



FETAL NASAL BONE LENGTH AS A PREDICTOR OF UNFAVOURABLE PERINATAL OUTCOMES BETWEEN 18 TO 22 WEEKS OF GESTATIONAL AGE.

Radiology

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ABSTRACT

Background: The determination of the study is to anticipate the unfavorable perinatal outcomes which is essential to avoid morbidities in both the mother and the fetus. **Aim:** To study the length of the fetal nasal bone as the predictor of unfavorable perinatal outcomes between 18 to 22 weeks of gestational age. **Study Design:** Retrospective cohort study. **Methods:** The study accepted information from 200 pregnant women between the gestational age of 18 and 22 weeks, along with the length of the fetal nasal bone. Percentiles for fetal nasal bone length were calculated and assessed to predict the unfavorable perinatal outcomes such as preterm premature rupture of membrane, premature labour, preterm birth, and fetal discomfort. **Results:** Fetal nasal bone length greater than the 95th percentile was substantially related to unfavorable perinatal consequences like preterm premature rupture of membranes, preterm labour, preterm delivery, and fetal discomfort. **Conclusion:** Higher percentiles of the length of a fetus nasal bone between 18 and 22 weeks of gestational age may help with the forecast of unfavorable perinatal outcomes such as preterm delivery, preterm labour, and preterm premature rupture of membranes.

KEYWORDS

fetal ultrasound, Nasal bone length, unfavorable perinatal outcome.

INTRODUCTION:

Prenatal ultrasound is one of the very important tool for fetal assessment throughout the pregnancy. The mid-trimester ultrasound is commonly performed between 18 and 22 weeks to evaluate fetal anatomy and to discover any fetal anomalies. The aim is to predict in case a pregnancy will be normal or have an unfavorable outcomes using fetal nasal bone length. Parameter like nuchal translucency measurement is a pivotal screening test in first trimester for both chromosomal abnormalities and unfavorable outcomes. There is an advancing attempt to discover a new parameter for predicting unfavorable perinatal outcomes between 18 to 22 weeks of pregnancy. The nasal bone length of the fetus can also be an effective screening and diagnostic tool. Earlier, the absence or hypoplasia of nasal bone (NB) and nasal bone length (NBL) was assessed for screening genetic anomalies like down syndrome and other aneuploidy in first trimester. The potential correlation between fetal NBL and unfavorable perinatal outcomes is yet to be determine. The study's goal is to figure out the potentiality of fetal NBL between 18 to 22 weeks of pregnancy to predict unfavorable perinatal outcomes in singleton mothers who gave birth to healthy fetuses without any evident systemic distortion or deformity [1,2]

MATERIALS AND METHODS

Study population:

The study has been carried out after institutional committee acceptance and ethical clearance and data was collected. Conducted a retrospective study on 200 pregnant women who had mid second trimester routine anomaly scan with fetal NBL measurements taken between 18 to 22+6 weeks of gestational weeks, conducted in department of radio-diagnosis, D. Y. Patil Hospital and Research Institute, Kadamwadi, Kolhapur from February 2021 to November 2022. Under the Indian PC-PNDT Act, 1994 all patients who were pregnant were registered. All cases included comprehensive data on antenatal visits and deliveries at our facility. The study is primarily based on investigations as radiology itself is a tool of investigation. Informed consent has been obtained before any procedure from competent voluntary patient. Consent has been taken after explaining the procedure and receiving their approval to be included in the study.

Inclusion And Exclusion Criteria:

Each case's gestational age was determined according to the most recent menstrual period (LMP) and ultrasound. If a disparity of over a week was identified between most recent menstrual period (LMP) and ultrasound, then these cases will be disqualified from this study.

Pregnancy with unknown or doubtful recent menstrual period (LMP), due to fertility treatment, pregnancy with aneuploidy and/or fetal abnormalities, mother with chronic disease (such as type 1 or type 2 diabetes, hypertension or rheumatic heart disease), complicated pregnancy (maternal obstetric history - prior preeclampsia, prematurity, stillbirth or gestational diabetes), multiple pregnancies including vanished twin syndrome, and cervical cerclage pregnancies were not included. In addition, women who have a history of history of smoking, alcohol, and substance abuse were excluded from the study. Pregnancies lacking fetal NB were also not included. [3,4]

Equipment & Technique of Examination:

Every pregnant patient visiting the obstetric clinic were encouraged to undergo routine anomaly scan. Between 18 and 22+6 weeks, a standard screening was conducted. NBL in the fetus was measured by a triple operator with at least 2 years of experience. Every ultrasonography examination was done using LOGIC GE F8 machine, a transabdominal convex probe frequency between 2 and 8 MHz. The midsagittal plane of the fetal face was acquired trans abdominally in the lying-down posture using transducer at right angles to the fetal NB for fetal NB measurements. The ultrasound image should only show the fetal head, neck, and upper chest. By tilting transducer left and right, it was simple to detect NB presence. This maneuver allowed to separate the tip of the nose and skin from the NB's surface as three well defined lines. An angle of approximately 45 degrees was used to confirm the actual presence of fetal NB. NB was considered present if they were hyperechoic and thicker than the overlying skin. NB was considered absent if they were either same or less echogenic, or not clearly visible.



