (JTTHF) in children. METHODS: Eighty-seven typically developing children 5 to 10 years old were included from five Outside School Hours Care centers in the Greater Brisbane Region, Australia. Hand function was assessed on two occasions with a modified JTTHF, then reproducibility was assessed using Intraclass Correlation Coefficient (ICC [3,1]) and the Standard Error of Measurement (SEM). RESULTS: Total scores for male and female children were not significantly different. Five-year-old children were significantly different to all other age groups and were excluded from further analysis. Results for 71 children, 6 to 10 years old were analyzed (mean age 8.31 years (SD 1.32); 33 males). Test-retest reliability for total scores on the dominant and nondominant hands were ICC 0.74 (95% CI 0.61, 0.83) and ICC 0.72 (95% CI 0.59, 0.82), respectively. 'Writing' and 'Simulated Feeding' subtests demonstrated poor reproducibility. The Smallest Real Difference was 5.09 seconds for total score on the dominant hand. CONCLUSIONS: Findings indicate good test-retest reliability for the JTTHF total score to measure hand function in typically developing children aged 6 to 10 years.

PMID: 26422369

4. Eur Spine J. 2015 Sep 26. [Epub ahead of print]

Factors predicting postoperative complications following spinal fusions in children with cerebral palsy scoliosis.

Nishnianidze T, Bayhan IA, Abousamra O, Sees J, Rogers KJ, Dabney KW, Miller F.

PURPOSE: The purpose of this study was to review the postoperative complications after posterior spinal fusion (PSF) in cerebral palsy (CP) scoliosis and identify the predictive preoperative risk factors. METHODS: All PSFs consecutively performed for CP scoliosis between 2004 and 2013 were reviewed. Preoperative risk score (ORS) and postoperative complications score (POCS) were used as measures of all recorded preoperative risk factors and postoperative complications, respectively. RESULTS: The review included 303 children with a mean age of 14.6 ± 3.0 years. Mean hospitalization was 16 days. Dependence on G-tube feeding was associated with higher POCS ($P = 0.027$). Postoperative fever, seizures, and septicemia were associated with higher ORS ($P < 0.01$). Specifically, postoperative pancreatitis and deep wound infections were more common in children with G-tube. CONCLUSION:
This study suggests that G-tube dependence is a predictive risk factor of complications after PSF in CP scoliosis. Children with G-tube need special perioperative care. No other specific preoperative risk factor predicted postoperative complications.

PMID: 26410446

5. Masui. 2015 May;64(5):549-51.

[Anesthetic Management Using Frontal Nerve, Greater Occipital Nerve, and Superficial Cervical Plexus Block for Posterior Cervical Spinal Fusion in a Patient with Athetoid Cerebral Palsy]. [Article in Japanese]

Matsunami S, Komasawa N, Fujiwara S, Fujitate Y, Soen M, Minami T.

Here, we report successful anesthetic management of posterior cervical spinal fusion utilizing block of the frontal nerve, the greater occipital nerve, and the superficial cervical plexus in a patient with athetoid cerebral palsy. A 69-year-old woman (height 157 cm; weight 33 kg) with athetoid cerebral palsy was scheduled to undergo posterior cervical spinal fusion for cervical spondylotic myelopathy. After induction of general anesthesia, we performed tracheal intubation using the Pentax-AWS Airwayscope with a thin Intlock. After tracheal intubation, we used ropivacaine for the frontal nerve, greater occipital nerve, and superficial cervical plexus block. Anesthetic maintenance was performed with total intravenous anesthesia utilizing propofol and remifentanil. Continuous administration of dexmedetomidine was started during operation. Following surgery, smooth spontaneous ventilation was observed following uneventful extubation. No significant pain and no athetoid movement were observed under continuous administration of dexmedetomidine.

PMID: 26422967

6. Bone Joint J. 2015 Oct;97-B(10):1441-4. doi: 10.1302/0301-620X.97B10.35978.

Prediction of hip displacement in children with cerebral palsy: development of the CPUP hip score.

Hermanson M, Hägglund G, Riad J, Rodby-Bousquet E, Wagner P.

