International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2018; 4(1): 795-798

www.orthopaper.com
Received: 04-11-2017
Accepted: 05-12-2017

Srinivasa Rao Tatavarti
Associate Professor,
Department of Orthopaedics,
Andhra Medical College,
Visakhapatnam, Andhra Pradesh, India

Rajasekhara Rao Garimella
Associate Professor,
Department of Orthopaedics,
GITAM Institute of Medical Sciences & Research,
Visakhapatnam,
Andhra Pradesh, India

Subbalakshmi TDP
Assistant Professor,
Department of Anaesthesiology,
Andhra Medical College,
Visakhapatnam,
Andhra Pradesh, India

Correspondence
Rajasekhara Rao Garimella
Associate Professor,
Department of Orthopaedics,
GITAM Institute of Medical Sciences & Research,
Visakhapatnam,
Andhra Pradesh, India

Post natal factors associated with cerebral palsy

Srinivasa Rao Tatavarti, Rajasekhara Rao Garimella, Subbalakshmi TDP

DOI: https://doi.org/10.22271/ortho.2018.v4.i1l.114

Abstract
Introduction: Cerebral palsy is a neuro developmental condition with various antenatal, intranatal and post natal factors associated with it. Cerebral palsy is multi factorial in its aetiology.
Aim: To study postnatal factors associated with Cerebral palsy.
Materials & Methods: This is a retrospective study collecting birth history data from the mothers of 160 cerebral palsy and 160 normal children to identify the most common post natal factors associated with cerebral palsy.
Results: Statistical analysis of the data collected from birth history of 160 cerebral palsy and 160 normal children showed history of jaundice was present in 26 and 1 child in cerebral palsy and normal children respectively, with estimated odds ratio of 30.8507 with lower and upper 95 % confidence interval ranging from 4.1315 - 230.3683. History of meconium aspiration was present in 32 and 2 cases of Cerebral palsy and normal children respectively with estimated odds ratio of 19.75 with 95% confidence interval ranging from 4.6445 – 83.984. History of seizures was present in 48 and 2 cases of Cerebral palsy and normal children respectively, with estimated odds ratio of 33.8571, with 95% confidence interval ranging from 8.0613 – 142.199 was present.
Conclusion: Health education to the mothers, regular health check up by a gynaecologist at primary health care level to identify at risk pregnant woman and improving the resuscitation infrastructure facilities for the new born and effective referral services are very essential to prevent/treat some of the underlying causes/factors responsible for the meconium aspiration, jaundice and seizures in the new born which if neglected are important factors for morbidity and mortality of the new born and for long term neuro-developmental problems of the children.

Keywords: Unconjugated hyperbilirubinaemia, kernicterus, meconium aspiration, seizures, Neuro developmental problem, cerebral palsy

Introduction
Cerebral palsy is a permanent movement disorder with multi factorial origin. Some antenatal, intranatal & post natal factors are associated with Cerebral palsy. Brain injury leads to primary abnormalities like loss of selective motor control, balancing difficulties, abnormalities in muscle tone. These in turn leads to secondary and tertiary deformities which finally gives a clinical picture typically seen in Cerebral palsy children like spasticity, mental retardation, muscular incoordination etc. This study focuses on some of the post natal factors associated with cerebral palsy children.

Aim: To study the post natal factors associated with cerebral palsy children

Materials & Methods
This is a retrospective cohort study, conducted by taking birth history from the mothers of 160 cerebral palsy affected children and birth history from mothers of 160 normal children. The study was conducted during the period from 2013 to 2017 at Rani Chandramani Devi Government hospital, Visakhapatnam, Andhra Pradesh.

Results
Data collected from the birth history of 160 cerebral palsy children and 160 normal children was analysed and following observations were found. History of jaundice was present in 26 and 1 cases of cerebral palsy and normal children respectively.

Estimated odds ratio was 30.8507 with lower and upper 95 % confidence interval ranging from 4.1315 - 230.3683. History of Meconium aspiration was present in 32 and 2 cases of CP & Normal children respectively. Odds ratio was 19.75 with 95% confidence interval ranging from 4.6445 – 83.984. History of Seizures was present in 48 and 2 cases of CP & Normal children respectively with estimated odds ratio of 33.8571, with 95% confidence interval ranging from 8.0613 – 142.199.

Discussion

Cerebral palsy is a neuro developmental condition which is multi factorial in its etiology. It is defined as an "umbrella term covering a group of non-progressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of its development" [1]. Postnatal causes include toxic, infectious meningitis, encephalitis [2]. Postnatal events account for 12% – 21% of CP. But in a large number of cases, the cause of CP remains unknown [2]. In our study, Jaundice, meconium aspiration sequelae, seizures, are the factors mostly given in the history related to the birth of cerebral palsy children compared to the normal children.

