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Maternal Vitamin D status and its Effect on Cord Blood Vitamin D Neonatal Calcium Levels

KEYWORDS: Maternal 25(OH) Vitamin D levels, Cord blood 25(OH) Vitamin D levels , Neonatal calcium levels.

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ABSTRACT *Objective: To assess the effect of Maternal Vitamin D status on cord blood Vitamin D and Calcium levels of neonates .*

Methods: In this observational study that was conducted in a teaching hospital in southern India from July 2012 to august 2013, 100 singleton, primigravida women with no medical illnesses were included. Maternal and cordblood 25(OH) Vitamin D levels were estimated for these women at the time of delivery. For the babies born to these mothers serum calcium was measured on day 3 of life and compared with the maternal and cord blood vitamin D levels.

Results : There is a high prevalence of Vitamin D deficiency among pregnant women (67%) and in newborn(91%).There is a positive correlation between maternal Vitamin D and cord blood Vitamin D levels . There was no relationship between the serum calcium and Cord blood Vitamin D.

Introduction :

Vitamin D deficiency in pregnant mothers is evident by several studies in India with a prevalence of 70-100%. The fetus is entirely dependent on the mother for its supply of 25-hydroxy vitamin D, which is believed to cross placenta. The maternal and fetal concentrations of 25(OH) D are closely correlated [1]. **V**itamin D deficiency is prevalent in India,a finding that is unexpected in a tropical country with abundant sun shine.Vitamin D insufficiency in pregnancy has important implications for the newborn and infant .The neonate is entirely dependent on mother for VitaminD. 25OH vitamin D,the storage form of Vitamin D readily traverses the hemochorial placenta of humans and the cord blood Vitamin D is 20% lower than maternal concentrations [2].Thus for neonate to be born with adult normal 25OH Vitamin D their mothers must be Vitamin D sufficient.Passage of 25OH Vitamin D from mother to fetus could reduce maternal levels ,especially if the mother is deficient in Vitamin D.

Materials &methods:

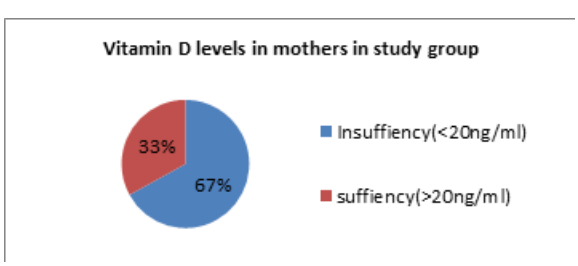
This is an observational study that was conducted on singleton, primigravidae women, delivered by spontaneous vaginal delivery at Gandhi Hospital.Women with medical diseases which affect Vitamin D metabolism such as hepatitis,chronic kidneydisease, parathyroidectomy were excluded from the study group.The study was conducted at Department of pediatrics with cooperation from Department of Obstetrics &Gynaecology over a period of 12months from August 2012 to July 2013.

At the time of delivery 5ml of maternal blood was collected after taking informed consent.After delivery 5ml of cord blood was collected and they were centrifuged to obtain serum at 8000 rpm.The samples were immediately sent to National Institute of Nutrition, Hyderabad maintaining cold chain,where the vitamin D assay was done using the High pressure liquid chromatography.Serum calcium was measured on day 3 of life in the newborn and compared with maternal and cordblood vitamin D levels. The data was analysed using the SPSS version 19 .

Results:

The mean maternal age in the study group was 21.87+/-2.549 yrs and there is no significant correlation observed with maternal age and maternal vitamin D status. (P value=0.872). Among 100 samples in the study group there was Vitamin D sufficiency in 33% and insufficiency was seen in 67% . (Fig 1). Vitamin D value of >20ng/ml was taken as sufficiency based on Misra et al.

Figure 1: Prevalence of Vitamin D insuffiency in study group mothers



One important observation in this study is that a maternal Vitamin D level of more than 30ng/ml is associated with suffiency of Vitamin D in the cord blood.

Table 1: Relation between maternal vitamin D and cord blood vitamin D:

Vit-D levels		Maternal Vit-D		Total
Cord blood		<20	>=20	
	<20	67	24	91
		73.6%	26.4%	100.0%
	>=20	0	9	9
		.0%	100.0%	100.0%
Total		67	33	100
		67.0%	33.0%	100.0%

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A significant correlation is observed between cord blood vitaminD and maternal vitaminD (p value <0.05).(Table 1)

There is no statistical significant relation between Vitamin D values in the cord blood and to neonatal serum calcium levels with a p value of 0.388.

Though Hypovitaminosis D was observed in 91 samples in the cord blood hypocalcemia was seen only in 7 samples among the new born.(Table 2)

Table 2 : Relation between cord blood vitamin D and serum calcium

Serum calcium		Cord blood vitamin D levels		Total
mg/dl		<20	>=20	
	<7	7	0	7
		100.0%	.0%	100.0%
	>=7	84	9	93
		90.3%	9.7%	100.0%
Total		91	9	100
		91.0%	9.0%	100.0%

Discussion:

In this study Vitamin D deficiency was observed in 67% of the pregnant women and 91% of the cord blood. Study by Manish Maladkar et al showed prevalence of vitamin D deficiency to be 50%[142] in Indian scenario. [3]

The cord blood vitamin D showed a positive correlation with the maternal Vitamin D levels and similar correlation was observed by Manish Maladkar et al [3,]

Sachen et al in their study form Northern India found that mean maternal serum 25(OH)D was 14+/-9.3 ng/ml, and cord blood 25(OH)D was 8.4+/-5.7 ng/ml. Eighty-four percent of women (84.3% of urban and 83.6% of rural women) had 25(OHD values below that cut off. Maternal serum 25(OH)D correlated positively with cord blood 25(OH)D, P<0.001.[4]

A study done by kathalene et al found that large studies shared vitamin D deficiency increased the risk of preterm and low birth weight deliveries. However smaller studies found no link[155].

There was no relationship between the serum calcium and Cord blood Vitamin D.The fetus accumulates about 30 g of calcium from the mother in utero and 80% of this transfer occurs in the last trimester of pregnancy.This is dependent on many factors such as maternal calcium intake,Vitamin D status,intestinal calcium absorption,maternal bone turn over,maternal renal function,and the capacity for placental calcium transfer.

Conclusions:

There is high prevalence of Vitamin D deficiency among pregnant women(67%) and in newborn(91%).There is a positive correlation between maternal Vitamin D and cord blood Vitamin D.A maternal value of more than 30ng/ml is associated with sufficiency in cord blood Vitamin D. There was no relationship between the serum calcium and Cord blood Vitamin D.Similar observations were found by waiters et al.

References:

1. Serenius F, Elidrissy AT, Dandona P. Vitamin D in pregnant women at term and in newly born babies in Saudi Arabia. J Clin Pathol 1984; 37 (4):444-447.
2. Marwaha RK et al;Vitamin D status in pregnant Indian women across trimesters and different seasons and its correlation with neonatal serum 25-hydroxy vitamin D levels.Br J Nutr 2011:106(9):1383-9.
3. Manish Mardkar et al Vitamin D deficiency in pregnancy :An updated view point in Indian scenario by Manish Mardkar et al: International Journal of pediatrics,6,204to 216.
4. -Sachan et al .High prevalence of vitamin D deficiency among pregnant women and their newborns in northern india 2005 May;81(5):1060-64.
5. Waiters B, Godel JC, Basu TK. Perinatal vitamin D and calcium status of northern Canadian mothers and their newborn infants. J Am Coll Nutr 1999;18(2):122-6.