ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 06 | June - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARISON OF PARKIN SCORE AND NEW BALLARDS SCORE FOR GESTATIONAL AGE ESTIMATION- PROSPECTIVE ANALYTICAL STUDY

Neonatology

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ABSTRACT

In an infant it is important to know correct gestational age , to evaluate the risk , line of management and mortality and morbidity. Most common used method for gestational age assessment is Ballard's score which includes various parameters and neurologic parameters and difficult to assess in sick neonate where parkin score only uses 4 criteria for assessment of gestational age. This prospective analytical study was conducted to compare new Ballard's score and parkin's score between healthy and sick neonates in tertiary care center

KEYWORDS

Newborn, gestational age estimation , Ballard's score, Parkin's score utilization.

INTRODUCTION

In an infant, it is very important to know the correct gestational age (GA) for evaluating the risk of mortality and morbidity. [1] Knowledge of GA modifies the line of management. It is essential to know the accurate GA of sick neonates. Even a minor change can lead to drastic shift in lines of management such as doses of inravenous fluid and medications. [2] Methods frequently used clinically for GA assessment are New Ballards Scores and Parkins score.

In many of the neonatal intensive care units (NICU), The New Ballards system of scoring (NBS) is used to estimate the GA. Various neurological criteria are difficult to be assessed in sick infants and the ones in incubator. The physical maturity is assessed by " planter surface, skin, lanugo, breast, eye , ear, genitals". Neuromuscular maturity can be assessed by " Posture, Arm recoil, Popliteal angle, Square window test, Heel to ear, Scarf sign". The 4 criteria that are used in Parkins scoring system (PS) are skin texture, breast size skin colour and ear firmness. [1] Many of the neurological criteria used in NBS are difficult to be assessed in sick infants and the ones in incubator where as PS uses only 4 criteria and is easier for practical use.

OBJECTIVES

- Estimation of gestational age by new ballard's score and parkin score
- To compare the New Ballard Score and Parkin's Score in healthy and sick neonates

MATERIALS& METHODS

Source Of Data:
This study was conducted in NICU and SNICU of RL Jalappa hospital.

Study Design: Prospective analytical study

Study Period- 3 months from November 2019 to January 20202.

Method Of Collection Of Data:
Inclusion Criteria:
1. Neonates whose GA estimate was available by last menstrual period (LMP) and/or first trimester ultrasonography scan were included

Exclusion Criteria:
1. Neonates whose mothers had irregular menstrual cycles, conceived when consuming oral contraceptive medications.
2. Neonates with major congenital malformations
3. Neonates born to mothers who had received any drug causing neonatal CNS depression – barbiturates and benzodiazepams

Sample Size:
sample size is estimated based on mean difference in gestational age by New Ballards Score, Parkins score method . As reported in study by Kavitha sreekumar and et.al which reported average variance estimate (32)2 in gestational age with 90% power with alpha error of 1% estimated sample size is 93.

METHODOLOGY

- All neonates who delivered and admitted to NICU and SNICU were included in the study.
- Written informed consent was taken from the parents.
- Demographic details including name, age, address was recorded in the Proforma.
- Gestational age assessment of admitted neonates was done by using LMP by Naegele's rule, Modified Ballards score and Parkins score compared.

Statistical Analysis:
Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Continuous data represented as mean and standard deviation. Paired t test was used as test of significance to identify the mean difference between paired data.

The descriptive data of both the scores were plotted in Bland- Altman plot. Correlations were performed with Pearson Correlation coefficient.

Graphical Representation Of Data:
MS Excel and MS word was used to obtain various types of graphs. P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical Software:-
MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

RESULTS:

Table 1:- Distribution Of Subjects According To Birth Weight.

Birth weight	Frequency	Percent
>2.5kg	66	44.9
1.5-2.49kg	66	44.9
1-1.49kg	12	8.2
<1kg	3	2.0
Total	147	100.0

44.9% of the newborn had birth weight more than 2.5kgs followed by 44.9% of the newborn had birth weight 1.5-2.49kgs, 8.2% of the newborn had birth weight 1-1.49kg and only 2% of the newborn had weight less than 1kg.

Among the subjects minimum birth weight was 0.85kg and maximum was 44.kg with mean birth weight was 2.41$\pm$0.725kgs.

We have included 147 subjects in our study. Out of 147 subjects 61(41.5%) was healthy newborn and 86(58.5%) was sick newborn. Among the sick newborn majority 54(62.79%) had RDS followed by perinatal asphyxia was present in 10(11.6%) newborn, sepsis in 7(8.1%) newborn and prematurity in 5(5.8%).

The mean gestational age as estimated by NBS was 36.8 $\pm$ 3.1 weeks and by Parkin score was 37.3 $\pm$ 2.63 weeks. Mean difference between the two scores estimating gestational age was 0.46weeks. P value 0.013, there was a statistical significance found between two score with respect to estimating gestational age. In normal neonates the mean difference was 0.68weeks. But in sick neonates it was 0.28weeks. P Value 0.281, there was no statistical significance found between healthy and sick newborn with respect to difference between two score in estimating gestational age.

