NEONATAL NEUROLOGY

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NEW ANTIEPILEPTIC DRUGS IN NEWBORNS

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Introduction: New antiepileptic drugs (AEDs) are being indicated in newborns without enough clinical evidence.

Objective: To analyze the efficacy and safety of new AEDs in newborns with refractory seizures.

Materials and Methods: Observational prospective study of newborns with seizures admitted between June 2005 and November 2013 at the Italian Hospital Neonatology Unit.

Results: 116 consecutive newborns with seizures were included. We analyzed 17 (14.6%) with refractory seizures that receives new AEDs, 70% term and 30% premature. 70.58% had a symptomatic partial epilepsy and 29.42% presented a Neonatal Epileptic encephalopathy. Overall in-hospital mortality was 11.7%. The new AEDs indicated as second-line anticonvulsant treatment were: Vigabatrin in 2p., Oxcarbacepine 4p., Levetiracetam 1p., and Topiramate in 1p. As a 3rd or 4t^{h} AED: Vigabatrin in 7p.,Levetiracetam 4p., Topiramate 3p., Oxcarbazepine 2p. and Valproate in 1 p. We observed a 50% or more seizure reduction in 10p. (58%) and 4p. (23.5%) with complete cessation of seizures. We noticed a 50% or more seizure reduction with Oxcarbazepine in 4/5p., Levetiracetam 3/5p. and Vigabatrin in 4/9p. No adverse events were reported during treatment with any anticonvulsant.

Conclusions: In our study, we observed a favorable seizure control in new-borns with refractory seizures with new AEDs.

The development of new prospective studies are needed, including more new-borns, to assess the efficacy, safety and neuroprotective effect of new AEDs as first-line treatment.

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THE NEUROLOGICAL DEVELOPMENT OF NEWBORNS AT HIGH RISK THROUGH OUTPATIENT SERVICES BY MULTIDISCIPLINARY TEAM

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Technological advances in neonatology have provided increased survival of infants at high risk, a fact that reflects a greater number of children with neurodevelopmental disorders. The vulnerability, the risk of mortality and incidence of sequelae resulting from the conditions of birth are awakening to the need for early intervention. Objective: To assess the neurodevelopment of infants who are accompanied by a multidisciplinary team and the correlation of factors such as weight, gestational age and Apgar score in the fifth minute psychomotor development of infants at high risk. Methods : The study by reviewing medical records of infants considered at high risk were referred from the neonatal ICU of the University Hospital of Taubaté with multidisciplinary outpatient services , with more than a 1- year follow-up , receiving quarterly pacing therapies and neurological assessments . Results: 140 newborns were analyzed, 54 % were male, who presented some risk for the development of neurological disorders. Prematurity (gestational age < 371/7 weeks) and low birth weight (weight < 2500gr) were the main risk factors ($p < 0.05$). Among the study population, 82.9 % had normal psychomotor development. Conclusion: The main factors for onset of neurological disorders are related to weight and gestational age at birth. The multidisciplinary follow up with early stimulation of infants at high risk is essential for reducing deficits in neurological development.

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CONGENITAL AMYOPLASIA: REPORT OF 7 CASES

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Introduction: Arthrogryposis is defined as multiple congenital contractures involving two or more joints. The amyoplasia is a sporadic disease most often associated with arthrogryposis (38-43%) and characterized by aplasia or hypoplasia of the muscle tissue, usually in the four limbs (63%), but can also present with involvement of the upper extremities only (13%) and lower extremities (24%). The amyoplasia pathophysiological causes are not yet well established.

Objective: report the clinical features of seven patients diagnosed with amyoplasia.

Methods: Descriptive and prospective analysis of seven patients diagnosed in our center.

Results: 7 patients, 5 men and 2 woman. 7/7 no pathology or toxic in pregnancy, 5/7 decreased fetal movements, 1/7 family history of hip dysplasia, 6/7 without antenatal diagnosis, 6/7 childbirth for caesarean, 5/7 contractures of upper and lower extremities, 2/7 have only lower extremities commitment, 4/7 presents hemangiomas, 7/7 surgical correction and motor rehabilitation early, 7/7 normal social and cognitive development, 3/7 achieve gait before 3 years of age with orthotic support, 2/7 Electromyography showed chronic neurogenic commitment axonal degeneration, 4/7 Marrow Ultrasound normal, 7/7 without other associated malformations. **Conclusions:** In our cases a predominance of males, with involvement of all 4 limbs, without other associated malformations, most of them have hemangiomas. All have normal intelligence and early surgery, kinesics and occupational intervention, which according to their age, has allowed them to develop abilities very close to normal.