Physiological jaundice usually appears on 2-3 days after birth and usually disappears by 7th-10th day [3]. Increase in the unconjugated serum bilirubin level upto 12 mg/dl can be considered as normal physiological range [3]. Of the various criteria present for demarcating physiological and pathological jaundice, two criteria namely, (1) jaundice appearing within 24 hrs of birth and (2) Jaundice persisting more than 1 week in a term infant, more than 2 weeks in a pre term infant [3] are considered in this study for statistical purpose because this is a retrospective study based on the history given by the mothers and other criteria based on serum unconjugated bilirubin levels which could not be given by the mothers while taking history hence could not be considered here.

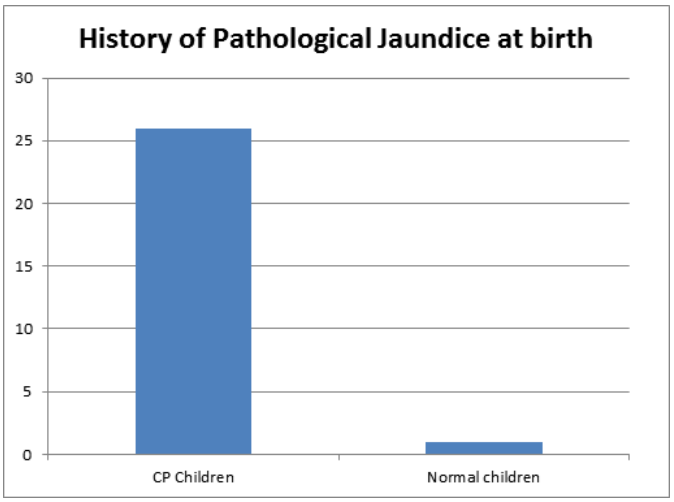

Fig 1: Comparing number of children having history of Pathological jaundice at birth in Cerebral palsy vs normal children (out of total 160 children each category)

Excess bilirubin is neuro toxic and can manifest in two forms : Acute bilurubin encephalopathy and chronic form - Kernicterus[4]. Bilirubin deposition can affect basal ganglia, hippocampus, cranial nerve nuclei, anterior horn cells of spinal cord, brainstem nuclei. This leads to neurotoxicity, in turn leading to neuronal degeneration [3]. Brain injury leads to abnormalities like loss of selective motor control, balancing difficulties, abnormalities in muscle tone. These are known as Primary effects of brain injury [5]. Due to the abnormal forces by the primary effects of the brain injury, secondary effects of brain injury like musculo-skeletal deformities evolve slowly which are in the form of muscle contractures and abnormalities in the bone growth [5]. Later compensatory abnormalities known as Tertiary effects of the brain injury develop to cope up with the secondary deformities [5]. This leads to features typically seen in cerebral palsy children like spasticity, mental retardation, muscular in coordination etc with varying degree of combinations.

Different treatment modalities are available for jaundice in the new born like, Phototherapy, metaloporphyrins for prophylaxis, Exchange blood transfusion etc. In a study by Roland C Ibekwe, MaryAnn U. Ibekwe *et al.*, they opined that Intensive phototherapy which is qualitative given early after the onset of Neonatal jaundice will alleviate the need for exchange blood transfusion with its accompanying risks [6]. Education of the pregnant mothers regarding the early presentation if neonatal jaundice appears was also stressed in their study [6]. In a study by Okperi B.O, the author identified Kernicterus from neonatal jaundice, Hypoxic ischaemic encephalopathy from severe birth asphyxia as the leading causes of cerebral palsy in Nigeria [7].

Meconium is the first stool of the infant. Meconium is normally stored in the intestines of the infant till birth. It is usually expelled out after birth. But sometimes meconium is expelled even before birth into the amniotic fluid. Inhalation of meconium stained amniotic fluid by infant may occur when the fetus is in uterus or during the birth of the baby. Meconium aspiration syndrome (MAS) usually seen in full term or post-term babies with Intra uterine growth retardation (IUGR) [3]. In our study out of 32 chidren with meconium aspiration history, 25 were full term and 7 were preterm babies. Of the 7 pre term babies, the birth weight of the babies noted was 1000 g (1 case), 1500 g (1case), 1750 g (1 case) 2200 g (3 cases) and 2250 (1 case). We have not observed any IUGR in the 27 full term babies with meconium aspiration history and all were above 2500 g birth weight. No post term birth was present in the 32 cases of meconium aspiration history recorded.

