



Monday 11 July 2011

This free weekly bulletin lists the latest research on cerebral palsy (CP), as indexed in the NCBI, PubMed (Medline) and Entrez (GenBank) databases. These articles were identified by a search using the key term "cerebral palsy".

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Interventions

1. *Dev Neurorehabil.* 2011;14(4):199-207.

Multidisciplinary perspective for cerebral palsy assessment after an International, Classification of Functioning, Disability and Health training.

de Oliveira Andrade PM, de Oliveira Ferreira F, Haase VG.

Universidade Federal de Minas Gerais, Programa de Pós Graduação em Neurociências, Belo Horizonte, Brazil.

Objective: To assess knowledge related to the ICF before and after an ICF training and to identify items to compose a monocentric rehabilitation ICF code set for cerebral palsy (CP). **Methods:** (a) Design: A cross-sectional study with a descriptive-explorative design. (b) Participants: Professionals from the fields of physiotherapy, nutrition, dentistry, occupational therapy, psychology, social work, speech therapy and medicine. (c) Instrument: A questionnaire to assess ICF's knowledge (total score = 17). **Results:** A high effect size of the ICF training was found (Cohen's $d = 4.10$). Ninety-one and 43 ICF categories were selected for a comprehensive evaluation and triage, respectively, for CP. **Conclusion:** ICF categories were identified to compose a comprehensive evaluation and for triage through an ICF code sets for CP. Studies are needed to validate the instrument on the knowledge of the ICF and to test the impact of ICF's training for clinical rehabilitation of CP.

PMID: 21732804 [PubMed - in process]

2. *Dev Neurorehabil.* 2011;14(4):191-8.

Longitudinal changes in feeding among children with cerebral palsy between the ages of 4 and 7 years.

Clancy KJ, Hustad KC.

University of Wisconsin-Madison, Madison, WI, USA.

Objective: To examine differences in feeding among children with cerebral palsy (CP) who varied in the severity of their oral motor involvement; to examine longitudinal change in feeding behaviours for different severity groups. **Method:** Twenty-three children with CP participated (mean age = 4.53 years at the first time point). Feeding data were collected from parent questionnaires at 6 month intervals over 30 months. **Results:** Significant differences were observed among severity groups for all feeding variables except coughing and choking during meals. Only one variable, coughing, showed significant change over time. **Conclusions:** Children with CP who had severe oral-motor involvement had marked and pervasive feeding difficulties which showed some fluctuation with time, but generally were stable. Children with CP who did not have oral motor involvement and those who had mild-moderate involvement also showed little-to-no change over time and had fewer problems than those in the severe group.

PMID: 21732803 [PubMed - in process]

3. *Rehabil Nurs.* 2011 Jul-Aug;36(4):146-52, 174.

Wheelchair positioning and breathing in children with cerebral palsy: study methods and lessons learned.

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In children with cerebral palsy (CP), poor trunk control can lead to spinal deformity, pulmonary compromise (Canet, Praud, & Bureau, 1998), and increased health risks and costs of long-term care (Braddock, 2002). Evidence links posture and pulmonary function, but the influence of wheelchair components on pulmonary function is unknown. This article reports on a study evaluating pulmonary measurement in wheelchairs and how it affected children with CP. The objectives of the study were to (a) describe recruitment and retention of school-aged children with CP and (b) discuss participants' response to the protocol. Using a wheelchair simulator, participants experienced five seating parameters while pulmonary mechanics measures were recorded. A process log captured participant recruitment and retention challenges and response to the protocol. Recruitment was challenging; retention was 50%. The protocol was feasible for 50% of participants, none of whom could participate in conventional pulmonary function testing. Among the study's participants, facemask and seating simulator acceptability were 75%, improving with participants' increased verbal communication abilities (verbal children tolerated the procedure best). The facemask was vulnerable to tilt; 75% of participants experienced fatigue.

PMID: 21721395 [PubMed - in process]

4. *Acta Paediatr.* 2011 Jul 4. doi: 10.1111/j.1651-2227.2011.02396.x. [Epub ahead of print]

Reliability of energy cost calculations in children with cerebral palsy, cystic fibrosis and healthy controls.

