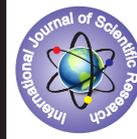


Analysis of congenital anomalies involving central nervous system in newborn



Paediatrics

KEYWORDS: anomalies, incidence, analysis, congenital, Rajendra institute of medical sciences.

Dr. Sandeep Bodra

M.B.B.S,M.D (Paediatrics), Department of Paediatrics & Genetics Diseases Research Department, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand

Dr. Amar Verma

MBBS (Gold Medalist) MD, DCH Ph.D.(Medicine) Department of Paediatrics & Genetics Diseases Research Department Rajendra Institute of Medical Sciences, Ranchi, Jharkhand

Dr. Kamal Narayan Prasad

M.B.B.S,M.D, 1ST year post graduate student, Department of Paediatrics, Rajendra Institute of Medical Sciences, Ranchi

ABSTRACT

This is a hospital based prospective study of 12080 newborn delivered in Rajendra Institute of Medical Sciences, Ranchi, a tertiary care centre situated in tribal dominated region of eastern India from January 2014 to September 2015.

The incidence of various birth defects in 12080 consecutive births was 15.7 per thousand. The sex ratio of congenital malformed births was 1.37:1 being higher in male (9.10 per thousand) than female (6.62 per thousand). System wise distribution of congenital malformations was: a) Central nervous system (6.45/ per thousand) being the highest, followed by musculoskeletal system (3.47/per thousand) and others. Distribution of birth defects affecting CNS was: 1.Meningomyelocele (2.06 per thousand) 2. Meningocele(1.65 per thousand) 3.Hydrocephalus (1.57 per thousand) 4. Encephalocele (0.49 per thousand) 5.Microcephaly (0.41 per thousand) 5. Spina Bifida Occulta (0.24 per thousand). The incidence of Birth defects in newborn weighing less than 2.5 kg was 3.39 per thousand and among more 2.5 kg was 13.32 per thousand respectively. CNS anomalies among tribal community was birth 4.63 per thousand.

Introduction:-

Birth Defect is a term widely used for Congenital Malformation i.e. a congenital physical anomaly which is recognizable at birth and significant enough to be considered a problem (2). In the last few decades it has become one of the leading causes of Neonatal mortality and morbidity. It is estimated that 1 in 40 or 25% of newborn, have a recognizable malformation or malformations at birth. In about half the cases, a single isolated malformation is found, while the other half display multiple malformations.

It is estimated that 10% of the paediatric hospital admissions have known genetic conditions, 18% have congenital defects of unknown aetiology, and 40% of surgical admission are patients with congenital malformation (1). 20% to 30% of infant deaths and 30% to 50% of deaths after neonatal period are due to congenital abnormalities. In 2001, birth defects accounted for 1 in 5 infant deaths in United States, with a rate of 137.6 per 100,000 live births, which is higher than other causes such as preterm/low birth weight (109.5/100,000) sudden infant death syndrome (55.5/100,000) and maternal complications of pregnancy (37.3/100,000) and respiratory distress syndrome (25.3/100,000)(1).

Congenital malformations are a result of multiple factors such as environmental, genetic or chromosomal but a large number are still idiopathic. It was seen that malformed infants had multiple aetiologies 1. Genetic(20%), chromosomal(3-5%), environmental(7-10%) and of unknown aetiology(65-70%). The present study was undertaken to determine place specific incidence, the secular trend and various aetiological factors so that it could help to decrease the morbidity and mortality of birth defects in the region under study.

Materials and methods:-

Present study included 12080 consecutive births beyond 37 completed weeks of gestational age in the department of obstetrics and gynaecology, Rajendra Institute of medical sciences, Ranchi between the period of January 2014 to August 2015. All the subjects were examined for the presence of congenital malformations. Further their incidence, system wise distribution and their possible relation to various environmental, medical and genetic factors during or before conception and or pregnancy were also studied & recorded.

All the new born were examined within 48 hours after life in a nude

state. congenital malformations which were noticeable on clinical examination were listed, irrespective of their severity. They were later investigated and a detailed retrospective investigation done. The parameters included in the study were single or multiple births, birth weight, sex of the baby, gestational age, maternal factors like presence of oligohydramnios, Polyhydramnios, history of drug intake, radiation exposure, family history etc. We propose through our study, to start a registry for birth defect in Jharkhand.

Result:-

In the present work a total number of 12080 consecutive hospital births of gestational age beyond 37 completed weeks were recorded during a period from January 2014 to August 2015. All the new-borns irrespective of their period of gestation, birth weight and sex were examined for the presence of congenital malformations within 48 hours after their birth. Of the total number of births 190 new-borns were found malformed (Incidence of 15.7 per thousand births).

| System Involved | Total number of cases | Incidence/thousand |
|------------------------|-----------------------|--------------------|
| Central nervous system | 78 | 6.45 |

Among the central nervous system deformities meningomyelocele was the commonest with per thousand incidences of 2.06. The second most common deformity was Meningocele having incidence 1.65 per thousand. There were 19 cases of hydrocephalous, 6 cases of Encephalocele, 5 cases of microcephaly and 3 cases of Spina bifida occulta having incidence per thousand 1.57, 0.49, 0.41 and 0.24 respectively.

