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CP Research News

Monday 10 November 2008

This free weekly bulletin lists the latest research on cerebral palsy (CP), as indexed in the NCBI PubMed (Medline) and Entrez (GenBank) databases.

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1: Clin Obstet Gynecol. 2008 Dec;51(4):829-39.

Prevention, diagnosis, and treatment of cerebral palsy in near-term and term infants.

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The incidence, risk factors, and etiology of cerebral palsy (CP) are reviewed based on evidence-based data. Current methods for diagnosing risk for brain injury, including neuroimaging data on CP in this group of infants are presented. Prevention of CP in term and near-term infants currently seems to be promising with neuroprotection with hypothermia for neonatal encephalopathy secondary to presumed acute hypoxic-ischemia at birth. Treatment of CP based on evidenced-based data will be reviewed.

PMID: 18981806 [PubMed - in process]

2: Clin Obstet Gynecol. 2008 Dec;51(4):816-28.

Diagnosis, treatment, and prevention of cerebral palsy.

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Cerebral palsy is the most prevalent cause of persisting motor function impairment with a frequency of about 1/500 births. In developed countries, the prevalence rose after introduction of neonatal intensive care, but in the past decade, this trend has reversed. A recent international workshop defined cerebral palsy as "a group of permanent disorders of the development of movement and posture, causing activity



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limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain." In a majority of cases, the predominant motor abnormality is spasticity; other forms of cerebral palsy include dyskinetic (dystonia or choreo-athetosis) and ataxic cerebral palsy. In preterm infants, about one-half of the cases have neuroimaging abnormalities, such as echolucency in the periventricular white matter or ventricular enlargement on cranial ultrasound. Among children born at or near term, about two-thirds have neuroimaging abnormalities, including focal infarction, brain malformations, and periventricular leukomalacia. In addition to the motor impairment, individuals with cerebral palsy may have sensory impairments, cognitive impairment, and epilepsy. Ambulation status, intelligence quotient, quality of speech, and hand function together are predictive of employment status. Mortality risk increases incrementally with increasing number of impairments, including intellectual, limb function, hearing, and vision. The care of individuals with cerebral palsy should include the provision of a primary care medical home for care coordination and support; diagnostic evaluations to identify brain abnormalities, severity of neurologic and functional abnormalities, and associated impairments; management of spasticity; and care for associated problems such as nutritional deficiencies, pain, dental care, bowel and bladder continence, and orthopedic complications. Current strategies to decrease the risk of cerebral palsy include interventions to prolong pregnancy (eg, 17alpha-progesterone), limiting the number of multiple gestations related to assisted reproductive technology, antenatal steroids for mothers expected to deliver prematurely, caffeine for extremely low birth weight neonates, and induced hypothermia for a subgroup of neonates diagnosed with hypoxic-ischemic encephalopathy.

PMID: 18981805 [PubMed - in process]

3: Clin Obstet Gynecol. 2008 Dec;51(4):800-15.

Neurodevelopmental management strategies for children with cerebral palsy: optimizing function, promoting participation, and supporting families.

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There is a spectrum of outcomes in health, functional skills, and participation among children with one of the cerebral palsy syndromes. Medical advances have allowed us to better understand the importance of goal-oriented management and attention to nutrition, safe feeding, seizures, deformity, and spasticity. However, ensuring long-term successful outcomes require coordination between medicine, social services, education, and rehabilitation and continually examining how to promote functioning and participation. Until multicentered population registries and networks for clinical trials are established, our knowledge of evidence-based outcomes will remain partial and incomplete.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18981804 [PubMed - in process]

4: Clin Obstet Gynecol. 2008 Dec;51(4):787-99.

Imaging for diagnosis and treatment of cerebral palsy.

Shimony JS, Lawrence R, Neil JJ, Inder TE.

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Neuroimaging, particularly with magnetic resonance techniques, can provide insight into the pattern and severity of cerebral injury underlying cerebral palsy providing a neuroanatomic understanding of the mo-

tor and related deficits. Early identification of injury before the establishment of marked motor deficits provides an opportunity for neuroprotection. Neuroimaging provides a robust manner for early delineation of the risk and nature of cerebral palsy that an infant may face. In the future, imaging may provide more functional methods, including novel methods such as optical tomography, map regeneration, adaptation, and functional recovery.

Publication Types:
Research Support, N.I.H., Extramural

PMID: 18981803 [PubMed - in process]

5: Clin Obstet Gynecol. 2008 Dec;51(4):775-86.

Antenatal antecedents and the impact of obstetric care in the etiology of cerebral palsy.

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Cerebral palsy (CP) affects 2/1000 live-born children. Multiple antenatal factors, including preterm delivery, low birth weight, infection/inflammation, multiple gestation, and other pregnancy complications, are mostly associated with CP in both the preterm and term infant, with birth asphyxia playing a minor role. Owing to the increasing survival of the very preterm and very low birth weight infant secondary to improvements in neonatal and obstetric care, the incidence of CP may be increasing. The focus of this paper is to explore antenatal antecedents as etiologies of CP and the impact of obstetric care on the prevention of CP.