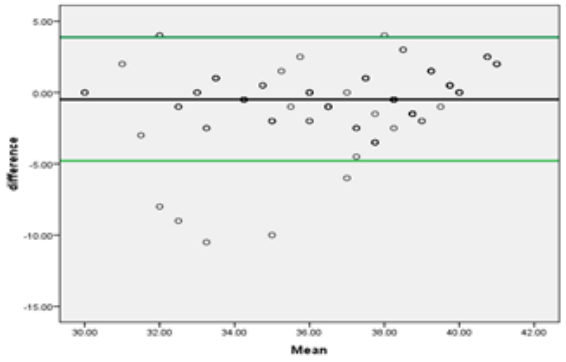

Figure 1:- Bland Altman Plot Of The Average And Difference Between The NBS And Parkin Score Along With The Limits.

Bland-Altman plot was plotted based on the values obtained and the mean difference b/w two scorewas found to be -0.46 and standard deviation was 2.217. The p value was 0.013 and it was highly significant. It means the two scores were statistically significant from each other in interpretation.

Table 2:- Comparison Of Time Taken For Performing Between Two Scores

	Mean	Std. Deviation	P value
New ballard score	4.43	0.986	<0.001
Parkin score	2.62	0.487	

Time taken for performing both the tests were recorded and compared. Mean time taken to complete NBS examination was 4.43min and Parkin score was 2.62min.

There was a statistically significant difference found between two scoring with respect to time taken for performing.

Table 3:- Correlation Of New Ballard Score And PARKIN Score

			PARKIN Score
Normal newborn	New ballard score	Pearson Correlation	0.629**
		P value	<0.001
Sick newborn	New ballard score	Pearson Correlation	0.772**
		P value	<0.001

For Normal newborn New ballard score and PARKIN Score had a strong positive correlation with Pearson Correlation 0.629 which was statistically significant.

For Sick newborn New ballard score and PARKIN Score had a strong positive correlation with Pearson Correlation 0.772 which was statistically significant.

DISCUSSION:

We need a method of estimating gestational age which should not upset ill babies, and in order to distinguish between preterm and small for dates babies it should not be affected by the quality of intrauterine growth [1].

Parkin et al. assessed the accuracy of various physical characteristics in comparison to neurological criteria used in the Dubowitz score.[2]They recommended a score consisting of four physical characteristics to assess the gestational age of neonates. In 1979, Ballards, et al. modified dubowitz score to develop a simplified score for assessment of fetal maturation of newly born infants.[3] In 1991, Ballard score was extended to include extremely premature neonates and it was named New Ballard Score.[4]

In our study we have included 147 newborn to compare between New Ballard Score and parkin score in estimating the gestational age.

In our study Out of 147 subjects 61(41.5%) was healthy newborn and 86(58.5%) was sick newborn. Among the sick newborn majority 54(62.79%) had RDS followed by perinatal asphyxia was present in 10(11.6%) newborn, sepsis in 7(8.1%) newborn and prematurity in 5(5.8%).

In a study done by Ambey R et al [5] among the co morbidities, majority were birth asphyxia which constituted 129 (25.8%) and prematurity which constituted 71 (14.2%), neonatal sepsis 67 (13.4%).

In our study Mean difference between the two scores estimating gestational age was 0.46weeks. In normal neonates the mean difference was 0.68weeks. But in sick neonates it was 0.28weeks. In a study done by Ambey R et al [5] Mean difference between the two scores estimating gestational age was 3.75 days. In normal neonates the mean difference was 3.61 days. But in sick neonates it was 3.7 days.

In our study Bland-Altman plot was plotted to know the agreement between two scores and it was found that there is similarity and most of the values were found within the limits of agreement. Similar finding were observed by a study by Ambey R et al [5].

In study by Sreekumar, et al [6] When the average of the NBS and PS scores were plotted, 95% of the values were found to lie within the limits of agreement. The mean difference between the NBS and PS in sick babies was 1.5 weeks.

In our study Time taken for performing both the tests were recorded and compared. Mean time taken to complete NBS examination was 4.43min and Parkin score was 2.62min.

In study done by Ambey R et al [5] mean time taken to complete NBS examination was 320.62 seconds (5 min 33 sec) and Parkin score was 95.92 seconds (1min 36 sec.).

In our study New ballard score and Parkin Score had a strong positive correlation which is statistically significant. Similar finding was observed in study conducted by Ambey R et al [5] and Shah B [7].

CONCLUSIONS

Parkin score caused less discomfort to neonates and takes less time to perform. In resource limited setting where Doctor-Patient ratio is very less Parkin score can be used to assess GA with reasonable accuracy.

Conflict Of Interest: Nil

Funding: Nil

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