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Original research article

"ASSESSMENT OF FETAL GESTATIONAL AGE WITH FETAL DESCENDING COLON DIAMETER IN THIRD TRIMESTER AND ITS CORRELATION WITH OTHER FETAL BIOMETRIC PARAMETERS"

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ABSTRACT

Background :

Accurately determining gestational age is pivotal for safe antenatal care, benefiting both mother and fetus by guiding screening tests, labor induction, and assessments. While clinicians previously relied on history and physical exams, ultrasound now predominates due to irregular menstrual cycles. The first trimester is optimal for ultrasound-based dating, yet accuracy diminishes in the third trimester, with a ±2-week standard deviation after 34 weeks. Thus, there's an need to develop new ultrasound indices for precise gestational age determination in later stages, ensuring optimal care throughout pregnancy. **METHODS:** Hospital based observational cross sectional study done in Konaseema institute of medical science and research foundation ,Amalapuram. **RESULTS:** A Significant positive linear correlation was found between gestational age and fetal colon diameter

KEYWORDS: Gestational age, Colon diameter, third trimester

INTRODUCTION

- Gestational age of all pregnant women must be calculated for safe antenatal evaluation of the pregnancy for both mother and fetus.
- The accurate estimation of pregnancy dates is important for the mother, who wants to know when to expect the birth of her baby, and for her health care providers, so we choose the times at which to perform various screening tests and assessments, such as serum screening, assessment of maturity, and induction of labor for postdate pregnancies (1).

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- Prior to the wide spread use of ultrasound, clinicians relied on a combination of history and physical examination to clinically determine gestational age, but due to irregular menstrual cycles, lack of clear last menstrual period date , ultrasound plays a main role in assessment of the gestational age(2) .
- The first trimester of pregnancy is the best time to determine the gestational age with ultrasound. As pregnancy progresses into the third trimester, the accuracy of the biometric measurements typically used to determine gestational age declines due to major biological changes. After 34 weeks of pregnancy, there is a standard deviation of ±2 weeks in determining the gestational age(3).
- Therefore, a new ultrasound index must be found, as despite the presence of other indices of gestational age in the last trimester.(4).

AIMS AND OBJECTIVES

The aim of the proposed study -

- To determine whether fetal colon diameter can be used as an independent parameter for estimating gestational age in third trimester and its correlation with other fetal biometric parameters.

Objectives of the dissertation titled -

- To assess fetal descending colon diameter as tool for estimating gestational age in third trimester as an independent parameter.

MATERIALS AND METHODS

- **Type of study**: Hospital based observational cross sectional study.
- **Study area**: Department of Radiodiagnosis, Konaseema institute of medical sciences and research foundation , Amalapuram.
- **Source of data**: Third trimester pregnant mothers referred to the Department of Radiodiagnosis , Konaseema institute of medical sciences, Amalapuram.
- **Duration of study**: 6 months (June 2023 to November 2023).
- **Inclusion criteria:**
  History of regular menses with a known date of the beginning of the last menstrual period.
  Confirmed gestational age based on sonographic measurement of the crown–rump length in early pregnancy
  Clinically and sonographically normal fetus.
  Third trimester (after 30 weeks)pregnant mothers.
- **Exclusion criteria :**
  Mothers not willing to give consent
  Fetal anomalies**.**
  Multiple pregnancies.
  Mothers with gestational diabetes.
- **Sample size :** 100
- **Study design :** Hospital based observational cross sectional study.

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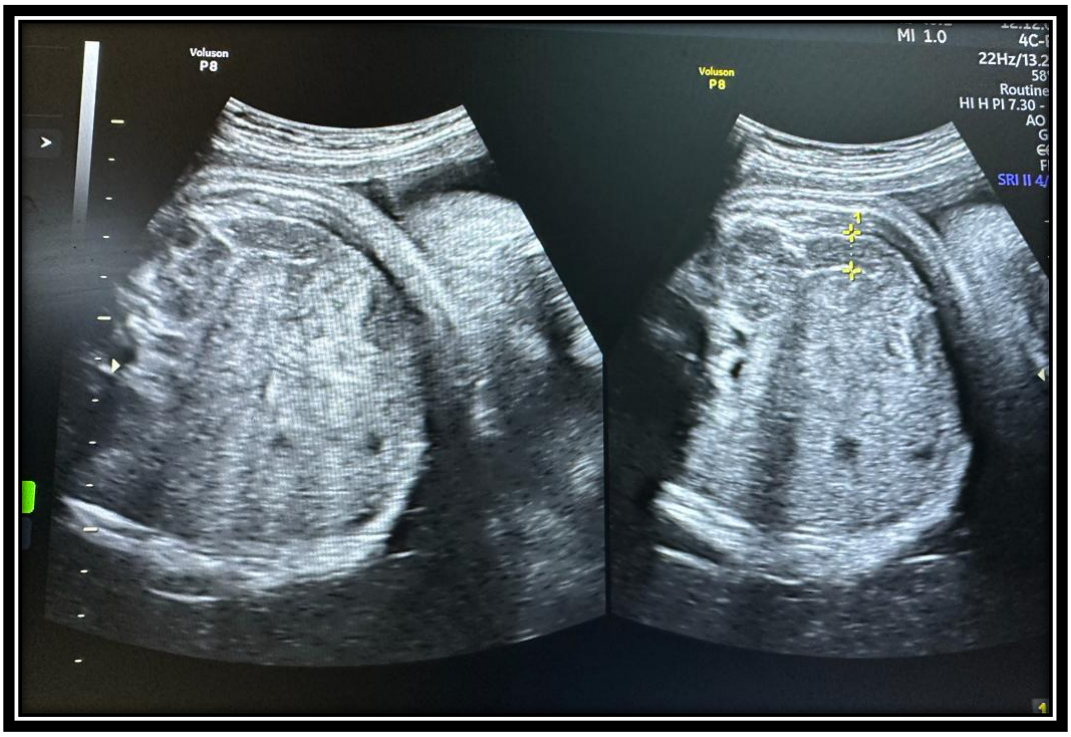
METHOD OF COLLECTION OF DATA