PMID: 18981802 [PubMed - in process]

6: Clin Obstet Gynecol. 2008 Dec;51(4):763-74.

Trends in the rates of cerebral palsy associated with neonatal intensive care of preterm children.

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Progressive changes in perinatal and neonatal intensive care of preterm infants since the late 1960s have led to an increase in survival and had an effect on the rates of neonatal morbidity, including brain injury, chronic lung disease, and sepsis. These have influenced the rates of neurodevelopmental impairment, including cerebral palsy. There was initially an increase in neonatal morbidity and rates of cerebral palsy associated with the increased survival of extremely low birth weight and low gestation infants. However, since the late 1990s and especially since the year 2000, the rates of neonatal morbidity have decreased with evidence of a decrease in the rates of cerebral palsy. Efforts to further decrease neonatal morbidity should continue to improve the outcomes of preterm children.

PMID: 18981801 [PubMed - in process]

7: Clin Obstet Gynecol. 2008 Dec;51(4):749-62.

Causative factors in cerebral palsy.

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Causative factors in cerebral palsy (CP) vary to some degree according to gestational age group and clinical CP subtype. Such catastrophes of birth as placental abruption, cord prolapse, and uterine rupture sharply heighten risk of CP. These conditions are fortunately uncommon, and are sometimes not survived; individually and collectively they account for only a small proportion of CP. Among other factors associated with increased risk of CP are prematurity, intrauterine exposure to infection or maternal fever in labor, ischemic stroke, congenital malformations, atypical intrauterine growth (restricted or excessive for gestational age), and complications of multiple gestations. Although any 1 factor, if severe, may be sufficient to cause CP, more often it is the presence of multiple risk factors that overwhelms defense mechanisms and leads to CP. The contribution of genetic vulnerabilities that interact with environmental stressors is an emerging aspect of our understanding of causative factors in CP.

Publication Types:
Research Support, N.I.H., Intramural

PMID: 18981800 [PubMed - in process]

8: Clin Obstet Gynecol. 2008 Dec;51(4):742-8.

Establishing the diagnosis of cerebral palsy.

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Cerebral palsy (CP) is a diagnosis of considerable concern to obstetricians, but the diagnosis of CP can be challenging, and may need to be confirmed by an experienced practitioner, ideally a child neurologist or psychiatrist. It is important not to make the diagnosis too early in infancy, especially when the signs are not severe, as resolution of early neuromotor abnormalities does occur, particularly in premature infants. Exclusion of genetic/metabolic disorders presenting with CP-like findings is important. The degree of activity limitation should be characterized; labeling children as having CP on the basis of abnormal examination findings alone without evidence of activity limitation is not useful. Brain imaging can be helpful in pinpointing the location of the underlying brain abnormality and sometimes provides etiologically useful information.

PMID: 18981799 [PubMed - in process]

9: Clin Obstet Gynecol. 2008 Dec;51(4):740-1.

Diagnosis, prevention, and treatment of cerebral palsy. Foreword.

Spong CY.

Publication Types:
Introductory Journal Article

PMID: 18981798 [PubMed - in process]

10: BMC Musculoskelet Disord. 2008 Nov 6;9(1):150. [Epub ahead of print]

Development of spasticity with age in a total population of children with cerebral palsy.

Hagglund G, Wagner P.

ABSTRACT: BACKGROUND: The development of spasticity with age in children with cerebral palsy (CP) has, to our knowledge, not been studied before. In 1994, a register and a health care program for children with CP in southern Sweden were initiated. In the programme the child's muscle tone according to the modified Ashworth scale is measured twice a year until six years of age, then once a year. We have used this data to analyse the development of spasticity with age in a total population of children with cerebral palsy. **METHODS:** All measurements of muscle tone in the gastrocnemius-soleus muscle in all children with CP from 0 to 15 years during the period 1995-2006 were analysed. The CP subtypes were classified according to the Surveillance of Cerebral Palsy in Europe network system. Using these criteria, the study was based on 6218 examinations in 547 children. For the statistical analysis the Ashworth scale was dichotomized. The levels 0-1 were gathered in one category and levels 2-4 in the other. The pattern of development with age was evaluated using piecewise logistic regression in combination with Akaike's An Information Criterion. **RESULTS:** In the total sample the degree of muscle tone increased up to 4 years of age. After 4 years of age the muscle tone decreased each year up to 12 years of age. A similar development was seen when excluding the children operated with selective dorsal rhizotomy, intrathecal baclofen pump or tendo Achilles lengthening. At 4 years of age about 47% of the children had spasticity in their gastro-soleus muscle graded as Ashworth 2-4. After 12 years of age 23% of the children had that level of spasticity. The CP subtypes spastic bilateral and spastic unilateral CP showed the same pattern as the total sample. Children with dyskinetic type of CP showed an increasing muscle tone up to age 6, followed by a decreasing pattern up to age 15. **CONCLUSION:** In children with CP, the muscle tone as measured with the Ashworth scale increases up to 4 years of age and then decreases up to 12 years of age. The same tendency is seen in all spastic subtypes. The findings may have implications both for clinical judgement and for research studies on spasticity treatment.

