

Research Article

Study of correlation of gestational age estimation by new ballard score with inter mammary distance in new born

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ABSTRACT

Background: It is important to recognise preterm babies as they have a different set of problems than term babies.

Methods: Study was done over a period of 2 years. 254 new-borns ranging in gestational age from 27 to 42 weeks were studied in MYH Hospital, Indore.

Results: Intermammary distance and gestational age showed a positive correlation with a correlation coefficient of 0.9. SGA and AGA babies had correlation coefficient of 0.95 and 0.89 respectively.

Conclusions: Intermammary distance of 69.60mm can be used to differentiate preterm and term babies. This simple measurement can be easily used by peripheral health workers at remote places to differentiate between term and preterm babies.

Keywords: Intermammary distance, Gestational age, New ballard score

INTRODUCTION

In India about one third of neonates are born low birth weight.¹ WHO defines LBW as birth weight less than 2.5 kg.² This includes both preterm and IUGR babies. Single most important determinant of neonatal deaths is low birth weight. Gestational age of a baby is important to determine as it is a predictor of future morbidity and mortality.

Methods to determine gestational age include date of last menstrual period, USG and certain scoring systems like new Ballard and Dubowitz.³⁻⁵ Date of LMP is not very reliable because it is memory based and many women have irregular cycles. USG is not affordable for all patients. Scoring systems are based on physical and neurological criteria which are suitable for trained health care specialists. Paramedical staffs at village level are not competent enough to use these scores.

Intermammary distance is simple to measure and is not cumbersome. It is useful to determine if such simple criteria correlate with gestational age determination by new Ballard score.

Preterm babies need to be referred to higher centres for further management. So if a simple measurement like intermammary distance can be used to determine preterm babies it will be highly productive.

METHODS

Subjects

254 newborns delivered at MYH hospital and admitted in MYH and CNBC nursery were studied who were of gestational age ranging from 27 to 42 weeks. The study period was 2 years. New-borns were excluded on the basis of risk factors present in either mother or baby itself included duration of rupture of membranes >24 hrs maternal fever >38 degree Celsius, foul smelling liquor,

chorioamnionitis, duration of labor >24 hrs., birth asphyxia, instrumentation (intubation, forceps delivery) and congenital anomalies.

New ballard score taken from Ballard JL et al: New Ballard score expanded to include extremely premature infants⁵ was used to determine gestational age. 6 neurological and 6 physical criteria were used.

Birth weight (BW)

Babies were weighed naked on weighing machine (BRAUN Company) nearest to 50 gm. at Labor room, MYH Hospital within 24 hrs of birth.

Inter mammary distance (IMD)

The intermammary distance was measured by fixing one nipple to the zero mark on the ruler and noting the distance of other nipple on the ruler.

All the measurements were taken in first 24 hours of birth. Standard statistical methods used for data analysis included correlation coefficient, mean, standard deviation and simple regression equation.^{6,7}

RESULTS

254 newborns delivered at MYH and kept in MYH and CNBC nursery were enrolled in this study. They were of gestational age from 27 to 42 weeks. Table1 shows the sex wise distribution of babies.

Table 1: Sex wise distribution of babies.

Male	Female
130	124

130 babies were male and 124 were female.

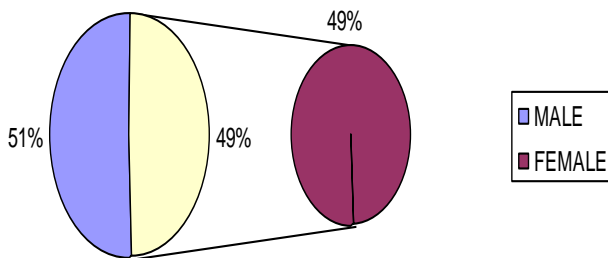


Figure 1: Sex wise distribution of babies.

Table 2 shows distribution of babies according to maturity. In this study, 97(38.2%) babies were term, 152(59.8%) were pre-term and 5(2%) were post-term.

Table 2: Distribution of babies according to gestational age.

