HORMONAL CHANGES AND THEIR CONCOMITTANT EFFECTS ON LIPIDS AT PARTURITION

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Lipids form a heterogenous group of substances classified together because of the similarity of their solubility characteristics. They are insoluble in water, but are soluble in organic solvents such as chloroform, ether, benzene, etc. Serum lipids consist of fatty acids (both esterified and non-esterified), neutral fats, phospholipids, steroids such as cholesterol, carotenoids, vitamins A, D, E and K and hormones like prostaglandins. These serum lipids exist in a dynamic equilibrium with tissue lipids like those of the gastrointestinal mucosa, hepatic tissue and adipose tissue.

Elevation of serum lipids as pregnancy advances is a well known fact. Though several hypotheses have been put forward to account for this rise in serum lipid levels, none of them is complete and satisfactory (Boyd 1934). Among all these concepts, endocrine changes during gestation have been proved to be the causative factor altering the lipid metabolism.

Material and Methods

All subjects were selected from the patients who were admitted for delivery in Nowrosjee Wadia Maternity Hospital, Bombay. These subjects were normal in all respects and had full term delivery. They were belonging to either lower or middle socio-economic class. All of them had normal menstrual cycles before the conception and had no evident hormonal deficiency.

Blood samples were withdrawn during the first stage of labour. At the time of delivery cord blood alone was collected. In order to draw a comparison, post-partum blood collection was done before the completion of 24 hours from the parturition time, thereby the same patient could be studied in antepartum and post-partum stages.

Total lipids from sera were estimated according to the method of Kunkel *et al* (1948).

Results

Table I denotes mean serum levels of total lipids in various groups. Mean serum total lipids of normal non-pregnants were 616 ± 56.74 mg%, and were elevated by 55% (959.6 ± 52.8 mg%) at labour. It drops down by 12.7% following the delivery (837.9 ± 56.56 mg%). In cord blood mean serum total lipids are 379.9 ± 43.3 mg%.

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TABLE I
Mean Serum Total Lipids

Groups	NP	AP	PP	Cord Blood
No. of Subjects	40	77	74	56
Mean mg%	616.025	959.60	837.9	376.9
+ S.D.	±56.74	±52.84	±56.56	±43.30

NP = Normal non-pregnant; AP = Antepartum; PP = Postpartum.

All the differences between the groups are statistically significant to the extent of $P < 0.001$.

Discussion

Antepartum rise in the total lipids declines in post-partum phase. According to Svanborg and Vikrot (1965) there may not be any important change taking place in serum lipid levels just before delivery. The hormonal changes affecting the onset of labour and therefore the extirpation of placenta may be considered as the factor responsible for this decline. Hormones like estrogens and progesterone are mainly of placental origin. Hence, after the delivery of placenta the levels of these hormones decline with the effect that circulating lipid levels slowly return to the pregestational levels.

Labour itself is a stress condition, both psychological and physical. It has been observed that stress is accompanied by the elevation of epinephrine and norepinephrine (von Euler and Hellner Bjarkman 1955; Grey and Beetham 1957). These hormones elevate certain lipid parameters contributing to the total lipids. The completion of delivery reduces these hormone levels and this may also diminish the total lipids.

The authors support the hypothesis postulated by Liggins (1973), which was opposed by Klopper in 1973. Liggins stated that fetal cortisol stimulate the release of estrogen from placenta and cause a fall in secretion of progesterone. Estrogens stimulate the synthesis of prostaglandin $F_{2\alpha}$, whereas progesterones block this reaction. Prostaglandins have been known to possess oxytocic properties. It also increases the sensitivity of myometrium to circulating estrogens. Klopper (1973) tried to elevate the estrogen concentration to observe if it would initiate the labour. He did not observe any effects. The authors point out that though Klopper had been successful in elevating the ratio of estrogens/progesterone, he could not produce a depression in progesterone levels. Therefore, effective concentration of progesterone present was quite sufficient to block the production of prostaglandin $F_{2\alpha}$.

Summary

(1) The study comprises of 77 antepartum and 74 postpartum patients. Serum total lipids were estimated. Cord blood has also been analysed.

(2) A correlation between elevated serum lipids and changing hormonal levels has been sought for.

(3) Authors support the Liggins theory.

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