

A Prospective Study of Abnormal Neurological Findings in High-Risk Newborn with Sepsis and Low Birth Weight

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Abstract: 46 Infants with clinical and laboratory confirmed neonatal sepsis newborn assessed for very early neurological response in form of clenched fist, inconsolable crying, persistent asymmetric tonic neck reflex, head circumference, adductor angle, dorsiflexion angle of foot, popliteal angle, scarf sign at 1 month, 3 month and 6 month of age at time of discharge at SSG hospital Baroda India, in which we found incidents of inconsolable crying in 17.3%, persistent asymmetric tonic neck reflex in 43.4%, clenched fist in 23.9%, deviation from normal head growth in 21.7%, adductor angle in 6.5%, scarf sign in 30.4%, dorsiflexion angle of foot in 6.5%, popliteal angle in 28.2% in the low birth weight with septicemia.

Keywords: Early abnormal neurological findings, early stimulation, high risk newborns, neonatal sepsis.

1. Introduction

Neonatal sepsis is major cause of infantile morbidity and mortality in developing country like India. It includes neonatal septicemia, pneumonia, meningitis, osteomyelitis, and urinary tract infection.

High-risk newborn within first 28 days of life, who has greater chance of morbidity and mortality regardless of birth weight, size and gestational age. There are many risk factors which will interfere with normal birth process and may change extra uterine growth and development. Health care giver should be able to identify neurological abnormalities and neuro-motor deviation at earliest. These screening tools for neurological assessment Include: Inconsolable crying, Asymmetric tonic neck posture beyond 4 weeks, Clenched fist, Abnormality in tone, Deviated head growth, Presence of primitive reflex beyond 4 to 5 weeks. These parameters are early indicators to pick up if child may need further neurological follow up and less chance to meet any abnormal deviation for early intervention and timely diagnosis.

2. Method

Neonatal intensive care unit (NICU) patient at department of pediatrics at time of discharge with inclusion criteria and exclusion criteria as below

1. *Inclusion criteria:* All newborn less than 2500 gram irrespective of gestational age and neonatal sepsis.

2. *Exclusion criteria:* Prematurity, Small For Date, Large For Date, Weight For Age >97th Centile, Mechanical Ventilation more than 6 Hour, Hypoxic Ischemic Encephalopathy as per Sernat and Sernat Classification, Symptomatic Hypoglycemia And Symptomatic Hypocalcemia, Neonatal Seizure, Meningitis, Perinatal Asphyxia, Shock Requiring Inotropes, Major Morbidities as Chronic Lung Disease, Intraventricular Hemorrhage and Periventricular Leukomalacia, Hyper-Bilirubinemia Requiring Exchange Blood Transfusion, Abnormal Neurological Examination at Birth, Unwilling Parents, Major Congenital Abnormality and Chromosomal Abnormality and External Trauma after Birth.

At one, three and six month of age follow up was done to have systemic neurological assessment for detail subjective examination for explained screening tools in methods.

3. Result

In this study we have prospective follow up of new born baby for six months for any deviation of neurological behavior as per above screening tool. Out of 46 enrolled infants 3 infants have all screening parameter present and 20 infants have at least 1 screening parameter positive. Over all inconsolable cry present in 17.3%, persistent tonic neck reflex in 43.4%, clenched fist in 23.9%, deviation in normal head growth parameter in 21.7%, adductor angle 6.5%, scarf sign in 30.4%, dorsiflexion angle of foot in 6.5% and popliteal angle in 28.2% in newborn with low birth weight and septicemia.

Table 1
Amiel-tison method with angles

Age (months)	Adductor angle	Popliteal angle	Dorsiflexion angle	Scarf sign
0-3	40-80	80-100	60-70	Elbow not cross midline
4-6	70-110	90-120	60-70	Elbow cross midline
7-9	110-140	110-160	60-70	Elbow goes beyond midline
10-12	140-160	150-170	60-70	

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Table 2
Showing incidence of abnormal neurological finding in septicemia

Variable	Normal	Abnormal	% of Abnormality
Inconsolable cry	38	8	17.3
Asymmetric tonic neck reflex	26	20	43.4
Clenched fist	35	11	23.9
Head circumference	36	10	21.7
Adductor angle	43	3	6.5
Scarf sign	32	14	30.4
Dorsiflexion angle of foot	43	3	6.5
Popliteal angle	33	13	28.2

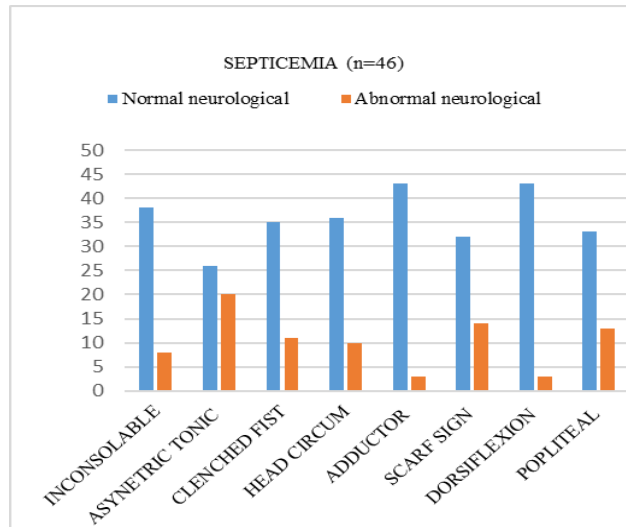


Fig. 1. Neurological finding at 6 months of age

4. Recommendation

There is less chance of isolated neurological assessment tool will have more power to predict ongoing or future neurological outcome, but combined multiple screening tool with frequent follow up and early diagnosis and timely intervention will change the course of neurodevelopmental process which may

lead to desired outcome for neuropsychological profile. Newer stimulation and early intervention method under strict supervision with developmentally appropriation will have scope of desired response for neurological behaviors.

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