Discussion:-

A comparative analysis of system wise distribution in various studies, including present study shows wide differences in various studies. Results for birth defects from other studies are as following:- Cart et al (1950) 14.7, McIntosh et al (1954) 75.0, Simpkins et al (1961) 54.0, Ghosh et al (1963) 34.0, Kamla et al (1977) 11.14, Chandra et al (1977) 16.96, Mathur et al (1978) 28.0, Choudhary et al (1984) 3.69, Kalra et al (1984) 19.85, Christianson et al (2006) 20.97. Result of current study is 15.7 birth defect / per thousand live birth.

Such a disparity was probably because of difference in incidence of congenital malformations due to geographical difference of place to place and amongst different social and ethnic groups. The highest incidence of 75.0 per thousand live births in McIntosh's study was due

to the fact that his survey followed the cases for a period of five years from birth.

Of the total 12080 new born surveyed, 7882 were males and 4198 were females. The sex ratio in the present study was 1.87:1. Of the total number of 190 malformed cases 110 were males and 80 were females with a sex ratio of 1.37:1. Among the data available the sex ratio was as follows. McIntosh et al (1954) 1.5:1, Ghosh et al (1963) 1.5:1, Khanna and Prasad (1967) 1.8:1, Kamala et al (1977) 1.7:1, Mathur et al (1978) 1.2:1 and Kalra et al (1984) 3.1:1(5, 7, 8, 9, 10,11). All were consistent with the present observations. A previous study in this institute showed a sex ratio of 1.9:1 among new-borns with birth defects.

The central nervous system was found to be the most common birth defect in present study. The total incidence was 6.45 per thousand live births. The results of Carter, Chandra and Kalra were in harmony with the present study. In our study meningomyelocele (2.06per thousand) was the most common central nervous system anomaly followed by Meningocele (1.65 per thousand) which may be due to the lack of awareness among local population. This also shows the failure of primary prevention strategies in this region which includes providing Iron and Folic acid supplementation. There were 19 cases

of Hydrocephalus (1.57 per thousand), 6 cases of Encephalocele (0.49 per thousand), 5 cases of Microcephaly (0.41 per thousand) and 3 cases of Spina bifida occulta (0.24 per thousand). These are attributed to a number of environmental, geographical and racial factors.

Incidence of different Birth defects among Tribal community: -

An analysis of the incidence of system-wise Birth defects was made among tribals which showed that Central nervous system malformations (1.65 per thousand) were highest.

Incidence among new born with birth weight <2.5 kg and >2.5 kg:

Among 190 cases with congenital malformations in the present study 41 cases had a birth weight less than 2.5 kg with 3.39 per thousand incidence and 161 cases with birth weight >2.5 kg having incidence 13.32 per thousand. In study of ^{congenital} malformations by McIntosh (1954), Mathur (1976), Choudhary (1984) and Kalra (1984) the incidence of congenital malformations was more in preterm and low birth weight babies.

Comparative chart of central nervous system anomalies by different authors & current study

| System involved | Carter (1950) | McIntosh (1954) | Simpkiss (1961) | Ghosh (1963) | Kamla (1977) | Chandra (1977) | Mathur (1978) | Choudhary (1984) | Kalra (1984) | Previous | Present |
|-----------------|---------------|-----------------|-----------------|--------------|--------------|----------------|---------------|------------------|--------------|----------|---------|
| CNS | 6.0 | 13.0 | 1.0 | 7.0 | 3.61 | 5.7 | 7.5 | 1.28 | 6.98 | 3.78 | 6.45 |

References: -

1. Anthony Wynshaw-Bori, Pediatrics and leslie G Biesecker; Dysmorphology, pg. 786-793, Nelson textbook of pediatrics 18th (edn.) 2008
2. https://en.m.wikipedia.org/wiki/Congenital_disorder
3. Carter M.P. & Wilson F.:B.M.J.2,407,1962
4. Choudhary A. et al:I.A.P Vol21:401-402,1984
5. Ghosh S. & Bali L.:Ind. J. Child Health 12,48,1963
6. indiagovernance.gov.in_files_16790
7. Kalra et al:Ind. Ped. Vol. 21, 945, 1984.
8. Kamala .et al: Med. Gen. Ind Vol.1,53-58, 1977
9. Khanna K.k.& Prasad L.S.N.:Ind J. Ped. 34, 63, 1960
10. Mathur B.C. et al: Ind. Ped. 12, 179-183, 1975.
11. McIntosh F. et al: Practioner 14. 506. 1954.