PMID: 18990204 [PubMed - as supplied by publisher]

11: Int Orthop. 2008 Nov 4. [Epub ahead of print]

Irreducible dislocation of the hip in cerebral palsy patients treated by Schanz proximal femoral valgus osteotomy.

Schejbalova A, Havlas V, Trc T.

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Palliative Schanz proximal femoral valgus osteotomy is considered a common option for treatment of irreducible hip dislocation in cerebral palsy. From 1992 to 2005, Schanz osteotomy was indicated on 55 occasions in 35 nonambulatory patients with the quadriplegic form of cerebral palsy aged 9-18. Post-operatively, the main emphasis focussed on clinical presentation, improvement of hip range of motion, and pain relief. X-rays were carried out at three, six, and 12 months postoperatively with subsequent average follow up 98 +/- 4.5 months. In all patients, the range of hip abduction and flexion increased. In 54 (98.2%) cases painful symptoms significantly improved. One patient (1.8%) had a subsequent femoral head excision because of persistent hip pain. Transient hip pain persisted in four patients (7.3%). Schanz valgus osteotomy improves the hip range of motion, relieves pain, and facilitates care of the patient. Schanz femoral osteotomy is a less invasive method compared to proximal femoral excision and should preferably be used in older children with neurogenic hip dislocation in whom reconstructive surgery is not indicated.

PMID: 18982326 [PubMed - as supplied by publisher]

12: Brain. 2008 Nov 3. [Epub ahead of print]

Changes in soleus H-reflex modulation after treadmill training in children with cerebral palsy.

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In healthy children, short latency leg muscle reflexes are profoundly modulated throughout the step cycle in a functionally meaningful way and contribute to the electromyographic (EMG) pattern observed during gait. With maturation of the corticospinal tract, the reflex amplitudes are depressed via supraspinal inhibitory mechanisms. In the soleus muscle the rhythmic part of the modulation pattern is present in children with cerebral palsy (CP), but the development of tonic depression with increasing age, as seen in healthy children, is disturbed. Treadmill training clinically improves the walking pattern in children with CP. Presuming that short latency reflexes contribute significantly to the walking pattern, a change in the modulation may occur after training. The aim of this study was to assess whether treadmill training also improves the soleus reflex modulation during gait in children with CP. Seven children with CP underwent brief treadmill training for 10 min a day over 10 consecutive days; all of them were functional walkers. Soleus Hoffmann (H-) reflexes were investigated during walking on a treadmill before the first, and one day after the last, training session. Treadmill training led to a considerable clinical improvement in gait velocity. After 10 days of training, soleus H-reflexes during gait were almost completely depressed during the swing phase. The complete suppression of the soleus H-reflex during the swing phase, which is also exhibited by healthy subjects, could reflect an improvement towards a functionally more useful pattern. In conclusion, treadmill training can induce changes in the modulation of short latency reflexes during gait.

PMID: 18984603 [PubMed - as supplied by publisher]

13: Spine. 2008 Nov 3. [Epub ahead of print]

Role of Amicar in Surgery for Neuromuscular Scoliosis.

Thompson GH, Florentino-Pineda I, Poe-Kochert C, Armstrong DG, Son-Hing J.

From the Divisions of *Pediatric Orthopaedics and daggerPediatric Anesthesiology, Rainbow Babies and Children's Hospitals, University Hospitals/Case Medical Center, Case Western Reserve University, Cleveland, OH; and double daggerDepartment of Anesthesiology, Medical College of Georgia, Augusta, GA.

STUDY DESIGN.: A retrospective case-control study. **OBJECTIVE.:** Evaluate the effectiveness of Amicar in decreasing perioperative blood loss in patients with neuromuscular scoliosis undergoing posterior spinal fusion (PSF) and segmental spinal instrumentation (SSI). **SUMMARY OF BACKGROUND DATA.:** Previously, a preliminary prospective; prospective randomized double-blind; same-day anterior and posterior spinal fusion; and fibrinogen studies have demonstrated Amicar to be effective in decreasing total perioperative blood loss and transfusion requirements in surgery for idiopathic scoliosis. Increased fibrinogen secretion is a possible explanation. We are now analyzing its effectiveness in neuromuscular scoliosis. **METHODS.:** Amicar was administered at 100 mg/kg over 15 minute not to exceed 5 g after anesthesia induction. Maintenance is 10 mg/kg/h until wound closure. There were 2 study groups: group 1 (n = 34), no Amicar and group 2 (n = 62) who received Amicar. The majority of patients in both groups had cerebral palsy. Total perioperative blood loss was determined from the estimated intraoperative blood loss and measured postoperative suction drainage. Total perioperative blood loss and transfusion requirements (cell saver and allogeneic) were compared using chi or Fisher exact test. **RESULTS.:** There was statistically less estimated intraoperative blood loss, total perioperative blood loss, and transfusion requirements in group 2. Postoperative suction drainage was also less but did not reach statistical significance. In group 1, estimated intraoperative blood loss, measured postoperative suction drainage,