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EFFECT OF SEVERE PERINATAL ASPHYXIA ON PITUITARY AND THYROID FUNCTIONS IN NEONATES

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Introduction: Oxidative stress plays a significant role in pathogenesis of perinatal asphyxia. Data is scarce regarding changes in pituitary and thyroid functions and their correlation with oxidative stress parameters in perinatal asphyxia. The current study was undertaken to evaluate pituitary and thyroid functions in perinatal asphyxia, ascertain their prognostic significance and relation with oxidative stress parameters.

Material and Methods: Thirty cases and controls each were assessed at birth for cord blood TSH, FT_4, FT_3, prolactin, cortisol, growth hormone, protein carbonyl and Malondialdehyde. The cases were reassessed for these parameters at 48-72 hrs after birth.

Results: The median cord blood GH and prolactin were higher in cases with normalization of latter at 48-72 hrs. FT_3 level was higher in cases at birth and FT_3 and FT_4 levels increased at 48-72 hrs after birth. At birth, serum cortisol was lower and malondialdehyde and protein carbonyls levels were higher in cases. Significant positive correlation was seen between serum levels of oxidative stress markers and FT_3. ROC shows cord blood FT_3 level can predict HIE stage 3/death in perinatal asphyxia at optimum cut off of 2.62pmol/L.

Conclusions: Perinatal asphyxia is associated with pituitary, thyroid and adrenal dysfunctions, with FT_3 having prognostic implications. Oxidative stress plays a role in pathogenesis.

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EEG AND MRI COMPARISON AS A PREDICTING FACTOR FOR NEURODEVELOPMENTAL OUTCOME IN HYPOXIC ISCHEMIC ENCEPHALOPATHY INFANT TREATED WITH HYPOTHERMIA

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Hypoxic-ischemic encephalopathy (HIE) is an important cause of acute neurological damage in newborns (NB) at or near term. In recent years, several trials have shown that moderate hypothermia by total body cooling or selective head, is an effective intervention to reduce mortality and major disability in infants who survive after a perinatal hypoxic-ischemic attack. Follow up of these kinds of patients is very important in order to establish neurodevelopmental outcome, and specific markers can allow us to detect predicting sign for good or poor outcome.

We reported on our experience in small series of newborn with HIE treated with hypothermia in whom a comparison between EEG and MRI was used as a first marker for predicting neurodevelopment outcome. We have observed that a depressed EEG activity in the first 72 h of life

together with a diffused alteration of basal ganglia at MRI was correlated with a poor neurodevelopmental outcome at 18 months of follow-up.

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HYPOMELANOSIS OF ITO ASSOCIATED WITH MULTIPLE BRAIN MALFORMATIONS

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Introduction: Hypomelanosis of Ito (HI) syndrome is characterized by skin hypopigmentations often associated with systemic manifestation with high malformation of cortical development. Hemimegalencephaly is a rare, sporadic and non familial congenital brain malformation that involves overgrowth of one hemisphere. We report 2 month old Indian male baby with hypomelanosis of Ito associated with hemimegalencephaly (HME) and polymicrogyria, clinically presented with neonatal sezures, macrocrania and hypotonia.

Case report: Two months old baby, product of full term pregnancy and normal delivery refer to pediatric neurologist as a case of hypotonia, macrocrania and hypopigmented lesions. He was admitted to NICU because of respiratory distress and focal right sided epileptic seizures aborted with phenobarbitone. Birth weight was 3.1kg. Pregnancy was stimulated by hormones, after 5 years of infertility, and during 5th month of pregnancy some bleeding was noted. On examination baby showed linear areas of pigmentation affecting mainly left side of the body, including trunk, leg, hand as well as head and generalized hypotonia. Head circumference was 42cm. MRI brain revealed extensive bilateral frontoparietal polymicrogyria, dominant in the left hemisphere and left sided hemimegalencephaly. Corpus callosum looks fade in the region of anterior body and genum. EEG at the age of 1 month showed focal epileptiform abnormality over left posterior region where also slowing was presented.

Conclusion: We presented rare association of Hypomelanosis of Ito characterised by bilateral skin lesions and head involvement, with multiple brain malformation including hemimegalencephaly, polymicrogyria and dysgenesis of corpus callosum.

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"SEGUIMIENTO NEUROLÓGICO DE RECIÉN NACIDOS PRETÉRMINO EN UNA UNIDAD DEL IMSS"

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Introducción y Objetivos: Dada la alta incidencia a nivel mundial y nacional de nacimientos de productos pre término, es necesario hacer una evaluación del pronóstico neurológico de dichos pacientes, por lo cual se realizó el presente estudio prospectivo evaluando un grupo de 15 recién nacidos, de hasta 36 semanas de gestación (SDG) con peso menor a 2000 gr, y muchos de ellos portadores de alguna entidad como complicación, ameritando muchos de ellos manejo en la UCIN y otros en Cunero Patológico, obtenidos y atendidos en el Hospital General Regional # 200 en Tecámac, del Instituto Mexicano del Seguro Social (IMSS) en el Estado de México.