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Aim: To study test-retest reliability of Physiological Cost Index (PCI) and Total Cost Index (TCI) in three groups of children. TCI modified PCI by excluding rest heart rate in calculation. **Methods:** Energy cost was evaluated from two consecutive walking tests and results were compared between methods, tests and groups. Thirty-nine children, eight with cerebral palsy, 11 with cystic fibrosis and 20 healthy controls, age 5 - 16 years participated at the Clinical Nutrition and Metabolism laboratory, University Hospital, Uppsala, Sweden. Heart rate was recorded during sitting and walking at self-selected speed. PCI and TCI were calculated using both non steady-state and steady-state work heart rate. Test-retest reliability was analysed by Mean of differences, pooled SD, coefficient of variation (CV%) and correlation coefficients. **Results:** Reliability was high for PCI and TCI. TCI showed consistently lower variation between tests than PCI for all groups. In the group with cerebral palsy, using non steady-state showed highest reliability. **Conclusion:** Both PCI and TCI were reliable methods when calculating energy cost in children with cerebral palsy, cystic fibrosis and controls. TCI seemed to be a suitable alternative in evaluation of gait efficiency in children.

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PMID: 21726284 [PubMed - as supplied by publisher]

5. Gait Posture. 2011 Jun 29. [Epub ahead of print]

Influence of gait analysis on decision-making for lower extremity orthopaedic surgery: Baseline data from a randomized controlled trial.

Wren TA, Otsuka NY, Bowen RE, Scaduto AA, Chan LS, Sheng M, Hara R, Kay RM.

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Previous studies examining the influence of gait analysis on surgical decision-making have been limited by the lack of a control group. The aim of this study was to use data from a randomized controlled trial to determine the effects of gait analysis on surgical decision-making in children with cerebral palsy (CP). 178 ambulatory children with CP (110 male; age 10.3±3.8 years) being considered for lower extremity orthopaedic surgery underwent gait analysis and were randomized into one of two groups: gait report group (N=90), where the orthopaedic surgeon received the gait analysis report, and control group (N=88), where the surgeon did not receive the gait report. Data regarding specific surgeries were recorded by the treating surgeon before gait analysis, by the gait laboratory surgeon after gait analysis, and after surgery. Agreement between the treatment done and the gait analysis recommendations was compared between groups using the 2-sided Fisher's Exact test. When a procedure was planned initially and also recommended by gait analysis, it was performed more often in the gait report group (91% vs. 70%, $p<0.001$). When the gait laboratory recommended against a planned procedure, the plan was changed more frequently in the gait report group (48% vs. 27%, $p=0.009$). When the gait laboratory recommended adding a procedure, it was added more frequently in the gait report group (12% vs. 7%, $p=0.037$). These results provide a stronger level of evidence demonstrating that gait analysis changes treatment decision-making and also reinforces decision-making when it agrees with the surgeon's original plan.

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PMID: 21723131 [PubMed - as supplied by publisher]

6. Dev Med Child Neurol. 2011 Aug;53(8):684-91. doi: 10.1111/j.1469-8749.2011.03951.x. Epub 2011 Mar 24.

Effects of hippotherapy and therapeutic horseback riding on postural control or balance in children with cerebral palsy: a meta-analysis.

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Aim: This research review and meta-analysis presents an overview of the effects of hippotherapy and therapeutic horseback riding (THR) on postural control or balance in children with cerebral palsy (CP). **Method:** To synthesize previous research findings, a systematic review and meta-analysis were undertaken. Relevant studies were identified by systematic searches of multiple online databases from the inception of the database through to May 2010. Studies were included if they fulfilled the following criteria: (1) quantitative study design, (2) investigation of the effect of hippotherapy or THR on postural control or balance, and (3) the study group comprised children and adults with CP. The selected articles were rated for methodological quality. The treatment effect was coded as a dichotomous outcome (positive effect or no effect) and quantified by odds ratio (OR). The pooled treatment effect was calculated using a random-effects model. Meta-regression of the effect size was performed against study covariates, including study size, publication date, and methodological quality score. **Results:** From 77 identified studies, 10 met the inclusion criteria. Two were excluded because they did not include a comparison group. Therapy was found to be effective in 76 out of 84 children with CP included in the intervention groups. The comparison groups comprised 89 children: 50 non-disabled and 39 with CP. A positive effect was shown in 21 of the children with CP in the comparison group regardless of the activity undertaken (i.e. physiotherapy, occupational therapy, sitting on a barrel or in an artificial saddle). The pooled effect size estimate was positive (OR 25.41, 95% CI 4.35, 148.53), demonstrating a statistically significant effectiveness of hippotherapy or THR in children with CP ($p<0.001$). Meta-regression of study characteristics revealed no study-specific factors. **Interpretation:** The eight studies found that postural control and balance were improved during hippotherapy and THR. Although the generalization of our findings may be restricted by the relatively small sample size, the results clearly demonstrate that riding therapy is indicated to improve pos-