and total perioperative blood loss were 2194 +/- 1626 mL, 903 +/- 547 mL, and 3055 +/- 1852 mL, whereas in group 2, it was 1125 +/- 715 mL, 695 +/- 489 mL, and 1805 +/- 940 mL. Transfusion requirements were 1548 +/- 962 mL in group 1 but only 660 +/- 589 mL in group 2 ($P < 0.0001$). Amicar was equally effective in all diagnoses. There were no complications related to the use of Amicar. **CONCLUSION:** Amicar was highly effective in decreasing perioperative blood loss and transfusion requirements in patients with neuromuscular scoliosis undergoing PSF and SSI. It was most effective in decreasing estimated intraoperative blood loss. This results in decreased transfusion requirements, costs, and potential transfusion-related complications.

PMID: 18981961 [PubMed - as supplied by publisher]

14: J Bone Joint Surg Am. 2008 Nov;90(11):2470-84.

Distal femoral extension osteotomy and patellar tendon advancement to treat persistent crouch gait in cerebral palsy.

Stout JL, Gage JR, Schwartz MH, Novacheck TF.

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BACKGROUND: Hallmarks of a persistent crouched walking pattern exhibited by individuals with cerebral palsy usually include loss of an adequate plantar flexion/knee extension couple, hamstring and/or psoas tightness, or contracture in conjunction with quadriceps insufficiency. Traditional treatment addresses the muscle-tightness component, but not the contracture or the muscle insufficiency. This study was performed to evaluate the effectiveness of distal femoral extension osteotomy and/or patellar tendon advancement in the treatment of crouch gait in patients with cerebral palsy. **METHODS:** A retrospective, nonrandomized, repeated-measures design was used. Individuals with a diagnosis of cerebral palsy were included if they had had (1) a distal femoral extension osteotomy in combination with a distal patellar tendon advancement (thirty-three patients), (2) a distal femoral extension osteotomy without patellar tendon advancement (sixteen), or (3) a distal patellar tendon advancement only (twenty-four). All subjects were evaluated with preoperative and postoperative gait analysis. Gait, radiographic, strength, and functional measures were included in the analysis to assess changes in knee function. **RESULTS:** Seventy-three individuals met the criteria for inclusion. A single side was chosen for the analysis of each subject. Ninety percent of the subjects had additional, concurrent surgery. Improvements were noted in the index assessing the level of gait pathology and in functional variables across all groups, and pain was consistently decreased. All preoperative stress fractures healed. Strength levels were maintained across all groups. The Koshino index of patellar height improved from 1.4 to -2.3 in the group treated with patellar tendon advancement only and from 1.5 to -2.9 in the group treated with both osteotomy and tendon advancement. The range of knee flexion improved an average of 15 degrees to 20 degrees, and stance-phase knee flexion was restored to the typical range (9 degrees to 10 degrees) in the groups that had advancement of the patellar tendon as part of the procedure. Individuals who underwent a distal femoral osteotomy only were still in a crouch (a mean of 31 degrees of knee flexion in midstance) at the final assessment. **CONCLUSIONS:** Inclusion of patellar tendon advancement is necessary to achieve optimal results in the surgical management of a persistent crouch gait exhibited by adolescents and young adults with cerebral palsy. When this procedure is done alone or in combination with a distal femoral extension osteotomy (for the treatment of a knee flexion contracture), knee function in gait can be restored to values within typical limits, with gains in community function.

PMID: 18978417 [PubMed - in process]

15: J Bone Joint Surg Br. 2008 Nov;90(11):1535; author reply 1535.

Outcome of single-event multilevel surgery in untreated cerebral palsy in a developing country.

Ibrahim SB.

Publication Types:
Comment
Letter

PMID: 18978280 [PubMed - in process]

16: J Child Neurol. 2008 Nov;23(11):1267-74.

Effect of acupuncture on the brain in children with spastic cerebral palsy using functional neuroimaging (fMRI).

Wu Y, Jin Z, Li K, Lu ZL, Wong V, Han TL, Zheng H, Caspi O, Liu G, Zeng YW, Zou LP.