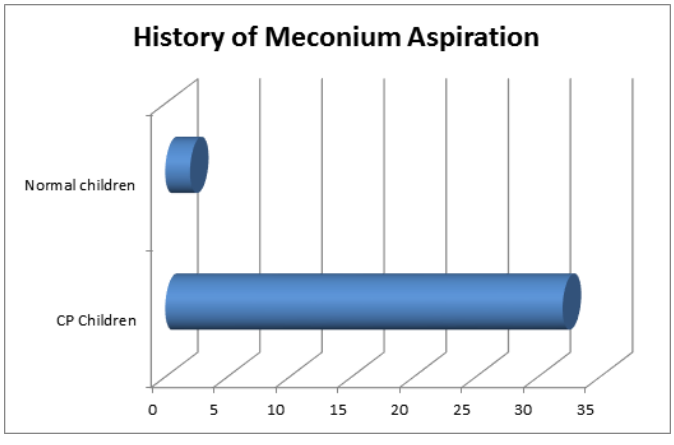

Fig 2: Comparing number children having history of Meconium aspiration at birth in Cerebral palsy vs normal children (out of total 160 children each category)

Inhalation of the meconium stained amniotic fluid can cause chemical pneumonitis, surfactant dysfunction and pulmonary hypertension. This if severe may lead to death of the new born or long term neurological sequelae in the survivors [8]. Various theories have been proposed regarding the fetal

passage of meconium, that fetus passes meconium as a response to hypoxia (Walker, 1953), or as a part of the normal gastro intestinal tract maturation under neural control (Mathews, 1979), or due to vagal stimulation from transient umbilical cord entrapment leading to increased peristalysis (Hon, 1961) [9]. In a study by N Beligere and R Rao, they concluded that poor outcome will be present in Meconium Aspiration Syndrome, irrespective of the mode of the delivery or mode of treatment. Most infants are normal at the time of discharge but on later follow-up, 10–20% of infants showed developmental disabilities [10]. In a prospective study conducted by Suhaim Afsar, Naresh P. Motwani *et al.*, they found that neonates diagnosed with Meconium aspiration syndrome, displayed neurodevelopmental delay in 13% cases [11]. In our study we have found 32 cases of cerebral palsy children has meconium aspiration history where as only 2 normal children have similar history which is a significant difference noted.

Seizures are a manifestation of some neurological dysfunction. In the new born seizures can arise due to a number of causes, ranging from infective, Iatrogenic, traumatic, metabolic, congenital etc. Of the various causes, high grade fever, meningitis, hypoglycemia, hypocalcemia, kernicterus, perinatal asphyxia, hypoxic ischemic encephalopathy are notable causes. With advanced investigative and treatment modalities the outcome has improved in recent years but long run neurological sequelae are still high. Apart from infant related factors, infections in mothers either before pregnancy or during pregnancy can lead to an increased risk of cerebral palsy and epilepsy in children.

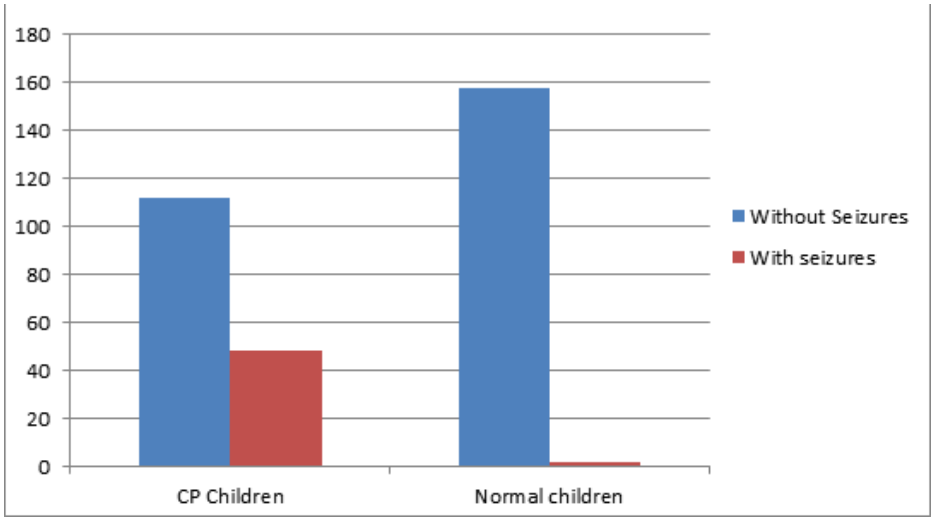

Fig 3: Comparing number children having history of seizures at birth in Cerebral palsy vs normal children (out of total 160 children each category)