tural control and balance in children with CP.

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7. Gait Posture. 2011 Jun 29. [Epub ahead of print]

Classification of the reduced vertical component of the ground reaction force in late stance in cerebral palsy gait.

Williams SE, Gibbs S, Meadows CB, Abboud RJ.

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Children with cerebral palsy (CP) often experience significant problems supporting their bodyweight (BW) and decelerating the downward velocity of the centre of mass (CoM) in late stance. This is seen as a decreased second peak of vertical ground reaction force (GRF) nominated FZ(2). This study categorises gait data by the degree of reduced FZ(2). Kinetic data were analysed from a CP database. Data from 129 patients, able to walk barefoot unaided, were investigated. Of these, 84 had kinetic data, 59 diplegics (both legs) and 15 hemiplegics (affected leg only), thus providing data from 133 legs. A reduced FZ(2) was observed in 116 legs (87%). Of the 133 legs, 44% failed to generate FZ(2)>BW. By including the Type 2 data this figure rises to, a staggering 66% who are having difficulty supporting BW at this stage of the stance phase. Only 12% of the legs showed a normal pattern (FZ(2) approximately equal to FZ(1)). In conclusion, the majority of CP children referred to the gait laboratory exhibited some degree of reduced FZ(2) and can be categorised as having a 'Ben Lomonding' gait pattern. 'Ben Lomonding,' is the term used to describe this phenomenon of reduced FZ(2), as the shape of the GRF graph resembles the shape of the Scottish mountain, Ben Lomond, which has two peaks, the second peak being much smaller than the first. Crucially, clinicians should be aware that nearly half of the CP children in this study were in difficulty supporting their BW in late stance and must use compensatory mechanisms to prevent collapse of the affected limb.

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8. J Spinal Disord Tech. 2011 Jul 6. [Epub ahead of print]

Surgical Correction of Spinal Deformity in Patients With Cerebral Palsy Using Pedicle Screw Instrumentation.

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STUDY DESIGN: Retrospective review of a prospectively collected single surgeon's series. **OBJECTIVE:** To investigate the efficacy of pedicle screw instrumentation in correcting spinal deformity in patients with quadriplegic cerebral palsy. In addition to assess quality-of-life and functional improvement after deformity correction as perceived by the parents of our patients. **SUMMARY OF BACKGROUND DATA:** All pedicle screw constructs have been commonly used to correct adolescent idiopathic scoliosis. There is limited information on their effectiveness in treating patients with cerebral palsy and neuromuscular scoliosis. **METHODS:** We reviewed the medical records and serial radiographs of 45 consecutive patients with quadriplegia who underwent spinal arthrodesis using pedicle screw/rod instrumentation and a standardized surgical technique. All patients were wheelchair bound with collapsing thoracolumbar scoliosis and pelvic obliquity. Twenty-eight patients had associated sagittal deformities. A telephone survey was performed by an independent investigator to assess parents' perception on surgical outcome. **RESULTS:** Thirty-eight patients underwent posterior-only and 7 staged anteroposterior spinal arthrodesis. Mean age at surgery was 13.4 years (range: 9 to 18.3 y) and mean postoperative follow-up was 3.5 years (range: 2.8 to 5 y). Pedicle screw instrumentation extended from T2/T3 to L5 with bilateral pelvic fixation using iliac bolts. Scoliosis was corrected from mean 82.5 to 21.4 degree (74.1%). Pelvic obliquity was corrected from mean 24 to 4 degree (83.3%).