Hip displacement, defined in this study as a migration percentage (MP) of more than 40%, is a common, debilitating complication of cerebral palsy (CP). In this prospective study we analysed the risk of developing hip displacement within five years of the first pelvic radiograph. All children with CP in southern and western Sweden are invited to register in the hip surveillance programme CPUP. Inclusion criteria for the two groups in this study were children from the CPUP database born between 1994 and 2009 with Gross Motor Function Classification System (GMFCS) III to V. Group 1 included children who developed hip displacement, group 2 included children who did not develop hip displacement over a minimum follow-up of five years. A total of 145 children were included with a mean age at their initial pelvic radiograph of 3.5 years (0.6 to 9.7). The odds ratio for hip displacement was calculated for GMFCS-level, age and initial MP and head-shaft angle. A risk score was constructed with these variables using multiple logistic regression analysis. The predictive ability of the risk score was evaluated using the area under the receiver operating characteristics curve (AUC). All variables had a significant effect on the risk of a MP > 40%. The discriminatory accuracy of the CPUP hip score is high (AUC = 0.87), indicating a high ability to differentiate between high- and low-risk individuals for hip displacement. The CPUP hip score may be useful in deciding on further follow-up and treatment in children with CP. Cite this article: Bone Joint J 2015;97-B:1441-4.

PMID: 26430023

7. Bone Joint J. 2015 Oct;97-B(10):1435-40. doi: 10.1302/0301-620X.97B10.35390.

The radiological assessment of pelvic obliquity in cerebral palsy and the impact on hip development.

Heidt C, Hollander K, Wawrzuta J, Molesworth C, Willoughby K, Thomason P, Khot A, Graham HK.

Pelvic obliquity is a common finding in adolescents with cerebral palsy, however, there is little agreement on its measurement or relationship with hip development at different gross motor function classification system (GMFCS) levels. The purpose of this investigation was to study these issues in a large, population-based cohort of adolescents with cerebral palsy at transition into adult services. The cohort were a subset of a three year birth cohort (n = 98, 65M: 33F, with a mean age of 18.8 years (14.8 to 23.63) at their last radiological review) with the common features of a migration percentage greater than 30% and a history of adductor release surgery. Different radiological methods of measuring pelvic obliquity were investigated in 40 patients and the angle between the

acetabular tear drops (ITDL) and the horizontal reference frame of the radiograph was found to be reliable, with good face validity. This was selected for further study in all 98 patients. The median pelvic obliquity was 4° (interquartile range 2° to 8°). There was a strong correlation between hip morphology and the presence of pelvic obliquity (effect of ITDL on Sharpe's angle in the higher hip; rho 7.20 (5% confidence interval 5.59 to 8.81, p < 0.001). This was particularly true in non-ambulant adolescents (GMFCS IV and V) with severe pelvic obliquity, but was also easily detectable and clinically relevant in ambulant adolescents with mild pelvic obliquity. The identification of pelvic obliquity and its management deserves closer scrutiny in children and adolescents with cerebral palsy. Cite this article: Bone Joint J 2015;97-B:1435-40.

PMID: 26430022

8. J Pediatr Rehabil Med. 2015 Sep 6;8(3):227-34. doi: 10.3233/PRM-150339.

Perceived quality of physiotherapy services among informal caregivers of children with cerebral palsy in Ibadan, Nigeria.

Olaleye OA, Hamzat TK, Oloso MO.

OBJECTIVE: Effective physiotherapy intervention for children with cerebral palsy (CP) requires that expectations of their caregivers be incorporated into treatment plans and strategies. This study explored the perceived Quality of Physiotherapy (QoP) for children with CP in Ibadan, Nigeria METHODS: This cross-sectional survey explored the perceived QoP using the SERVQUAL instrument among informal caregivers of children with CP from two different healthcare facilities. Data was analysed using Mann Whiney U and Wilcoxon Signed Rank tests at $p \leq 0.05$. RESULTS: Fifty-three informal caregivers (50 females, 3 males) of children with CP (32 males, 21 females) were surveyed. Fourth-fifths (81.13%) of the caregivers perceived the QoP service for their children as poor. The highest negative and positive ranks were in the tangible and responsiveness dimensions of the SERVQUAL respectively. CONCLUSIONS: The study demonstrated that caregivers of children with CP perceived the quality of physiotherapy provided for their children as poor. This poor perception is related more to the tangible dimension of care. Strategies to improve care environment for children with CP and their informal caregivers should be implemented to engender satisfaction with care.

PMID: 26410065

9. J Pediatr Rehabil Med. 2015 Sep 6;8(3):251-7. doi: 10.3233/PRM-150336.

Health benefits of seated speed, resistance, and power training for an individual with spastic quadriplegic cerebral palsy: A case report.

Gannotti ME, Fuchs RK, Roberts DE, Hobbs N, Cannon IM.