In a research article published by Chun S.Wu, Lars H.Pedersen *et al.*[12] on single ton new born, they have showed the risk of cerebral palsy or epilepsy in the children born to mothers who had infections before or during pregnancy. As the present study is a retrospective study, specific cause in each case for seizures could not be traced but seizures after birth as a whole was found to be a significant factor in the birth history associated with cerebral palsy children when compared to the birth history of normal children. In a cohort study by Magda Lahorgue Nunes *et al.*, in a tertiary university hospital, they have observed that neonatal seizures predominated in the term newborns with perinatal asphyxia an elevated perinatal mortality and post neonatal morbidity[13].The follow up of the cases have showed an increased risk for developing postnatal epilepsy and developmental delay[13].

Acknowledgements

Our sincere thanks to all the mothers and the children, who have participated in this study by giving valuable information with utmost patience without whom the study would not have been possible.

Our sincere thanks to the authors mentioned in the references, as their study gave us in depth understanding about the various topics mentioned in the study.

Conclusion

In the present study, history of pathological jaundice, meconium aspiration, and seizures after birth were present in significant number in the birth history of cerebral palsy children when compared to normal children birth history. Health education to the mothers, regular health checkups of the pregnant by a gynaecologist at the root level primary health care to identify at risk pregnant woman and improving the resuscitation infrastructure facilities for the new born and effective referral services are very essential to prevent/treat some of the underlying causes/factors responsible for the meconium aspiration, jaundice and seizures in the new born which if neglected are important factors for long term neuro developmental problems of the children. However further research should be done with large sample size to confirm these findings.

References

1. Mutch L, Alberman E, Hagberg B, Kodama K, Perat MV. Cerebral palsy epidemiology: where are we now and where are we going? Dev Med Child Neurol. 1992; 34:547-551.
2. Chitra Sankar, Nandini Mundkur. Cerebral palsy - definition, classification, etiology and early diagnosis symposium on developmental and behavioural disorders-1, Indian Journal of Pediatrics. 2005; 72:866.
3. DC Dutta's text book of Obstetrics, Disease of the fetus and the new born, 7th edition, 32:476.
4. Williams Obstetrics. Diseases and injuries of the term new born, 24th edition, 33:644.
5. James R Gage, Michael H Schwartz, Steven E Koop, Tom F Novacheck. Text book The identification and

treatment of gait problems in cerebral palsy", 2nd edition, 107.
6. Roland C Ibekwe, Mary Ann U Ibekwe, Vivian U Muoneke. Outcome of Exchange Blood Transfusions Done for Neonatal Jaundice in Abakaliki, South Eastern Nigeria J Clin Neonatol. 2012; 1(1):34-37. doi: 10.4103/2249-4847.92239, PMCID: PMC3761982.
7. Okperi BO. Neonatal jaundice and Birth asphyxia as major causes of Cerebral palsy in Nigeria International Journal of Medicine and Biomedical Research, 2013, 2(3). www.ijmbr.com © Michael Joanna Publications
8. Williams Obstetrics. Diseases and injuries of the term new born, 24th edition, chapter. 33:637.
9. Williams Obstetrics. Intrapartum assessment, 24th edition, chapter. 24:493.
10. Beligere N, R Rao. Neuro developmental outcome of infants with meconium aspiration syndrome, Journal of Perinatology. 2008; 28:S93-S101. doi:10.1038/jp.2008.154.
11. Suhaim Afsar, Naresh P Motwani, Sudhakar C, Uma Chaturvedi. Evaluation of neuro-developmental outcome among babies with meconium aspiration syndrome, International Journal of Contemporary Pediatrics Afsar S *et al.* Int J Contemp Pediatr. 2016; 3(4):1185-1188. http://www.ijpediatrics.com
12. Chun S Wu, Lars H Pedersen, Jessica E Miller, Yuelian Sun, Elani Streja, Peter Uldall, *et al.* Risk of Cerebral Palsy and Childhood Epilepsy Related to Infections before or during Pregnancy Published, 2013. https://doi.org/10.1371/journal.pone.0057552
13. Magda Lahorgue Nunes, Maurer Pereira Martins, Bianca Menke Barea, Ricardo C Wainberg, Jaderson Costa da Costa. Neurological outcome of new borns with neonatal seizures: a cohort study in a tertiary university hospital, Arq. Neuro-Psiquiatr Paulo, 2008, 66(2a São). http://dx.doi.org/10.1590/S0004-282X2008000200005