In posterior-only procedures, average blood loss was 0.8 blood volumes, intensive care unit stay 3.5 days, and hospital stay 17.6 days. In anteroposterior procedures, average blood loss was 0.9 blood volumes, intensive care unit stay 8.9 days, and hospital stay 27.4 days. Major complications included 1 deep infection and 1 reoperation to remove prominent implants but no deaths, no neurological deficit, and no detected pseudarthrosis. Parents' survey showed 100% satisfaction rate. **CONCLUSIONS:** Pedicle screw instrumentation can achieve excellent correction of spinal deformity in quadriplegic cerebral palsy with low complication and re-operation rates and high parent satisfaction.

PMID: 21738076 [PubMed - as supplied by publisher]

9. Acta Chir Orthop Traumatol Cech. 2011;78(3):253-257.

A Contribution of Instrumental Gait Analysis to the Establishment of Surgical Indications in Cerebral Palsy. [Article in Czech]

Poul J, Urbášek K, Bajerová J, Jadrný J, Fedrová A, Kaiser-Šrámková L.

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PURPOSE OF THE STUDY: To evaluate our experience with indications for surgery based on instrumental gait analysis in cerebral palsy children, and to compare them with those drawn from the results of clinical examination. **MATERIAL AND METHODS:** The gait analysis laboratory was built in the Paediatric Hospital of the Faculty of Medicine in Brno in the 2008/09 period with support of the Norwegian funds. It is equipped with eight optical cameras, two auxiliary motion-picture video cameras, two force platforms and a telemetry system for electromyography. Between June 2009 and March 2010 a total of 297 children with spastic cerebral palsy, 66 with hemiparesis and 231 with diparesis were examined. **RESULTS:** On the basis of instrumental gait analysis, indications for surgery were established in 19 hemiparetic and 88 diparetic patients, which meant a new indication in 107 children. In 14 children, the results of gait analysis led to abandoning former indications for surgery based on clinical examination only while, in 13 children, they backed up the surgical indications in spite of the negative results of clinical examination. In six children a so-called superclinical decision was made, i.e., the results of repeated clinical examinations outweighed those of instrumental gait analysis either in favour of or against surgery. **DISCUSSION:** Based on the gait analysis results, a change in treatment plans was made in 27 out of 297 children (9 %). This is in contrast with the findings of other authors who report a much higher rate of treatment planning changes (52-70 %) In our study the use of instrumental gait analysis allowed us to decrease the frequency of surgical indications by 4.7 %. Other authors have achieved a higher value, up to 13 %. Unlike other studies, ours did not confirm the effect of gait analysis outcomes on an increase in the number of one-stage multi-level surgical procedures. **CONCLUSIONS:** Instrumental gait analysis is a great contribution to the diagnosis of movement disorders in children with cerebral palsy. **Key words:** motion analysis, cerebral palsy, instrumental gait analysis.

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10. Acta Chir Orthop Traumatol Cech. 2011;78(3):232-236.

Baker's Procedure in the Treatment of Pes Equinus in Cerebral Palsy Patients. [Article in Czech]

Trč T, Havlas V, Rybk D.

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PURPOSE OF THE STUDY: Surgical procedures on muscles in cerebral palsy are regarded as essential interventions. The tactics for surgery on the triceps surae muscle in the treatment of spastic pes equinus involve several surgical options at different muscle levels. **MATERIAL AND METHODS:** In the 1992-2008 period, Baker's procedure, prolongation of the triceps muscle in the common part of the gastrocnemius and soleus aponeuroses, was indicated in 114 children, aged between 3 and 18 years, mostly with spastic hemiplegia (45.7 %) or diplegia (42.9 %). In both groups, the isolated Baker's procedures and the combined procedures were clinically assessment at 2 and 6 months after surgery. **RESULTS:** Clinical examination at a follow-up of 8 weeks showed that all patients achieved 5 to 10 degrees of dorsiflexion of the foot. A maximum of Achilles tendon stretch-out was achieved in seven patients (6.14%) after 6 months. In one patient (0.9%) an excessive dorsiflexion was recorded. **DISCUS-**

SION: The choice of surgical tactics for treatment of spastic pes equinus is related to a positive or a negative result of the Silf-verskiold test, because this shows the degree of contracture of the gastrocnemius and soleus muscles. Prolongation at their joint aponeurosis should be indicated when the test shows partly positive results, and muscle balance at all levels of the lower extremity should be maintained. CONCLUSIONS Baker's procedure is one of the options to treat spastic pes equinus. The surgery is indicated primarily in isolated pes equinus and in children with spastic hemiplegia with low risk of Achilles tendon excessive elongation. Key words: pes equinus, Silfverskiold test, Baker's procedure.