Material y Métodos: a todos los RN seleccionados, nacidos en el primer semestre del año en curso (2013), se les realizó ultrasonido transfontanelar (USG TF) y electroencefalograma (EEG) dentro del primer mes de vida y después cada 3 meses, así como valoración clínica neurológica dentro de la primer semana de vida, al mes y posteriormente en forma trimestral, recibiendo todos ellos asesoría por parte del Servicio de Rehabilitación durante su hospitalización y a su egreso.

Resultados: El presente estudio demuestra la alta incidencia de daño neurológico en estos pacientes, inherente a la prematurez sobre todo, así como los beneficios parciales que se obtienen con un programa temprano de detección de anomalías en el Neurodesarrollo y su pronta Rehabilitación..

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NEUROLOGIC MANIFESTATIONS OF INFANT CHRONIC LEAD POISONING. REPORT OF 9 CASES

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Purpose: Evaluate the neurologic manifestations in 9 children with chronic lead intoxication.

Methods: 9 children from Pasco, a mining city in the Andes of Peru, were evaluated neurologically or probable chronic lead intoxication.

Results: All the 9 cases were from three families, who lived very close to the mining site. The blood lead concentrations were over the 10 µg/dL limit (100, 66, 96, 54, 55, 40, 45, 70, 120). The neurological symptoms were mild and unspecific: sporadic headaches, mild learning disorders, mild behavior disorders, anemia compensated by the high altitude (over 4000 meters above sea level). X rays showed bone impregnation between epiphyses and metaphyses.

Only one case showed severe neurological alterations. Was a girl, 8 months old, with blood lead levels of 120 µg/dL. She had Burton signs, and presented convulsions at age of 8 months, as well as development delay, calcification of basal ganglia, agenesis of corpus callosum, cortical hypotrophy, identified by CAT scan and MRI. Intra uterus lead intoxication was suspected in this infant as the probable cause of these neurological abnormalities.

As part of the treatment all cases were removed from the lead intoxication source, and the lead blood levels were reduced in 50% by 6 months. Even though chelation therapy is recommended in these cases of high blood lead levels, it isn`t available in our country.

Conclusion: Chronic Lead intoxication may not have severe neurological symptoms until very high blood lead levels are achieved. Intra uterus intoxication may have severe neurological compromise.

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AN UNUSUAL CAUSE OF BRACHIAL PLEXUS PALSY IN NEONATAL PERIOD: RETROPHARYNGEAL ABSCESS

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Introduction: Brachial plexus palsy is often unilateral and due to obstetric trauma during delivery. Bilateral brachial plexus palsy is very rare in neonates. The other causes are familial congenital brachial plexus palsy, maternal uterine malformation, congenital varicella syndrome, osteomyelitis, exostosis of the first rib, tumors and hemangioma in the region of the brachial plexus. We described here a 25-day neonate, who presented with bilateral flaccid paralysis of upper extremities due to retropharyngeal abscess.

Case: A 25-day-old term male neonate, born with a birth weight of 2.5 kg, presented with complaints of paucity of movements of the bilateral upper limb. The baby was born in a private hospital by uncomplicated caesarean section. Physical examination revealed flaccid paralysis in upper extremities, dyspnoea, cyanosis and lymphadenopathies in the bilateral cervical areas. There was no fever history. Cervical magnetic resonance imaging showed multiloculary abscess within the retropharyngeal area causing compression to airway. The lesion was extending into the upper mediastinum and both paraspinal areas, especially C6-C7 neural foramina. These abscesses were drained and given to the patient antibiotics (vancomycin-meropenem and metronidazole) six-weeks longer. Clinical and radiological improvement was observed after three months of treatment. There is no neurological sequel after six weeks of treatment.

Discussion: We described a male neonate presented with flaccid paralysis in upper extremities due to wide retropharyngeal abscess and involvement of bilateral spinal root ganglions of C6-C7. We would like to emphasize that retropharyngeal abscess can be a reason of brachial plexus palsy in neonates even its rarity.

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FETALVENTRICULOMEGALY INVESTIGATIONS AND OUTCOMES - 5 YEAR EXPERIENCE

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Background: Ventriculomegaly is defined as a dilatation of 10 mm or more of the fetal lateral cerebral ventricles on ultrasound at 20 weeks gestation (1, 2). It can be isolated benign finding or associated with chromosomal abnormalities, congenital infections, malformations or cerebral haemorrhage. It is graded as mild (10 -12 mm), moderate (13-15 mm) and severe (> 15 mm) based on atrium width measurement.