Figure 1 fetal nasal bone length measurement

unfavorable pregnancy outcomes: An automated perinatal database was used to get unfavorable pregnancy outcomes. Unfavorable perinatal outcomes were: Premature birth - Any spontaneous delivery prior 37 weeks of pregnancy is considered a premature birth. preterm labour - Labor that begins prior 37 week of pregnancy is referred to as preterm labour. Preterm premature rupture of the membranes (PPROM), which is characterized as membrane rupture prior to the start of labour and prior 37 weeks of gestation. A state of fetal distress was diagnosed if a pattern of non-reassuring fetal electrocardiography was detected during labor. [5]

Statistical Analysis:

Data was entered in the MS-Excel and then imported into SPSS for analysis. Data were evaluated using SPSS V 1.2.5001 software. Continuous variables were shown in mean whereas, categorical variables were presented in percentage. To determine correlation, the Pearson correlation coefficient test was used. $P < 0.05$ was deemed statistically significant.

RESULTS:

Of the 200 cases, 100 had an unfavorable outcomes and 100 had uncomplicated pregnancies. The group with unfavorable perinatal outcomes consisted of 61 preterm birth, 24 preterm labour, 13 PPROM, and 2 fetal distress (fig.1). In the group with unfavorable perinatal outcomes, the weight and age of the mother had a noticeable increase than the group with normal outcomes (table 1). With gestational age, nasal bone length is significantly increased. ($P < 0.001$). For the normal fetuses with measurable NBL. The calculated 5th and 95th percentiles for fetal NBL at 18 to 22 weeks were 3.78 mm and 7.76 mm respectively. The formula below depicts the length of the fetal nasal bone and gestational age relationship. nasal bone length (millimeters) = $0.351 \times \text{gestational age (weeks)} - 2.07$ ($R^2 = 0.919$) (figure 2).

Fetal NBL >95th percentile was substantially related with preterm birth, preterm labour, and PPROM. ($p=0.00002$ accuracy 0.95 $p=0.0001$, accuracy 0.93, $p=0.001$, accuracy 0.94 respectively) (figure 3).

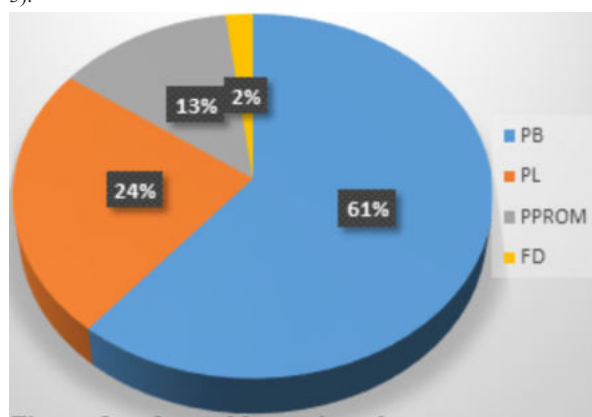


Figure 1 unfavorable perinatal outcomes

Table 1 variables of normal outcome group and unfavorable perinatal outcome group

Variables	Unfavorable outcome (100)	Normal outcome (100)	P value
Maternal age	31 (29-35)	27 (25-30)	0.002
Maternal weight	60.4 (55-68.5)	59 (54-65.5)	0.005
Nasal bone length	8.05 (6.71 – 8.85)	7.79 (6.89 – 8.59)	0.771

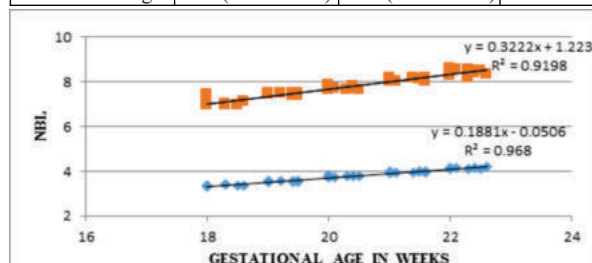


Figure 2 correlation between nasal age and gestational age in normal outcome group

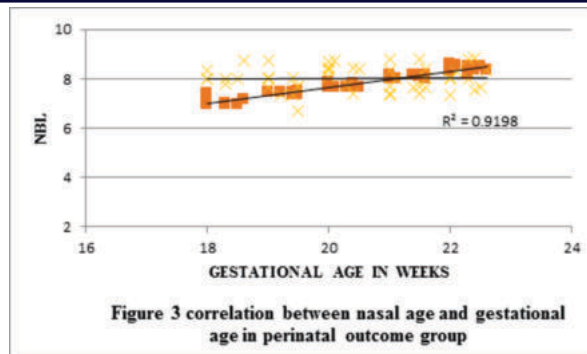


Figure 3 correlation between nasal age and gestational age in perinatal outcome group

DISCUSSION:

In this study, high percentile NBL was highly linked to unfavorable prenatal outcomes such as preterm birth, preterm labour, and PPROM. One of the extra test criteria in the mid second trimester (18-22 weeks) is NB. Chromosome abnormalities are frequently discovered to be related with the absence or hypoplasia of NB. Although it has not yet been examined, there may be a link between higher NBL and unfavorable perinatal outcomes. However, there is a clear link between higher NBL and unfavorable perinatal outcomes. Sonnek et al. previously hypothesized that NBL might be negatively linked with the likelihood of aneuploidy. According to the current study's findings, it is possible that NBL at higher percentiles is directly associated to unfavorable perinatal outcomes.

The study's main drawback may be the small sample size. Nevertheless, we chose our patients based on very specific criteria. Other positive strengths of this study are complete follow-up of all patients who are pregnant and appropriate presentation of adverse perinatal outcomes. Before being used in clinical practice, the potential dependability of these correlations should be verified by more studies in this field. Others in the area who are planning substantial research may be interested in the capacity of fetal NBL to identify unfavorable perinatal outcomes. Potential screening indicators for unfavorable perinatal outcomes include fetal NBL. [6,7]

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