PMID: 21729639 [PubMed - as supplied by publisher]

Epidemiology / Aetiology / Diagnosis & Early Treatment / Surveillance

11. *Acta Neurochir Suppl.* 2011;111:55-60.

A novel preclinical model of germinal matrix hemorrhage using neonatal rats.

Lekic T, Manaenko A, Rolland W, Tang J, Zhang JH.

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Background: Germinal matrix hemorrhage (GMH) is a neurological disorder associated with very low birth weight premature infants. This event can lead to post-hemorrhagic hydrocephalus, cerebral palsy, and mental retardation. This study developed a novel animal model for pre-clinical investigations. Methods: Neonatal rats underwent infusion of clostridial collagenase into the right germinal matrix (anterior caudate) region using stereotaxic techniques. Developmental milestones were evaluated over 10 days, cognitive function at 3 weeks, and sensorimotor function at 4 weeks after collagenase infusion. This was accomplished by anthropometric quantifications of cranial, cerebral, cardiac, and splenic growths. Results: Collagenase infusion led to delays in neonatal developmental milestones, followed by cognitive and sensorimotor dysfunctions in the juvenile animals. Cranial growth was accelerated during the first week after injury, and this was followed by significant brain atrophy, splenomegaly, and cardiac hypertrophy 3 weeks later. Conclusion: This study characterized the developmental delays, mental retardation, and cerebral palsy features resembling the long-term clinical course after germinal matrix hemorrhage in premature infants. Pre-clinical testing of therapeutics in this experimental model could lead to improved patient outcomes while expanding upon the pathophysiological understanding of this disease.

PMID: 21725732 [PubMed - in process]

12. *Acta Neurochir Suppl.* 2011;111:237-41.

Protective effect of hydrogen gas therapy after germinal matrix hemorrhage in neonatal rats.

Lekic T, Manaenko A, Rolland W, Fathali N, Peterson M, Tang J, Zhang JH.

Departments of Physiology, Loma Linda University, School of Medicine, Loma Linda, CA, 92354, USA.

Background: Germinal matrix hemorrhage (GMH) is a neurological disease of very low birth weight premature infants leading to post-hemorrhagic hydrocephalus, cerebral palsy, and mental retardation. Hydrogen (H₂) is a potent antioxidant shown to selectively reverse cytotoxic oxygen-radical injury in the brain. This study investigated the therapeutic effect of hydrogen gas after neonatal GMH injury. Methods: Neonatal rats underwent stereotaxic infusion of clostridial collagenase into the right germinal matrix brain region. Cognitive function was assessed at 3 weeks, and then sensorimotor function, cerebral, cardiac and splenic growths were measured 1 week thereafter. Results: Hydrogen gas inhalation markedly suppressed mental retardation and cerebral palsy outcomes in rats at the juvenile developmental stage. The administration of H₂ gas, early after neonatal GMH, also normalized the brain atrophy, splenomegaly and cardiac hypertrophy 1 month after injury. Conclusion: This study supports the role of cytotoxic oxygen-radical injury in early neonatal GMH. Hydrogen gas inhalation is an effective strategy to help protect the infant brain from the post-hemorrhagic consequences of brain atrophy, mental retardation and cerebral palsy. Further studies are necessary to determine the mechanistic basis of these protective effects.

PMID: 21725762 [PubMed - in process]

13. Acta Neurochir Suppl. 2011;111:201-6.

Neuroprotection by melatonin after germinal matrix hemorrhage in neonatal rats.

Lekic T, Manaenko A, Rolland W, Virbel K, Hartman R, Tang J, Zhang JH.

Department of Physiology, Loma Linda University, School of Medicine, Loma Linda, CA, USA.