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We study the effect of acupuncture on brain activation patterns in children with cerebral palsy using functional magnetic resonance imaging (fMRI). fMRI of the whole brain was performed in 11 children with cerebral palsy and 10 healthy children during stimulation of a common acupoint in Traditional Medicine [Liv3 (Taichong)] on the left foot. We use both twisting and nontwisting methods with a blocked paradigm on a 2.0 Tesla MRI scanner. Functional data were analyzed by using Statistical Parametric Mapping software (SPM 99). Both signal increase and decrease in various regions of the brain were found in both groups of children. However, the pattern was different for the 2 groups, especially with decreases in signal regions. We suggest that the observed differences between children with cerebral palsy and healthy children with the stimulation of acupoint Liv3 might be due to blockage of the liver meridian in children with cerebral palsy.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18984835 [PubMed - in process]

17: Pediatrics. 2008 Nov;122(5):1079-85.

Candidate genes and cerebral palsy: a population-based study.

Gibson CS, Maclennan AH, Dekker GA, Goldwater PN, Sullivan TR, Munroe DJ, Tsang S, Stewart C, Nelson KB.

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OBJECTIVE: The objective of this study was to examine whether selected genetic polymorphisms in the infant are associated with later-diagnosed cerebral palsy. **METHODS:** A population-based case-control study was conducted of 28 single-nucleotide polymorphisms measured in newborn screening blood spots. A total of 413 children with later-diagnosed cerebral palsy were born to white women in South Australia in 1986-1999, and there were 856 control children. Distributions of genotypic frequencies were examined in total cerebral palsy, in gestational age groups, and by types of cerebral palsy and gender. Genotyping was performed by using a TaqMan assay. **RESULTS:** For inducible nitric-oxide synthase, possession of the T allele was more common in all children with cerebral palsy and for heterozygotes who were born at term. For lymphotoxin alpha, homozygous variant status was associated with risk for cerebral palsy and with spastic hemiplegic or quadriplegic cerebral palsy. Among term infants, heterozy-

gosity for the endothelial protein C receptor single-nucleotide polymorphism was more frequent in children with cerebral palsy. In preterm infants, the variant A allele of interleukin 8 and heterozygosity for the beta-2 adrenergic receptor were associated with cerebral palsy risk. Interleukin 8 heterozygote status was associated with spastic diplegia. Variants of several genes were associated with cerebral palsy in girls but not in boys. **CONCLUSIONS:** Two of the 28 single-nucleotide polymorphisms examined were associated with all types of spastic cerebral palsy in both gestational age groups and others with cerebral palsy in gestational age or cerebral palsy subgroups. Some of these associations support previous findings. There may be a genetic contribution to cerebral palsy risk, and additional investigation is warranted of genes and gene-environment interactions in cerebral palsy.

Publication Types:
Research Support, N.I.H., Extramural
Research Support, Non-U.S. Gov't

PMID: 18977990 [PubMed - in process]

18: Pediatrics. 2008 Nov;122(5):e1014-21.

Impact of intensive care practices on short-term and long-term outcomes for extremely preterm infants: comparison between the British Isles and France.

Bodeau-Livinec F, Marlow N, Ancel PY, Kurinczuk JJ, Costeloe K, Kaminski M.

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OBJECTIVES: The objective of this study was to compare practices of care and outcomes of infants who were born between 23 and 25 weeks' gestation in 1995 in the British Isles and in 1997-1998 in France. **METHODS:** We examined 2 population-based cohorts in the British Isles (1892 births included) and in France (456 births): the EPICure and EPIPAGE studies. The rate of follow-up was 90% at 30 months and 86% at 2 years. At 5 to 6 years, the cognitive function of 64% of the children without severe disability was assessed in the EPICure study and 57% in the EPIPAGE study. **RESULTS:** The mortality rate of live-born infants was lower in the EPICure study (25%) than in the EPIPAGE study (34%) before admission to a NICU but higher in the NICU (45% vs 29%, respectively), such that there was no difference in the proportions of survivors at discharge after adjustment for gestational age. The risk for severe brain lesions was 24% among infants who were admitted to a NICU in both studies, 41% in the EPICure study versus 67% in the epidemiologic study on great prematurity (EPIPAGE) among infants who died after discontinued treatment in NICU, and 17% vs 11% among survivors at discharge. The risk for cerebral palsy at 24 to 30 months was 20% in the EPICure study versus 16% in the EPIPAGE study, whereas the risk for overall cognitive score of <70 at 5 to 6 years was 10% vs 14%, respectively. **CONCLUSIONS:** Despite apparent differences in the modalities of limitation of intensive care, the outcomes of infants who were born at 23 to 25 weeks' gestation in the EPICure and EPIPAGE studies were not significantly different.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18977951 [PubMed - in process]

19: BMC Pediatr. 2008 Oct 31;8(1):50. [Epub ahead of print]**Participation in everyday activities and quality of life in pre-teenage children living with cerebral palsy in South West Ireland.**

McManus V, Corcoran P, Perry IJ.

