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Is Gestational Third Trimester Testosterone Level a Good Predictor of the Fetal Sex?

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Abstract

Desire to know fetal gender is wide spread and cut across many cultures and religious believes. Current methods of determining this include the ultrasound scanning and karryotyping among others. This study set out to determine if gestational third trimester testosterone level is a good predictor of fetal gender. A four month longitudinal study was carried out. All pregnant women attending ante-natal clinic up to the third trimester of pregnancy had 5ml of intravenous blood taken from either ante cubital fossa between 28 and 34 weeks of gestation. These were checked again to ascertain the gender of the baby after delivery. The third trimester testosterone levels in pregnancies with male and female fetuses are 2.6 ± 1.6 vs 2.5 ±1.6 nmol/L. There is no significant difference between the third trimester testosterone levels in pregnancies with male and female fetuses p = 0.05. Thus, the gestational third trimester is not a good predictor of fetal sex. Other tests should be used to determine the fetal sex/gender at this gestational age.

Keywords: fetal sex, testosterone, pregnancy.

1.Introduction

Time and again, the quest for fetal sex/gender is being sought by parents for different reasons. In some parts of the world especially in most part of Africa, where inheritance is paternal, it considered a taboo and a sign of failure not to give birth to a male child. In some parts of the world conversely, the female child is the favored one. These individuals that are looking for male/female child do go a long way to achieve what they desire. In parts of Asia, it is preferable to have a male child because females pay exorbitant price to get married. In most part of the western world however, fetal gender is being sought in order to be well prepared for whichever sex. The preparation usually involves getting the baby's room and the cot ready, toys, etc. particular colors are associated with each gender. Thus, wherever one turns, there is a need to know the sex or gender of the fetus.

Testosterone is the most important androgen in males, 95 % of which is synthesized by the testes and the rest by the adrenal cortex. It is very crucial for spermatogenesis, fetal male sexual differentiation, pubertal development, maintenance of adult secondary sex characters, immunity, bones and muscles etc. (Stephen, 2003). Fetal testes produce testosterone which is important for male sexual differentiation. Testosterone production starts as soon as the testes differentiate (8 week of gestation) and reaches to its peak at 10 -15 week of gestation. It is also known that the level of maternal testosterone peaks in the second trimester and start to decline from the third trimester and this continues till after delivery (Ellinwood *et al.*, 1980). In Rhesus monkey and also in human, fetal testes are active steroidogenically. In human fetus the formation of testosterone by testes appeared to be independent of gonadotropin control. (Word *et al.*, 1989).

I have chosen the third trimester because my interest is in knowing the sex of the baby before birth and not in choosing which sex to have.

2.Materials And Method

This was a longitudinal study of four month in two private hospitals in 2014. All pregnant women that registered for ante-natal care were bled in the third trimester after an informed consent and ethical committee approval. Anthropometric measurements were also taken. The women aged between 20 and 40years. The sexes of their babies were noted at birth. The inclusion criteria were a pregnancy making it up to the third trimester and subsequent parturition in the hospital. The exclusion criterion was delivering outside the hospital. In all, 96 women were recruited but only 80 delivered in the hospitals at the end of the four months. The third trimester maternal testosterone was measured using the Enzyme Immunometric Assay method (EIA). The result is as shown below.

3.Results

The mean ages of the women with male and female fetus are 27.3 ± 11.6 vs 27.1 ± 11.6 (mean ± 2SD) years. The third trimester testosterone levels in pregnancies with male and female fetuses are 2.6 ± 1.6 vs 2.5 ±1.6 nmol/L. The combined mean was 2.5 ±1.6 nmol/L.

4.Discussion And Conclusion

The result show that there is no statistically significant difference between the means of the third trimester testosterone level of mothers that gave birth to male and female children. This is in agreement with Forest, Ances, Tapper, & Migeon,(1971).