Background: Germinal matrix hemorrhage (GMH) is a devastating neurological disorder of very low birth weight premature infants that leads to post-hemorrhagic hydrocephalus, cerebral palsy, and mental retardation. Melatonin is a potent antioxidant known to reverse free-radical mediated injury in the brain. This study investigated the effect of melatonin treatment after GMH injury. **Methods:** Clostridial collagenase was infused into the right germinal matrix region of neonatal rats with stereotaxic technique. Cognitive function, sensorimotor ability, cerebral, cardiac and splenic growths were measured in juvenile animals. **Results:** Systemic melatonin treatment ameliorated cognitive and sensorimotor dysfunction at the juvenile developmental stage. This hormone also normalized brain atrophy, splenomegaly, and cardiac hypertrophy consequences at 1 month after injury. **Conclusion:** This study supports the role of free radicals in acute neonatal hemorrhagic brain injury. Melatonin is an effective antioxidant that can protect the infant's brain from the post-hemorrhagic consequences of mental retardation and cerebral palsy. Further mechanistic studies are warranted to determine the mechanisms behind these neuroprotective effects.

PMID: 21725756 [PubMed - in process]

14. Acta Neurochir Suppl. 2011;111:253-7.

Beneficial effect of hyperbaric oxygenation after neonatal germinal matrix hemorrhage.

Lekic T, Manaenko A, Rolland W, Ostrowski RP, Virbel K, Tang J, Zhang JH.

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Background: Germinal matrix hemorrhage (GMH) is a potentially devastating neurological disease of very low birth weight premature infants. This leads to post-hemorrhagic hydrocephalus, cerebral palsy, and mental retardation. Hyperbaric oxygen (HBO) treatment is a broad neuroprotectant after brain injury. This study investigated the therapeutic effect of HBO after neonatal GMH. **Methods:** Neonatal rats underwent stereotaxic infusion of clostridial collagenase into the right germinal matrix (anterior caudate) brain region. Cognitive function was assessed at 3 weeks, and then sensorimotor, cerebral, cardiac, and splenic growths were measured 1 week thereafter. **Results:** Hyperbaric oxygen (HBO) treatment markedly improved upon the mental retardation and cerebral palsy outcome measurements in rats at the juvenile developmental stage. The administration of HBO early after neonatal GMH also normalized brain atrophy, splenomegaly, and cardiac hypertrophy 1 month after injury. **Conclusion:** This study supports the role of hyperbaric oxygen (HBO) treatment in the early period after neonatal GMH. HBO is an effective strategy to help protect the infant's brain from the post-hemorrhagic consequences of brain atrophy, mental retardation, and cerebral palsy. Further studies are necessary to determine the mechanistic basis of these neuroprotective effects.

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15. Am J Obstet Gynecol. 2011 May 14. [Epub ahead of print]

Placental infarction identified by macroscopic examination and risk of cerebral palsy in infants at 35 weeks of gestational age and over.

Blair E, de Groot J, Nelson KB.

Center for Child Health Research, University of Western Australia, Telethon Institute for Child Health Research, and School of Paediatrics and Child Health, Perth, Western Australia.

OBJECTIVE: We sought to investigate whether placental infarction determined by macroscopic examination was associated with risk of cerebral palsy (CP). **STUDY DESIGN:** This was a population-based study of macroscopic placental infarcts in singletons >35 weeks' gestational age, in 158 perinatal deaths, 445 infants with CP, and 491 controls matched with CP cases for gestational age. **RESULTS:** Placental infarcts were recorded in 2.0% of controls, 4.4% of deaths (relative risk [RR], 2.2; 95% confidence interval [CI], 0.8-5.6), 5.2% of infants with CP ($P < .05$, RR, 2.5; 95% CI, 1.2-5.3), and 8.4% with spastic quadriplegic CP ($P = .0026$; RR, 4.4; 95% CI, 1.8-10.6). In children with CP, unlike controls, placental infarction was associated with reduced fetal growth, older maternal age, more prior miscarriages, and poor neonatal condition, but not with maternal preeclampsia. **CONCLUSION:** Placental infarction identified by macroscopic examination was associated with increased risk of CP and the CP subtype, spastic quadriplegic CP. Antecedents of placental infarction differed in children with CP compared with control children.

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16. Arch Pediatr Adolesc Med. 2011 Jul;165(7):642-646.

