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Original Research Article

To Determine the Correlation between New Ballard Score and Parkin Score with Gestational Age by First Trimester USG

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Abstract:
Background & Method: The aim of the study is to determine the correlation between New Ballard Score and Parkin Score with gestational age by first trimester USG. 250 newborns were taken who fulfilled the inclusion criteria. The background data has been collected from the mother and neonatal case sheets regarding gestational age from first trimester ultrasonography, Last menstrual period, antenatal drug use, neonatal birth weight and gender and recorded.
Result: IQR-inter quartile range, q3=p75 & q1=p25; p75- 75th percentile value, p25 -25th percentile value. Mean of gestational age by USG is 37.96 (SD- 1.392).
Conclusion: The percentage wise distribution of term of pregnancy showed full term (85.2%), preterm (11.2%) and post term (3.6%). The mean age of mothers was 26.8±3.11 years. This method was simple, quick and easy and does not disturb the baby much, especially when they were in incubators or sick, when it is not desirable to disturb them by repeated manipulation, as required during New Ballard scoring method.

Keywords: New Ballard Score, Parkin Score, gestational age & USG.

Study Designed: Observational Study.

1. Introduction

THE concept of maturity in newborn infant implies a state of readiness for the change from intrauterine life. This is clearly a complex state, being greatly affected by the development of pulmonary, cardiovascular, renal, endocrine and nervous system, as well as by general growth and structure of the body.[1]
In the newborn infant, it is essential to know the correct gestational age, so as to evaluate the risk of morbidity and mortality.[2] Knowledge of maturity is useful in timing of delivery in complicated pregnancies, evaluation of intrauterine growth, optimal management of a newborn infant, prediction of the infant's clinical course and subsequent developmental evaluation.[3]
The prevalence of LBW in India has been reported to range from 21% to 33%.[4] These infants are anatomically and functionally immature and therefore their mortality is high. Over

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80% of all neonatal deaths, in both the developed and developing countries, occur among LBW babies.[5] A LBW neonate can be preterm or intrauterine growth retarded.
These premature infants are at increased risk of developing perinatal asphyxia, temperature instability, feeding problems, hyperbilirubinemia, intraventricular haemorrhage, infections, retinopathy of prematurity and many more.
Mortality of LBW babies is directly related to the birth weight and gestational maturity.[6] The methods to assess the gestational age in a newborn infant is by calculation from mother's last menstrual period, antenatal sonography, clinical examination, electroencephalogram, ophthalmic examination. [7]
In low-resource settings, USG is not widely available and women commonly do not seek care until late in pregnancy. The date of the last menstrual period (LMP) is also used to estimate gestational age and is considered accurate when known. However, this information is often inaccurate due to poor recall, especially in women with lower education and socioeconomic status who are also more likely to delay seeking maternal care.[8]In others, it gives misleading information for example when menses are very irregular or have continued after conception or when the mother was taking oral contraceptives shortly before conception. Antenatal ultrasonography, electroencephalogram and ophthalmic examination have not penetrated in to the roots of rural population.

2. Material & Method

Neonatal Intensive Care Unit (NICU), Labour room, Department of Paediatrics, Durgapur Steel Plant Hospital, Durgapur, West Bengal with sample of 250 newborns was taken who fulfilled the inclusion criteria. The background data has been collected from the mother and neonatal case sheets regarding gestational age from first trimester ultrasonography, Last menstrual period, antenatal drug use, neonatal birth weight and gender and recorded. The New Ballard Score (NBS) and Parkin Score are done on the enrolled subjects as per the procedure, New Ballard Score Neuromuscular maturity- posture, square window, arm recoil, popliteal angle, scarf sign, heel to ear, Physical maturity- skin, lanugo, plantar surface, breast, ear/eye, genitals and Parkin score Skin texture, Skin color, Breast size and Ear firmness.

INCLUSION CRITERIA-

Following neonates will be selected for the study:

1. Neonates whose mothers have first trimester ultrasonography scan were included.
2. Live born babies of different gestational ages within 24hrs.
3. Neonates whose mothers were knowing date of last menstrual period.

EXCLUSION CRITERIA-

following neonates will be excluded from the study

1. Neonates born with major congenital anomalies.
2. Neonates whose mother's had irregular menstrual cycles, conceived when taking oral contraceptive medications.
3. Neonates born to mothers who received any drug causing neonatal CNS depression.
4. Neonates whose parents did not give consent.