Children with moderate to severe cerebral palsy are at risk for low bone mass for chronological age, which compounds risk in adulthood for progressive deformity and chronic pain. Physical activity and exercise can be a key component to optimizing bone health. In this case report we present a young adult male with non-ambulatory, spastic quadriplegia CP whom began a seated speed, resistance, and power training exercise program at age 14.5 years. Exercise program continued into adulthood as part of an active lifestyle. The individual had a history of failure to thrive, bowel and bladder incontinence, reduced bone mineral density (BMD) for age, and spinal deformity at the time exercise was initiated. Participation in the exercise program began once a week for 1.5-2 hours/session, and progressed to 3-5 times per week after two years. This exercise program is now a component of his habitual lifestyle. Over the 6 years he was followed, lumbar spine and total hip BMD Z-scores did not worsen, which may be viewed as a positive outcome given his level of gross motor impairment. Additionally, the individual reported less back pain, improved bowel and bladder control, increased energy level, and never sustained an exercise related injury. Findings from this case report suggest a regular program of seated speed, resistance, power training may promote overall well-being, are safe, and should be considered as a mechanism for optimizing bone health.

PMID: 26410068

10. Assist Technol. 2015 Fall;27(3):183-92. doi: 10.1080/10400435.2015.1012607.

Design and Evaluation of the Kinect-Wheelchair Interface Controlled (KWIC) Smart Wheelchair for Pediatric Powered Mobility Training.

Zondervan DK, Secoli R, Darling AM, Farris J, Furumasu J, Reinkensmeyer DJ.

BACKGROUND: Children with severe disabilities are sometimes unable to access powered mobility training. Thus, we developed the Kinect-Wheelchair Interface Controlled (KWIC) smart wheelchair trainer that converts a manual wheelchair into a powered wheelchair. The KWIC Trainer uses computer vision to create a virtual tether with adaptive shared-control between the wheelchair and a therapist during training. It also includes a mixed-reality video game system. METHODS: We performed a year-long usability study of the KWIC Trainer at a local clinic, soliciting qualitative and quantitative feedback on the device after extended use. RESULTS: Eight therapists used the KWIC Trainer for over 50 hours with 8 different children. Two of the children obtained their own powered wheelchair as a result of the training. The therapists indicated the device allowed them to provide mobility training for more children than would have been possible with a demo wheelchair, and they found use of the device to be as safe as or safer than conventional training. They viewed the shared control algorithm as counter-productive because it made it difficult for the child to discern when he or she was controlling the chair. They were enthusiastic about the video game integration for increasing motivation and engagement during training. They emphasized the need for additional access methods for controlling the device. CONCLUSION: The therapists confirmed that the KWIC Trainer is a useful tool for increasing access to powered mobility training and for engaging children during training sessions. However, some improvements would enhance its applicability for routine clinical use.

PMID: 26427746

11.Dev Med Child Neurol. 2015 Oct 1. doi: 10.1111/dmcn.12936. [Epub ahead of print]

Investigating the impact of pain, age, Gross Motor Function Classification System, and sex on health-related quality of life in children with cerebral palsy.

Findlay B, Switzer L, Narayanan U, Chen S, Fehlings D.

AIM: To explore whether health-related quality of life (HRQOL) can be predicted by pain, age, Gross Motor Function Classification System (GMFCS) level, and sex in children with cerebral palsy (CP) and whether different pain etiologies have varying effects on HRQOL. METHODS: Children with CP aged 3 to 19 years and their caregivers were consecutively recruited. Caregivers reported their child's pain (Health Utilities Index 3 [HUI3] pain subset) and HRQOL (DISABKIDS questionnaires). Physicians identified pain etiologies. A multiple linear regression model determined whether pain, GMFCS level, sex, and age predicted HRQOL. An ANOVA evaluated the effects of pain etiologies on HRQOL. RESULTS: Three hundred and forty-four participants were approached and 87% (n=300) participated. Sufficient data were available on 248 (72% of total sample). Sixty-six participants (27%) formed the pain group with HUI3 pain scores of at least 3. The presence of pain and increasing age significantly negatively predicted HRQOL ($p<0.001$, $R2 =0.141$), while GMFCS and sex did not. Musculoskeletal deformity (24%) and hypertonia (18%) were the most frequent pain causes. HRQOL statistically differed depending on the pain etiology ($p=0.028$) with musculoskeletal deformity showing the lowest mean HRQOL. INTERPRETATION: The presence of pain and increasing age negatively predict HRQOL in CP. musculoskeletal deformity has the greatest negative impact on HRQOL.

PMID: 26426208

12. Pediatrics. 2015 Oct;136(4):e947-60. doi: 10.1542/peds.2015-0273.

Chronic Pain Assessment Tools for Cerebral Palsy: A Systematic Review.