	AGA	SGA
Term	73	24
Pre-term	115	37
Post-term	5	0

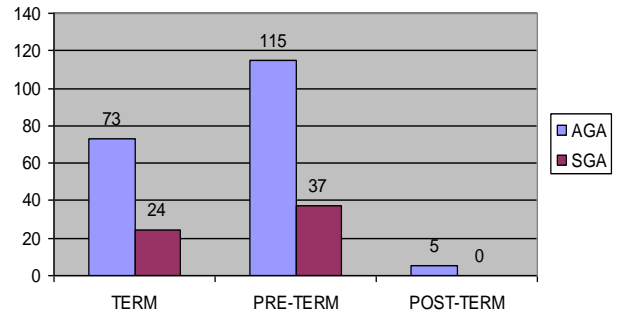


Figure 2: Maturity wise distribution of babies.

Babies were classified as average for gestational age (AGA) and small for gestational age (SGA). 193 (76%) were AGA and 61 (24%) were SGA.

The intermammary distance was correlated with birth weight of babies.

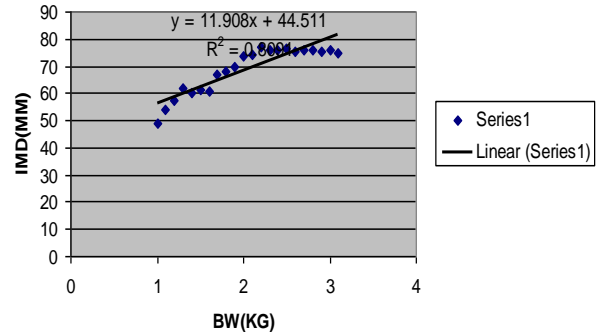


Figure 3: Correlation between BW and IMD.

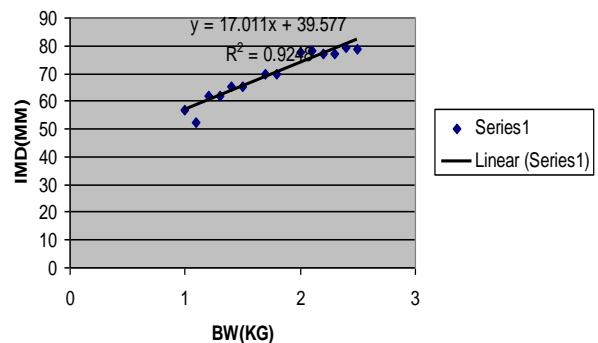


Figure 4: Correlation between BW and IMD (SGA).

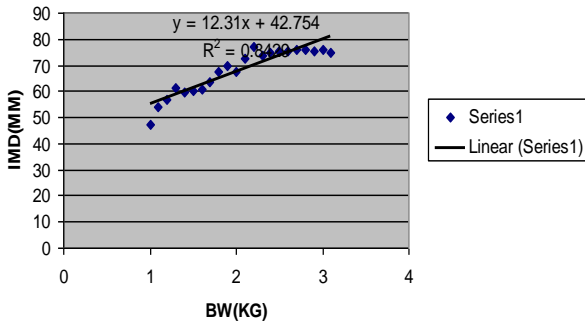


Figure 5: Correlation between BW and IMD (AGA).

The correlation coefficient of gestational age and intermammary distance was 0.90.

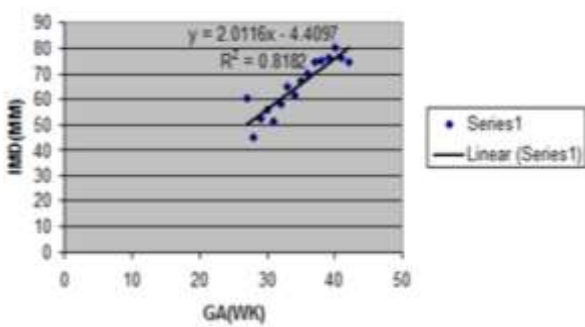


Figure 6: Correlation between GA and IMD.