Effects of Prophylactic Indomethacin in Extremely Low-Birth-Weight Infants With and Without Adequate Exposure to Antenatal Corticosteroids.

Schmidt B, Seshia M, Shankaran S, Mildenhall L, Tyson J, Lui K, Fok T, Roberts R; for the Trial of Indomethacin Prophylaxis in Preterms Investigators.

Department of Pediatrics, Hospital of the University of Pennsylvania, Ravdin 8, 3400 Spruce St, Philadelphia, PA 19104. Barbara.Schmidt@uphs.upenn.edu.

OBJECTIVE: To examine whether treatment with antenatal corticosteroids modifies the immediate and long-term effects of prophylactic indomethacin sodium trihydrate in extremely low-birth-weight infants. **DESIGN:** Post hoc subgroup analysis of data from the Trial of Indomethacin Prophylaxis in Preterms. **SETTING:** Thirty-two neonatal intensive care units in Canada, the United States, Australia, New Zealand, and Hong Kong. **PARTICIPANTS:** A total of 1195 infants with birth weights of 500 to 999 g and known exposure to antenatal corticosteroids. We defined as adequate any exposure to antenatal corticosteroids that occurred at least 24 hours before delivery. **Intervention** Indomethacin or placebo intravenously once daily for the first 3 days. **OUTCOME MEASURES:** Death or survival to 18 months with cerebral palsy, cognitive delay, severe hearing loss, or bilateral blindness; severe periventricular and intraventricular hemorrhage; patent ductus arteriosus; and surgical closure of a patent ductus arteriosus. **RESULTS:** Of the 1195 infants in this analysis cohort, 670 had adequate and 525 had inadequate exposure to antenatal corticosteroids. There was little statistical evidence of heterogeneity in the effects of prophylactic indomethacin between the subgroups for any of the outcomes. The adjusted P values for interaction were as low as .15 for the outcome of death or impairment at 18 months and as high as .80 for the outcome of surgical duct closure. **CONCLUSION:** We find little evidence that the effects of prophylactic indomethacin vary in extremely low-birth-weight infants with and without adequate exposure to antenatal corticosteroids. Trial Registration clinicaltrials.gov Identifier: NCT00009646.

PMID: 21727276 [PubMed - as supplied by publisher]

17. Early Hum Dev. 2011 Jun 29. [Epub ahead of print]

Prediction of developmental performance in preterm infants at two years of corrected age: Contribution of the neurological assessment at term age.

Simard MN, Lambert J, Lachance C, Audibert F, Gosselin J.

School of psychology, Faculty of Social Science, Laval University, Quebec, Canada, Division of Public Health, Research Center of CHUQ, Quebec, Canada.

BACKGROUND: The population of preterm infants is increasing and resources available for follow-up are limited.

Early markers are needed to identify children who will show major as well as more subtle neurodevelopmental impairments. Such a challenge could be achieved with the Amiel-Tison Neurological Assessment at Term (ATNAT). AIMS: This study assesses the usefulness of the ATNAT in the prediction of developmental problems at two years of corrected age (CA) in infants born between 29 and 37 weeks of gestation. METHOD: Inclusion criteria were: gestational age between 29(0/7) and 36(6/7) weeks inclusively, birth weight below 2500g and minimal 24-hour stay in the Neonatal Intensive Care Unit of Sainte-Justine Hospital. A sample of 147 was prospectively recruited and assessed at two ages: at term with the ATNAT and at 24months CA with Bayley Scales of Infant Development-II. RESULTS: No major impairment such as cerebral palsy and no neurosensory impairment were observed. Developmental delay defined by an index < 70 on the mental or psychomotor scale was reported respectively in 6.2% and 5.4% of the cohort. Significant differences in mental, psychomotor and behavioral performances were found according to neurological status. Neurological status was the only variable to enter the predictive model for psychomotor and behavioral indexes. Gender and neurological status remained in the predictive model for mental performance. CONCLUSION: This study supports the inclusion of the ATNAT among the eligibility criteria for systematic neurodevelopmental surveillance as it allows early identification of infants at higher risk of low developmental performances at 24months CA.

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18. Int J Dev Neurosci. 2011 Jun 25. [Epub ahead of print]

Umbilical cord blood biomarkers of neurologic injury and the risk of cerebral palsy or infant death.