ABSTRACT: BACKGROUND: Cerebral palsy (CP) is the most common cause of physical disability in children but its impact on quality of life is not well understood. This study examined participation in everyday activities among children without CP and children with mild, moderate and severe impairment due to CP. We then examined ten domains of quality of life in children with CP and investigated whether participation in everyday activities was associated with improved quality of life independent of gender, age and level of impairment. **METHODS:** This was a cross-sectional study of children aged 8-12 years based on two questionnaires, frequency of participation (FPQ) and KIDSCREEN, completed by parents of 98 children on the South of Ireland Cerebral Palsy Register (response rate = 82%) and parents of 448 children attending two Cork city schools (response rate = 69%) who completed one questionnaire (FPQ). Multiple linear regression was used: firstly to estimate the effect of severity of CP on participation in everyday activities independent of age and gender and secondly we estimated the effect of participation on quality of life independent of age gender and other relevant co variants. **RESULTS:** Participation in 11 of the 14 everyday activities examined varied across the children without CP and the children with severity of CP. In general, increased impairment decreased participation. Independent of age and gender, there was a highly significant decrease in overall participation with a fall of -6.0 (95% CI = -6.9 to -5.2) with each increasing level of impairment. The children with CP generally had high quality of life. Increased impairment was associated with diminished quality of life in just two domains - Physical well-being and Social support and peers. Overall participation in everyday activities was significantly associated with quality of life in 3 of the 10 domains (Physical well-being, Social support and peers & Moods and emotions) in analysis adjusted for gender age and level of impairment. **CONCLUSIONS:** While increased impairment due to CP restricts participation in the majority of everyday activities, the level of participation has a limited effect on the quality of life of the children with CP in age 8-12 years.

PMID: 18976459 [PubMed - as supplied by publisher]

20: Clin Neurol Neurosurg. 2008 Oct 31. [Epub ahead of print]**Treatment of sialorrhoea in children with Cerebral Palsy: A double-blind placebo controlled trial.**

Alrefai AH, Aburahma SK, Khader YS.

Jordan University of Science and Technology, Jordan.

OBJECTIVES: To prospectively study the efficacy and safety of intraparotid gland injection of Botulinum neurotoxin serotype A (Dysport((R))) for the treatment of sialorrhoea (drooling) in children with cerebral palsy (CP). **PATIENTS AND METHODS:** Twenty-four children, ages 21 months to 7 years, were recruited and randomized to receive either treatment with 100U Botulinum toxin or placebo. Rating scales for the frequency and severity of drooling were performed at the time of injection, at 1 month, and at baseline prior to the second injection. A second set of injections of either 140U of drug or placebo was given 4 months later, and the same rating scales were used. Eight patients declined the second injection. Due to high dropouts in the placebo group in second set of injections, statistical analysis was performed for the results of the initial injection only. **RESULTS:** Scores of the median frequency ($p=0.034$) and severity ($p=0.026$) of drooling were reduced in the treatment group. Median total score also declined in the treatment group ($p=0.027$). After the second injection, five out of nine patients injected with the drug showed a decline in the total score; including three patients who did not respond to the first injection. Only two patients experienced transient increase in drooling after the treatment with the drug. **CONCLUSION:** Botulinum toxin is an effective and safe treatment option for drooling in children with CP.

PMID: 18977585 [PubMed - as supplied by publisher]

21: J Perinat Med. 2008 Oct 31. [Epub ahead of print]

Intrauterine infection with *Ureaplasma* species is associated with adverse neuromotor outcome at 1 and 2 years adjusted age in preterm infants.

Berger A, Witt A, Haiden N, Kaider A, Klebermasz K, Fuiko R, Langgartner M, Pollak A.

1Department of Pediatrics, Division of Neonatology and General Pediatrics, Medical University Vienna, Austria.

Abstract Aims: To evaluate the association between the presence of bacterial pathogens in the amniotic cavity at the time of preterm delivery and neuromotor outcome at two years adjusted age in preterm infants born at ≤ 33 weeks' gestation. **Methods:** The cohort included 114 preterm infants, born at 23-33 weeks' gestation to mothers with amniotic cavity cultures taken during cesarean delivery who were subsequently evaluated at 24.0 \pm 1.1 months corrected age with the Bayley Scales of Infant Development II and a standardized neurologic examination. **Results:** A group of 67 infants with negative amniotic cavity cultures was compared to 47 infants with positive amniotic cavity cultures (*Ureaplasma urealyticum* (Uu) in 32 cases and other bacteria in 15 cases). Patients with positive amniotic cavity cultures had a significantly higher risk for an adverse psychomotor development index (PDI) score (OR 3.1, CI 1.3-7.1), an abnormal neurologic outcome (OR 4.8, CI 1.7-13.8), and a higher probability for diagnosis of cerebral palsy (OR 4.8, CI 1.4-16.4) at two years compared to patients with negative culture results. Isolation of Uu at birth was associated with a particular adverse outcome of preterm infants. **Conclusions:** Isolation of pathogens from the amniotic cavity at birth is significantly associated with abnormal PDI and adverse neuromotor outcome in preterm infants, irrespective of gestational age and birthweight.