Aim: To assess the etiology, investigations and neurological outcome of fetal ventriculomegaly cases in our centre from 2009 to 2013

Methods: 35 women with ventriculomegaly on 20 week anomaly scan were identified from fetal medicine database. Electronic and clinical records of mother & baby were reviewed to collect data on antenatal

investigations, delivery details, discharge outcome and long term neurological outcome. Three cases underwent termination of pregnancy & 32 babies were born. All women had serial USS to determine if the ventriculomegaly had returned to normal, was stable or was progressive.

Results: 32 fetuses had ventriculomegaly (21 mild, 9 moderate & 2 severe). Fetal chromosomes were normal in 9 cases. TORCH screen was normal in 30 women. 13 women had fetal MRI scans.

All 16 babies in whom mild ventriculomegaly returned to normal or was stable on serial scans were neurologically normal at birth and did not have developmental abnormality. All 5 babies with mild but progressive ventriculomegaly were neurologically normal at birth but one of these baby required insertion of VP shunt. 4 out of 11 Babies with moderate or severe ventriculomegaly had delayed development.

Conclusion: Fetuses with non-progressive isolated ventriculomegaly have good prognosis but those with moderate or severe ventriculomegaly are at risk of neurodisability.

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NEONATAL SEIZURES AND METABOLIC DISORDERS IN A TERTIARY NICU

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Background: Seizures are frequent in neonatal period. They can be idiopathic or caused by hypoxic-ischaemic injury, structural brain malformations, infections and metabolic disorders.

Objective: To evaluate the etiologic diagnosis of newborn babies with seizures admitted in a level 3 / tertiary neonatal intensive care unit.

Materials and Methods: Retrospective review of clinical files of the newborn babies admitted with seizures during a period of 3 years (Nov 2010 to Oct 2013). Data was collected on antenatal risk factors, labour and delivery complications, sepsis, neurological abnormalities and investigations including neurophysiology and imaging.

Results: 51 neonates had seizures at admission. The admission rate was 1800 in 3 years making the incidence of seizures 2.9 per 100 admissions. Neuroimaging, neurophysiology studies, infective screen and metabolic investigations were performed as appropriate. Most babies had neonatal encephalopathy due to perinatal hypoxic-ischaemic injury. Other etiology included neonatal ischaemic stroke, sepsis/ meningitis, intracranial bleed and inborn errors of metabolism (IEM).

IEM disorders included pyridoxine dependent epilepsy, molybdenum co-factor deficiency and mitochondrial disorder in 1 baby each. The diagnosis of IEM was made in all 3 cases and disease specific treatment was started in 2 cases within first 4 days.

Mortality rate was 17% (9 babies died).

Conclusion: Although inborn errors of metabolism are rare as initial presentation of neonatal seizures it is important to diagnose these early as some are treatable.

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EEG MONITORING IN PRETERM NEONATES USING A NEW PORTABLE EEG DEVICE – MICROEEG®

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Rationale: Recording EEGs in the neonatal intensive care unit (NICU) can be difficult due to various reasons. The ***micro***EEG® (BioSignal Group) is a small (88gm, 9.4x4.4x3.8cm), portable, wireless FDA-approved device, which digitizes EEG signals close to the electrodes and transmits data wirelessly to a personal computer. This device can be used with standard electrode caps. The goal of this study was to assess the ease and technical quality of the ***micro***EEG device to obtain continuous EEG recording in preterms.

Methods: Sixteen babies (24-30 weeks) were recruited at 2 sites as a part of an ongoing study of neonatal apnea. Continuous 8-9 hours of EEG (10-20 system) were obtained using ***micro***EEG® with an electrode cap (waveguard™ ANT Neuro) every 2-4 weeks. The ***micro***EEG® device transmitted data wirelessly to a laptop at the bedside, and was uploaded to a central server for remote interpretation.

Results: A total of 48 EEG studies were obtained. Recordings began in 30 minutes, and then uploaded rapidly to the server when finished. 9/48 studies were technically limited due to abundant artifacts. The remaining 39 studies were acceptable for clinical review. Background was immature in 6/39 EEGs. Sharp transients were present in 4 EEGs, with seizures recorded in one EEG. One bradycardia event (< 60) was recorded, with no change on EEG.

Conclusion: The ***micro***EEG® can potentially provide a practical, accessible, high quality continuous EEG recording in the NICU. The small size and remote reading capability could overcome many obstacles with EEG in the NICU.