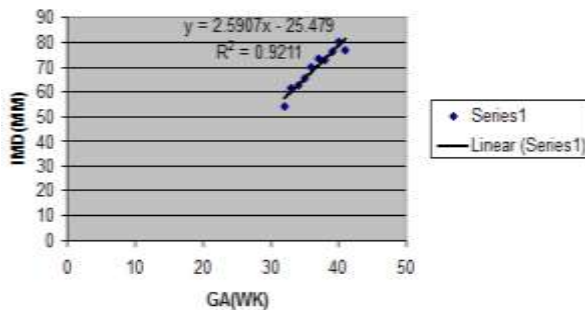


Figure 7: Correlation between GA and IMD (SGA).

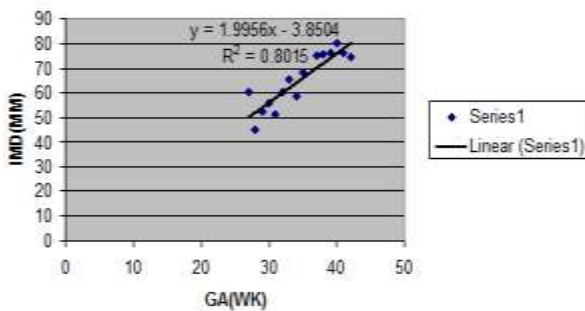


Figure 8: Correlation between GA and IMD (AGA).

Both AGA and SGA babies had positive correlation of 0.89 and 0.95 respectively between gestational age and intermammary distance.

DISCUSSION

Incidence of babies born preterm in India is 10-12% as compared to 5-7% in west. Neonatal mortality of these infants is high as they are both physiologically and anatomically immature.

This study was aimed to coin a simple method of knowing gestational age so that peripheral health workers at remote places could easily recognize preterm babies and refer them to higher centers for further management. In this study intermammary distance was correlated with gestational age estimation by new Ballard score. 254 newborns delivered at MYH and kept in MYH and CNBC nursery were enrolled in this study. Their gestational age varied from 27 weeks to 42 weeks.

Male and female newborns were 130 and 124 respectively. According to maturity 5 were post-term, 152 were pre-term and 97 were term. Preterm, term and post-term babies were classified into average for gestational age (AGA) and small for gestational age (SGA) groups according to a form developed by Kay J.L., Seton Medical center, Austin, TX, with Mead Johnson and Co, Evansville, IN. Manual of neonatal care.⁸ First, correlation between intermammary distance and birth weight of babies was sought. With intermammary distance correlation coefficient was 0.89. This correlation with body weight was 0.91 in AGA babies and 0.96 in SGA babies.

In our study we sought correlation between gestational ages with intermammary distance. Gestational age determination was done by New Ballard score taken from Ballard JL et al: New Ballard score expanded to include extremely premature infants. J Pediatr 119:417.⁵ The intermammary distance was measured by fixing one nipple to the zero mark on the steel ruler (SHARP company) and noting the distance of other nipple on the ruler to the nearest of 0.05cm thrice by the author and the average was recorded.⁹

Correlation coefficient was 0.90 by linear regression analysis for intermammary distance.

Correlation was 0.95 in SGA and 0.89 in AGA babies for intermammary distance .It was inferred that gestational age and intermammary distance had a positive correlation. So, it is possible to estimate the gestational age of babies with help of intermammary distance.

The relationship between gestational age and intermammary distance was:

$$IMD = 2 * GA - 4.40.$$

Where, IMD = Intermammary distance in mm.

Kulkarni and Rajendran studied internipple distance in newborn babies from 26 to 42 weeks of gestation and reported a mean internipple distance of 5.17 cm at 28 weeks compared with 7.51 cm at 41 weeks. Similar observations were made by Merlob.^{10,11}

Sivan et al.¹² and Fok et al.¹³

Determination of cut off points for identifying preterm and term babies.

Intermammary distance of 69.60 mm can be used to differentiate preterm and term babies which is useful because preterm babies have different set of problems and complications than term babies.

CONCLUSIONS

Gestational age has a strong correlation with intermammary distance. Intermammary distance of 69.6 mm can be used as a cut-off points for differentiating between term and preterm babies which can be easily used by peripheral health workers to differentiate between term and preterm babies.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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