Costantine MM, Weiner SJ, Rouse DJ, Hirtz DG, Varner MW, Spong CY, Mercer BM, Iams JD, Wapner RJ, Sorokin Y, Thorp JM Jr, Ramin SM, O'Sullivan MJ, Peaceman AM, Simhan HN.

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To evaluate the association between cerebral palsy (CP) or infant death and putative cord blood biomarkers of neurologic injury, we performed a nested case-control secondary analysis of a multicenter randomized trial of magnesium sulfate (MgSO₄) versus placebo to prevent CP or death among offspring of women with anticipated delivery from 24 to 31 weeks' gestation. Cases were infants who died by 1 year (n=25) or developed CP (n=16), and were matched 1:2 to a control group (n=82) that survived without developing CP. Umbilical cord sera concentrations of S100B, neuron-specific enolase (NSE) and the total soluble form of the receptor for advanced glycation end-products (sRAGE) were measured by ELISA in duplicates. Maternal characteristics were similar between the 2 groups. Cases were born at a lower gestational age (GA) and had lower birth weight compared with controls. There were no differences in concentrations of the three biomarkers and the composite outcome of CP or infant death. However, S100B was higher (median 847.3 vs. 495.7pg/ml; P=0.03) in infants who had CP and total sRAGE was lower (median 1259.3 vs. 1813.1pg/ml; P=0.02) in those who died compared with the control group. When corrected for delivery GA and treatment group, both differences lost statistical significance. In conclusion, cord blood S100B level may be associated with CP, but this association was not significant after controlling for GA and MgSO₄ (4) treatment.

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Short- and long-term outcomes in babies born after antenatal magnesium treatment.

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Aim: To identify the prenatal events associated with adverse outcome in babies born at less than 32 weeks' gesta-

tion, including antenatal magnesium sulfate treatment. Methods: A case-control study was performed to examine the effect of long-term tocolysis with MgSO₄. Long-term neonatal and infantile adverse outcomes were defined as one of the following: intraventricular hemorrhage, periventricular leukomalacia, cerebral palsy and infantile death. Results: Data were analyzed for 425 cases (236 who received magnesium sulfate and 189 control cases who did not). Perinatal deaths included 13 cases that had received magnesium (5.5%) and 17 control cases (9.0%). Long-term neonatal and infantile adverse outcomes were noted in 80 cases. The factor associated with an increased risk of combined adverse outcome after adjustment for confounding effects was the administration of corticosteroids (adjusted odds ratio [OR] 0.47, 95% confidence interval [CI] 0.27-0.81), but not magnesium sulfate (OR 0.82, 95% CI 0.48-1.40). In the subgroup that also received ritodrine (n = 315), magnesium sulfate was given to 195 cases. In this group, the factor associated with an increased risk of combined adverse outcome (n = 64) after adjustment for the confounding effects was also corticosteroids (adjusted OR 0.25, 95% CI 0.13-0.49), but magnesium sulfate was not associated with an increase in risk (OR 0.64, 95% CI 0.34-1.22). Conclusions: Long-term tocolysis with magnesium sulfate is not a significant factor related to the occurrence of neonatal and infantile adverse outcomes. Further study is needed to clarify the dose-response effect of magnesium sulfate.

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Visual perception in preterm children: what are we currently measuring?

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Over the past two decades, cerebral visual impairment has been recognized as a principal deficit in preterm children, and in particular those with cerebral palsy. We review the current knowledge of visual processing deficits in these children, and provide an overview of the tools for assessing cerebral visual impairment. Commercially available instruments are usually directed at evaluating visuospatial skills rather than detecting object recognition difficulties. Particularly in children aged 3 years or younger and in children with multiple handicaps, cerebral visual impairment is difficult to diagnose. This difficulty may be attributable to limitations specific to the instrument, such as a test that is inappropriate for age, or to child-specific limitations such as motor impairment or speech delay. We therefore include an overview of relevant neuroimaging findings reported in these children, focusing on the most recent imaging modalities. Novel techniques such as diffusion tensor imaging may provide sensitive markers of cerebral visual impairment in situations where clinical diagnosis is difficult, and such approaches may allow for early intervention.

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