PMID: 18976044 [PubMed - as supplied by publisher]

22: Eur J Paediatr Neurol. 2008 Oct 30. [Epub ahead of print]

Long-term use of botulinum toxin type A in children with cerebral palsy: Treatment consistency.

Molenaers G, Schörkhuber V, Fagard K, Van Campenhout A, De Cat J, Pauwels P, Ortibus E, De Cock P, Desloovere K.

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At the University Hospital of Pellenberg (Belgium), more than 1000 patients have been treated with Botulinum toxin type A (BTX-A) over the last decade. Ten percent of these patients (n=106) received multiple (at least four times), multi-level, high-dosage treatments. The aim of this study was to evaluate the stability of dosage and treatment intervals in long-term, multi-level, high-dosage treated children with cerebral palsy and to evaluate the evidence for a safe and stable response to this treatment. Data on disease, age, dosage and target muscles were extracted for each treatment session of 106 patients who received multiple BTX-A treatment sessions. Patients had a follow-up of 4y 6mo (range 1y 8mo-8y 9mo) on average and received 4 to 12 BTX-A treatments within the period of January 1996 and December 2005. Patients received a mean dosage of 23.5 \pm 5.2U/kgbw at first treatment with stable subsequent values. Mean dosages for children with diplegia, hemiplegia and quadriplegia were 24.5 \pm 4.7U/kgbw, 15.9 \pm 3.7U/kgbw and 22.0 \pm 4.8U/kgbw, respectively. Mean age at first treatment was 4y 6mo (range 1y 11mo-18y 10mo) with a majority of patients (76.4%) first treated within 2 and 4y of age. Treatment intervals of approximately 1y remained stable within four, five and six subsequent treatments. Long-term, high-dosage, multi-level BTX-A applications can be considered as a safe and stable treatment option for children with cerebral palsy and the formation of antibodies, responsible for secondary non-response, can be indirectly precluded.

PMID: 18977158 [PubMed - as supplied by publisher]

23: Acta Paediatr. 2008 Oct 11. [Epub ahead of print]

Follow-up of 5- to 11-year-old children treated for persistent pulmonary hypertension of the newborn.

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Abstract Aim: Determine the prevalence of sensorineural hearing loss (SNHL) and relate this to cumulative exposure to hypoxia, hypocapnia and hypotension. Describe chronic health problems among 5- to 11-year-old children treated for persistent pulmonary hypertension of the newborn (PPHN). **Methods:** The index group consisted of 85 children and a reference group was matched for age, sex and municipality of current residence. Questionnaires were sent to the families. The families in the index group were asked to participate in an examination of their child's hearing. **Results:** Seven children (11%) had SNHL. SNHL was not associated with hypoxia, hypocapnia or hypotension during treatment for PPHN. In the index group chronic health problems were reported in 42% compared with 17% in the reference group (chi-square test, $p = 0.001$). Twenty-one percent in the index group were treated with bronchodilator therapy compared with 8% in the reference group (chi-square test, $p = 0.028$). In the index group five children had cerebral palsy and two had developmental delay. Nineteen percent in the index group and 5% in the reference group had remedial education (chi-square test, $p = 0.008$). **Conclusion:** Children treated for PPHN are at high risk for SNHL. Exposure to hypoxia, hypocapnia or hypotension did not predict SNHL. The incidence of chronic health problems and use of remedial education was high.

PMID: 18976361 [PubMed - as supplied by publisher]

24: J Altern Complement Med. 2008 Oct;14(8):1005-9.

Randomized controlled trial of traditional Chinese medicine (acupuncture and tuina) in cerebral palsy: part 1--any increase in seizure in integrated acupuncture and rehabilitation group versus rehabilitation group?

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OBJECTIVE: The objective of this study was to observe for any change in baseline seizure frequency with acupuncture in children with cerebral palsy. **METHODS:** A randomized controlled study was conducted: Group I consisted of integrated acupuncture, tuina, and rehabilitation (physiotherapy, occupational therapy, and hydrotherapy) for 12 weeks; and Group II consisted of rehabilitation (physiotherapy, occupational therapy, and hydrotherapy) for 12 weeks. After a washout period of 4 weeks, Group II then received acupuncture and tuina for 12 weeks. Each subject received 5 daily acupuncture sessions per week for 12 weeks (total = 60 sessions). All children were assessed for any change in seizure frequency during treatment. **RESULTS:** One hundred and sixteen (116) children were recruited and randomized into Group I (N = 58) and Group II (N = 58). Thirty-three (33) children withdrew (9 from Group I and 24 from Group II). Of the remaining 83 children, Group I consisted of 49 and Group II of 34 children. For baseline, 5 children (6%; 5/83) had seizures. During phase 1 (12 weeks) of integrative treatment and subsequent 4-week follow-up, 3 children in Group I had seizures. Among those 3 children with seizures, 1 child with prior history of recurrent febrile seizure had 3 more recurrent febrile seizures during acupuncture treatment and 2 children without any prior history of seizures had new-onset seizures (1 with 3 recurrent febrile seizures and 1 with afebrile seizure). For Group I, 2 children with epilepsy had no increase in seizure frequency during acupuncture treatment. For Group II during the phase 2 acupuncture period, none had increase in seizure frequency. In both groups, 4 of 5 children (80%; 2 in Group I and 2 in Group II) with seizures had no increase in seizure frequency during acupuncture treatment and follow-up. **CONCLUSIONS:** The risk of increasing seizure is not increased with acupuncture treatment for cerebral palsy.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18990048 [PubMed - in process]

25: Exp Brain Res. 2008 Sep;190(2):215-23. Epub 2008 Jul 1.