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3. Results

Table 1: Frequency and percentage wise distribution of term of pregnancy in terms of gestational age by LMP

Demographic Data	Frequency	%
Gestational age (weeks):		
Pre term (<37)	28	11.2
Full term (37-41)	213	85.2
Post term (>41)	9	3.6
Total	250	100
Gestational age (Mean±SD)	38.32±1.54 WEEKS	

Table 2: Frequency and percentage wise distribution of Mother's age

Demographic Data	Frequency	%
Mother's age		
21-25 years	97	38.8
26-30 years	112	44.8
31-35 years	41	16.4
Mean ±SD	26.8±3.11	
Total	250	100

Table 3: frequency and percentage wise distribution of weight of neonates (GA_USG)

	Frequency	Percent
AGA	178	71.2
AGA, LBW	44	17.6
LGA	14	5.6
SGA	1	.4
SGA, LBW	13	5.2
Total	250	100.0

Table 4: Descriptive statistics on outcome parameters

	Mean ±SD	Median	IQR =q3-q1
New Ballard score	34.77±4.98	35	38-32
Parkin score	7.32±1.85	7	8-6

IQR-inter quartile range , q3=p75 & q1=p25 ; p75- 75th percentile value ,p25 -25th percentile value

Table 5: Correlation between New Ballard Score and Gestational age by USG

	Mean	Std. Deviation	'r' value	p-value
Ballard score	34.77	4.989	0.834	
GA_USG	37.96	1.392		
***P<0.001 Highly Significant.				P<0.001 HS ***

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Mean of gestational age by USG is 37.96 (SD- 1.392).

4. Discussion

The present study has assessed the accuracy of gestational age assessment in new-born using new Ballard score and Parkin score and correlation with four simple physical criteria which are breast, genitals, eye/ear and, skin. A Prospective observational analytical study was performed on 250 new-borns at Neonatal Intensive Care Unit (NICU), Labour room, Department of Paediatrics, Durgapur Steel Plant Hospital, Durgapur, West Bengal. The study has correlated Gestational age with first trimester USG with four physical criteria which are Breast/Genitals/Ear and eye/Skin texture. The major findings of the study are discussed here with the findings of reference studies.

The present study found the mean of New Ballard Score is 34.77 (SD- 4.989), Parkin Score is 7.32 (SD- 1.850) and that the correlation between New Ballard Score and Parkin score had a strong correlation. Similar observations were observed by previous studies Ambey et al., 2018.[2]

The present study found out highly significant correlation between New Ballard Score and Gestational age by first trimester USG with an 'r' value of 0.834 ($p<0.001$). It also found out highly significant correlation between Parkin Score and Gestational age by first trimester USG with an 'r' value of 0.798 ($p<0.001$). It shows that New Ballard Score is more accurate than Parkin Score. Likewise, in a study by Sreekumar et al., The mean gestational age by dates/USG was 36.2 weeks, by NBS was 36.1 (SD-3.31) and by PS was 37.6 (SD-4.06). The mean difference between Obstetric GA and NBS was 0.04 weeks (<1 day), Obstetric GA and PS was 1.5 weeks (12 days) and GA by NBS and Parkins was 1.5 weeks (12 days). The standard deviation of the mean difference was 1.68. In their study, gestational age assessment by New Ballard Score was found to be more accurate than Parkin Score.[9] In another study, Mehta VR et al., (2021) also reported that New Ballard Score corresponds more accurately than Parkin Score.[10] Gestational age assessment by New Ballard Score is more accurate than Parkin Score. Gestational age assessment by New Ballard Score is more accurate than Parkin Score.[11]

5. Conclusion

The percentage wise distribution of term of pregnancy showed full term (85.2%), preterm (11.2%) and post term (3.6%). The mean age of mothers was 26.8±3.11 years. The age wise distribution of the mothers signified that majority of the subjects (44.8%) belongs to 26-30 age group followed by 38.8% mothers of age 21-25 years and 16.4% mothers of age 31-35 years.

This method was simple, quick and easy and does not disturb the baby much, especially when they were in incubators or sick, when it is not desirable to disturb them by repeated manipulation, as required during New Ballard scoring method.

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