- After obtaining informed consent from each mother, mother was scanned only once during the study by using a trans abdominal 3.5-5.0-MHz curvilinear transducer.
- The fetal colon was identified sonographically by its peripheral location and characteristic haustral folds.
- The maximum internal diameter of the fetal descending colon was measured in the parasagittal plane.
- Each measurement was repeated three times in each fetus and the largest diameter was recorded.
- The measurement of fetal colon diameter was followed by biometric measurements like biparietal diameter, head circumference, abdominal circumference and femur length.

  Freeze-frame ultrasound capabilities and electronic on-screen calipers were used for the bowel measurements.

  Data collected will be analysed and will be enrolled in Microsoft excel sheet and is transferred to SPSS. Using SPSS , statistical analysis done.

Image 1:Gray scale imaging showing the fetal colon diameter.



RESULTS

The results obtained from the 100 pregnant women –

- The mean bi-parietal diameter was 89.8 ± 6.37 mm (range, 35 - 99.2 mm).
- The mean head circumference was 314.3 ± 15.8 mm (range, 228 - 350 mm).

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- The mean abdominal circumference was 330.3 ± 21.7 mm (range, 230 - 370 mm).
- The mean femur length was 71.45 ± 3.71 mm (range, 58 - 79.7 mm).
- The mean colon diameter was 12.53 ± 2.6 mm,(range of 6 - 18.8 mm).

Table 1:Correlation coefficients between colon diameter and bi-parietal diameter, head circumference, abdominal circumference and femur length.

PARAMETERS	COEFFICIENT OF CORRELATION	INFERENCE
Colon diameter versus bi-parietal diameter	0.33	moderate
Colon diameter versus head circumference	0.48	moderate
Colon diameter versus abdominal circumference	0.72	Strong
Colon diameter versus femoral length	0.81	Strong

Table 2:Correlation coefficients between colon diameter and gestational age

Parameter	Coefficient of relation	Inference
GA versus Colon diameter	0.82	Strong

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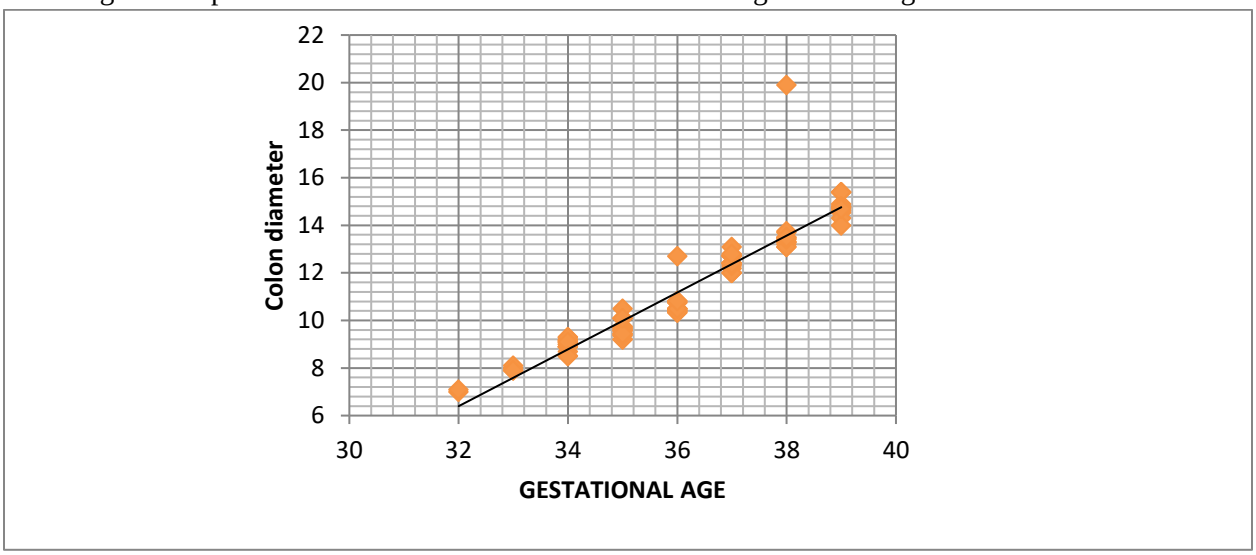
A significant positive linear correlation was found between gestational age and fetal colon diameter.



DISCUSSION & CONCLUSION

- In order to determine the best biometric measurement for estimating gestational age, we compared the correlation between gestational age and colon diameter and the correlation between colon diameter and each of the other biometric parameters.
- We found that the correlation between gestational age and colon diameter is as strong as the correlation between gestational age and bi-parietal diameter, head circumference, abdominal circumference, and femur length.
- During the 6th week of fetal development, the endodermal epithelium of the gut tube proliferates and completely occludes the lumen. Over the next 2 weeks, however, it vacuolates and recanalizes (5). Congenital stenosis or duplication of the fetal colon may result from incomplete recanalization, resulting in intestinal obstruction (6). Abnormal rotation and fixation of the fetal primary intestinal loop may result in a variety of malformations, including compression or volvulus of the intestine .
- It is common for many women to be referred to an ultrasound unit for suspicion of expanding the intestine of the fetus, so one of the aims of this study was to develop a table of reference values for the normal descending colon diameter of fetuses in the 3rd trimester of pregnancy.

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