Kingsnorth S, Orava T, Provvidenza C, Adler E, Ami N, Gresley-Jones T, Mankad D, Slonim N, Fay L, Joachimides N, Hoffman A, Hung R, Fehlings D.

BACKGROUND AND OBJECTIVE: Chronic pain in children with cerebral palsy (CP) is underrecognized, leading to detriments in their physical, social, and mental well-being. Our objective was to identify, describe, and critique pediatric chronic pain assessment tools and make recommendations for clinical use for children with CP. Secondly, develop an evidence-informed toolbox to support clinicians in the assessment of chronic pain in children with disabilities. METHODS: Ovid Medline, Cumulative Index to Nursing and Allied Health Literature, and Embase databases were systematically searched by using key terms "chronic pain" and "clinical assessment tool" between January 2012 and July 2014. Tools from multiple pediatric health conditions were explored contingent on inclusion criteria: (1) children 1 to 18 years; (2) assessment focus on chronic pain; (3) psychometric properties reported; (4) written in English between 1980 and 2014. Pediatric chronic pain assessment tools were extracted and corresponding validation articles were sought for review. Detailed tool descriptions were composed and each tool underwent a formal critique of psychometric properties and clinical utility. RESULTS: Of the retrieved 2652 articles, 250 articles met eligibility, from which 52 chronic pain assessment tools were retrieved. A consensus among interprofessional working group members determined 7 chronic pain interference tools to be of importance. Not all tools have been validated with children with CP nor is there 1 tool to meet the needs of all children experiencing chronic pain. CONCLUSIONS:
This study has systematically reviewed and recommended, through expert consensus, valid and reliable chronic pain interference assessment tools for children with disabilities.

PMID: 26416940

13. J Nepal Health Res Counc. 2015 Jan;13(29):31-7.

A Snapshot of 1001 Children Presenting with Cerebral Palsy to a Children's Disability Hospital.

Banskota B, Shrestha S, Rajbhandari T, Banskota AK, Spiegel DA.

BACKGROUND: Cerebral palsy (CP) has largely been an unaddressed problem in low and middle income countries (LMIC's). The purpose of this retrospective study is to provide a facility-based snapshot of CP in Nepal. METHODS: A retrospective chart review of 1001 patients diagnosed as having cerebral palsy, presenting to our institution from December 2008 to December 2011, was carried out. RESULTS: Majority of cases were found to be a result of birth complications and post-natal infections. Most children with CP were born at home, presented after walking age and came from socioeconomically unstable or borderline households. Less than 20% were attending school. Spastic diplegia was the most common presentation. Children with post-natal spasticity secondary to infection seemed to retain greater ambulatory potential. CONCLUSIONS: In contrast to CP in developed countries, the etiology in LMIC's is largely related to birth-related complications and post-natal infections. There is an urgent need to address preventable causes of cerebral palsy in Nepal.

PMID: 26411710

14. Pak J Med Sci. 2015 Jul-Aug;31(4):860-4. doi: 10.12669/pjms.314.7812.

Dietary Practices in Saudi Cerebral Palsy Children.

Al-Hammad NS.

OBJECTIVES: To determine the dietary practices of Saudi cerebral palsy (CP) children.METHODS: A self-administered questionnaire was used to collect the following information from parents of CP children: demographics, main source of dietary information, frequency of main meals, foods/drinks used for main meals and in-between-meals.

RESULTS: Parents of 157 CP children participated. Parents were divided into three, while children were divided into two age groups. The main sources of dietary information included popular media (46.5%) and dentist (36.3%). Most of the children had three meals (71.3%) or two meals (24.8%) daily. Choices for main meals included meats (68.8%), vegetables (65.6%), fruits (28.4%) and puddings (38.9%). The main three drinks choices with main meals included packed juices (59.9%), bottled water (58.8%) and fresh fruit juices (33.1%). The choices for in-between meals snacks included biscuits (61.1%), potato chips (51.6%), fruits (43.9%) and chocolates (41.4%). The choice of drinks with snacks was similar to that used with main meals. In cross-tabulation, older parents used meat (p=.03) and soft drinks (p=.04) more often for their children's main meals. Older children were given meat (p=.004) and soft drinks (p=.04) more often with main meals. Older children were given potato chips as snacks more often than younger children (p=.02), and there was a trend towards use of chocolates as snacks in older children (p=.08).
CONCLUSION:
Parents of CP children need to be educated about dietary practices of their children especially in areas such as the use of packed juices, dairy products, soft drinks and chocolates.