Brain motor system function in a patient with complete spinal cord injury following extensive brain-computer interface training.

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Although several features of brain motor function appear to be preserved even in chronic complete SCI, previous functional MRI (fMRI) studies have also identified significant derangements such as a strongly reduced volume of activation, a poor modulation of function and abnormal activation patterns. It might be speculated that extensive motor imagery training may serve to prevent such abnormalities. We here report on a unique patient with a complete traumatic SCI below C5 who learned to elicit electroencephalographic signals beta-bursts in the midline region upon imagination of foot movements. This enabled him to use a neuroprosthesis and to "walk from thought" in a virtual environment via a brain-computer interface (BCI). We here used fMRI at 3T during imagined hand and foot movements to investigate the effects of motor imagery via persistent BCI training over 8 years on brain motor function and compared these findings to a group of five untrained healthy age-matched volunteers during executed and imagined movements. We observed robust primary sensorimotor cortex (SMC) activity in expected somatotopy in the tetraplegic patient upon movement imagination while such activation was absent in healthy untrained controls. Sensorimotor network activation with motor imagery in the patient (including SMC contralateral to and the cerebellum ipsilateral to the imagined side of movement as well as supplementary motor areas) was very similar to the pattern observed with actual movement in the controls. We interpret our findings as evidence that BCI training as a conduit of motor imagery training may assist in maintaining access to SMC in largely preserved somatotopy despite complete deafferentation.

Publication Types:
Case Reports
Research Support, Non-U.S. Gov't

PMID: 18592230 [PubMed - indexed for MEDLINE]

26: Neurobiol Dis. 2008 Aug;31(2):266-77. Epub 2008 May 22.

Characterization of seipin/BSCL2, a protein associated with spastic paraplegia 17.

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Seipin, which is encoded by the BSCL2 gene, is a glycoprotein of unknown biochemical function that is associated with dominant hereditary motor neuron diseases. Mutations in the N-glycosylation site of seipin are associated with the disease states and result in accumulation of unfolded protein in the endoplasmic reticulum (ER), leading to the unfolded protein response (UPR) and cell death, suggesting that these diseases are tightly associated with ER stress. Here, we determined the subcellular localization, functional domains, and distribution of seipin in tissues. Our studies show that the transmembrane domains in seipin are critical for ER retention, ubiquitination, formation of inclusions, and activation of UPR.

Using immunohistochemistry, seipin expression is detected in neurons in the spinal cord and in the frontal lobe cortex of the brain. The present study provides new insights into the biology of seipin protein that should help our understanding of the pathogenesis of seipin-related diseases.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18585921 [PubMed - indexed for MEDLINE]

27: PLoS ONE. 2008;3(11):e3668. Epub 2008 Nov 7.

Neonatal oral imitation in patients with severe brain damage.

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BACKGROUND: Neonates reproduce facial movements in response to an adult model just after birth. This neonatal oral imitation usually disappears at about 2- to 3-months of age following the development of cortical control. There is controversy relating to the nature and neural basis of such neonatal imitation. To address this issue, we studied the relationship between oral imitation, primitive reflexes, and residual voluntary movement in patients with severe brain damage. **METHODS:** Six male and six female patients with cerebral palsy, from 4 to 39 years, were included in this study. Oral imitation was examined when they were awake and looked at the experimenter. Patients were evaluated as performing oral imitation when they opened their mouth repeatedly without visual feedback regarding their own behavior in response to the experimenter's oral movement. Tongue or lip protrusion was not examined because none of patients were able to do those behaviors due to their physical disability. Rooting and sucking reflexes were also investigated as representatives of primitive reflexes. **RESULTS:** Six patients (50%) performed oral imitation. Mouth opening was not observed repeatedly in response to other facial expression without opening the mouth such as surprise or smile, excluding the possibility of nonspecific oral reaction. They exhibited little voluntary movement of their extremities. Half of them also manifested at least one primitive reflex. No patients exhibiting residual voluntary movements of their extremities performed oral imitation or primitive reflexes. **CONCLUSIONS:** Oral imitation reappears in a similar way to primitive reflexes in patients showing severely impaired cortical function and little voluntary movement of their extremities due to severe brain damage, suggesting that neonatal oral imitation is mainly controlled by the subcortical brain region.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18989360 [PubMed - in process]



The CP Institute is
proudly supported by the
CP Foundation