However, maternal androgens do not appear to come from the fetus, as several studies have failed to find a difference in serum second trimester testosterone levels between women carrying a male and those carrying a female fetus; Glass & Klein, 1980; Meulenberg & Hofman, 1991; Rivarola, Forest, & Migeon, 1968; Van de Beek, Thijssen,Cohen-Kettenis, Van Goozen, & Buitelaar, 2004). However, the current study involved measurement in the third trimester of pregnancy.

Thus, ultrasonography in the hand of experts and fetal sampling of chorionic villi among other approved tests are important to the determination of fetal sex/gender. Although the third trimester testosterone level of mothers is not helpful when it comes to the determination of fetal sex but it is still useful in monitoring the feto-placental well being. It has been postulated that maternal testosterone levels can affect newborn growth and size through several potential mechanisms. Maternal testosterone may modify her energy homeostasis and thus decrease nutrient supplies to the placenta and fetus. Alternatively, testosterone may modify placental function and reduce the capacity for transport of nutrients to the fetus. Maternal testosterone may also cross the placenta and exert a direct effect on fetal growth and/or energy homeostasis. A combination of all these mechanisms is also conceivable.

The negative Kurtosis seen here shows a flat distribution. This means there are no marked differences between the levels of testosterone in pregnancies with either sex.

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Table 1. Mean maternal ages and third trimester Testosterone levels.

	Male Fetus	Female Fetus		
	Age	Testos level	Age	Testos level
Mean	27.3	2.6	27.1	2.5
SD	5.8	0.8	5.8	0.8
Geometric Mean	26.8	2.5	26.6	2.4
CI 0.05	1.7	0.2(2.4 - 2.8)	1.9	0.3(2.2-2.8)
CI 0.005	2.5	0.3(2.3 - 2.9)	2.7	0.4(2.1-2.9)

The Kurtosis for third trimester testosterone levels in pregnancies with male and female fetus was 0.47 while that for third trimester testosterone levels in pregnancies with female fetus was determined to be -0.06.

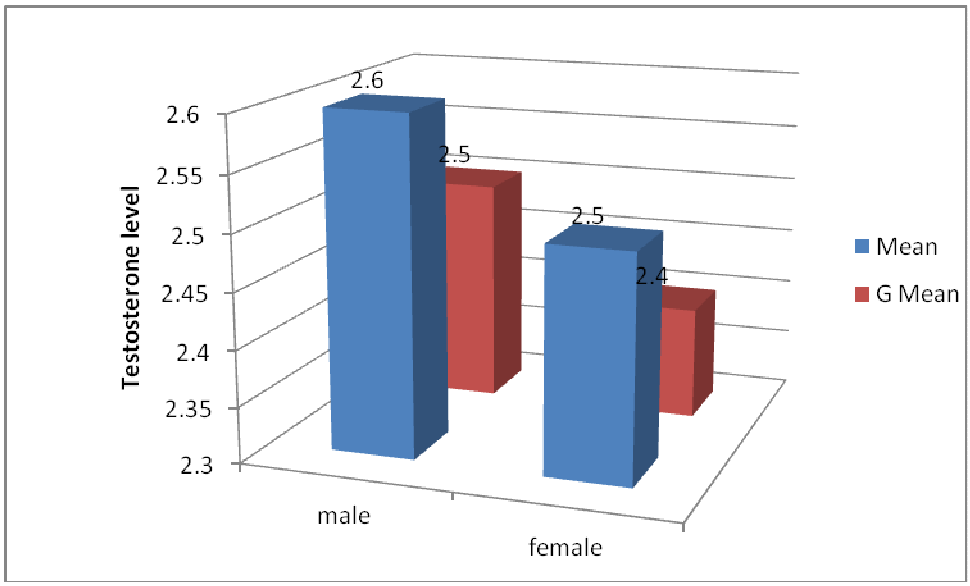

Fig 1: Mean and Geometric mean of pregnancies with male and female fetus.

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