PMID: 26430418

15. Res Dev Disabil. 2015 Sep 27;47:135-143. doi: 10.1016/j.ridd.2015.09.009. [Epub ahead of print]

Stress and resolution in mothers of children with cerebral palsy.

Krstić T, Mihić L, Mihić I.

Parental resolution of diagnosis represents coming to terms with and accepting the diagnosis of a serious condition in their child. As risk factors for achieving resolution, we investigated: a child's functional status, cumulative stress, and maternal depression. The current study tested the hypothesis that mothers who are unresolved to their child's diagnosis would have considerably higher levels of risk factors, compared to resolved mothers. We also examined whether the observed risk factors could predict the resolution status. Maternal resolution was assessed by means of the Reaction to Diagnosis Interview. The sample consisted of 100 mothers of children aged 2-7, diagnosed with cerebral palsy. The results showed that unresolved mothers had children with poorer functional status, experienced more stressful life events, and were more depressed compared to resolved ones. The functional status of a child and maternal depression were shown to be significant resolution predictors. Importantly, they were more successful in predicting the resolved than the unresolved status. Further research is needed in order to investigate more extensively the unresolved parental status.

PMID: 26421350

Prevention and Cure

16. Brain Dev. 2015 Sep 29. pii: S0387-7604(15)00206-5. doi: 10.1016/j.braindev.2015.09.007. [Epub ahead of print]

Outcome of hemiplegic cerebral palsy born at term depends on its etiology.

Kitai Y, Haginoya K, Hirai S, Ohmura K, Ogura K, Inui T, Endo W, Okubo Y, Anzai M, Takezawa Y, Arai H.

OBJECTIVES: To elucidate the etiology and its relationship to the outcomes of hemiplegic cerebral palsy (HCP).
PARTICIPANTS AND METHODS: MR images and outcomes of 156 children with HCP born at term and older than three years were investigated in two major centers for cerebral palsy in Japan. Etiologies were classified into perinatal ischemic stroke (PIS), cerebral dysgenesis (CD), and others. PIS was divided into periventricular venous infarction (PVI) and two types of arterial infarction; middle cerebral artery infarction (MCAI) and deep gray matter infarction (DGMI). Initial signs and the time of presentation were investigated among the three types of PIS. As functional outcomes, laterality of paresis, age at initial walk, affected hand's function, intellectual development, and occurrence of epilepsy were compared among all the four types. RESULTS: Etiology: PIS was found in 106 children (68%), while CD accounted for 28 (18%). Among PIS, venous infarction was more common than arterial infarction (62:44). OUTCOMES: PVI revealed later presentation of motor asymmetry and more involvement of lower

extremity as the initial sign among PIS groups. Only MCAI showed right-side predominance in laterality of paresis. DGMI related to better intellectual development and PVI showed lower occurrence of epilepsy, while there was no significant difference in affected hand's function among the four groups. PIS groups showed significantly earlier attainment of independent walk, better intellectual development, and lower occurrence of epilepsy than CD. CONCLUSIONS: PVI was the most common cause of HCP born at term, and the etiology closely related to the initial signs of hemiplegia and overall outcomes.

PMID: 26428444

17. Sci Rep. 2015 Sep 29;5:14732. doi: 10.1038/srep14732.

Implementation of an antenatal magnesium sulfate protocol for fetal neuroprotection in preterm infants.

Bouet PE, Brun S, Madar H, Baisson AL, Courtay V, Gascoin-Lachambre G, Lasocki S, Sentilhes L.

The aim of our study was to assess the feasibility of implementing a protocol for the use of magnesium sulfate to prevent cerebral palsy. This retrospective single-center study included all women with fetuses of gestational age <33 weeks of gestation whose birth was planned or expected within 24 hours from September 2011 to December 2012. They were to receive magnesium sulfate, administered intravenously as a 4-g bolus followed by a constant infusion of 1 g per hour. If delivery had not occurred after 12 hours and was no longer considered imminent, the infusion was to be discontinued. The study included 119 women, 81 (68.1%) of whom received magnesium sulfate. Among the latter, 71 (87.5%) gave birth within 24 hours. The reasons treatment was not given were: omission by medical team (19/38, 50%), urgent delivery (18/38, 47.4%), and contraindication to treatment (1/38, 2.6%). The mean gestational age at protocol implementation was 29.6 +/- 2.1 weeks. Maternal monitoring, especially at the onset of infusion, appeared suboptimal. No major maternal side effects were observed. Our study shows that implementing a protocol for prevention of cerebral palsy by magnesium sulfate is feasible in a tertiary obstetric center.

PMID: 26415713