# MAGNESIUM, THE IGNORED ELEMENT DURING PREGNANCY

by

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*Introduction*

Magnesium is an important element as far as the metabolic reactions are concerned. Magnesium is shown to be responsible for the maximal activity of some enzymes viz. alkaline phosphatases, pyrophosphatases, prostatic phosphatases, etc. It functions in carbohydrate metabolism as an activator for many of the enzymes of glycolytic systems. Magnesium plays an intimate role in oxidative phosphorylation *in vivo*. It plays a distinguished role in neuro-muscular activity. It brings about the lowering of blood pressure and its high concentration in man induces bradycardia and finally cardiac arrest.

Bogert and Plass (1923) found hypomagnesemia in 23 women during labour. Hypomagnesia in pregnant women has been reported by Hall (1957), Newman (1957), Bastos de Jorge *et al* (1965A, 1965B), Celli Arcella (1965), Rusu *et al* (1966), Michel (1971). Koberlin and Mischel (1958) reported that the magnesium concentration of serum depends on age of the woman. According to Achari (1961), the serum magnesium level in normal pregnancy is within the limits of variation in the normal nonpregnant women. Lube (1961) reported an elevated serum magnesium level during normal pregnancy. Newman (1957) observed high concentrations of magnesium in cord blood. Rusu *et al* (1966) have considered serum magnesium level as a parameter for the high risk of pregnancy involving premature birth.

In view of the above studies which were carried out in India and out of India, the present study was undertaken to understand and to visualize the effects of magnesium during pregnancy and in amniotic fluid.

*Materials and Methods*

The subjects for the said study have been selected from the Out Patient Department of Nowrosjee Wadia Maternity Hospital, Bombay. Fortythree normal gravidas in the first trimester, 34 normal gravidas in the second trimester and 43 normal gravidas in the third trimester have been studied. These subjects were examined by the resident medical officer on duty and were considered to be normal gravidas with no evident abnormalities. There was no evidence of normal deficiency in these

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patients. The age of these subjects varied from 18 to 40 years. In all cases studied, systolic pressure was less than 130 mm of Hg. and diastolic pressure was less than 100 mm of Hg. The normal nonpregnant subjects were taken from the staff and students of the Seth G.S. Medical College and K.E.M. Hospital, Bombay with the same age group (30 cases).

Amniotic fluid was collected from 18 patients in second trimester who were admitted to the hospital for the termination of pregnancy. These patients were absolutely normal but wanted to terminate pregnancy.

Magnesium was determined by the method of Neill and Neely (1956).

*Results*

mg.% in the second trimester. It continues to decrease in the third trimester and attains the value 1.874 mg% Table II represents serum and amniotic fluid magnesium levels.

A fall in magnesium level in the second trimester from that of in the first trimester is not significant whereas both the falls in the third trimester from that of the normal nonpregnant subjects and from that of the first trimester are significant to the extent of $P < 0.025$. The difference in the magnesium levels in serum and amniotic fluid is significant to the extent of $P < 0.005$.

*Discussion*

The magnesium levels of sera and amniotic fluid as studied above indicate that

TABLE I
*Serum Magnesium*

| Group | Normal Non-pregnant | Trimester | | |
|---|---|---|---|---|
| | | 1st | 2nd | 3rd |
| Serum Mg++ (mg.%) | 2.080 | 2.096 | 2.025 | 1.874 |
| Standard deviation | ± 0.368 | ± 0.197 | ± 0.435 | ± 0.302 |
| Standard Error | ± 0.067 | ± 0.030 | ± 0.075 | ± 0.046 |
| Coefficient of variation | 17.692 | 9.390 | 21.463 | 16.114 |

TABLE II
*Serum and Amniotic fluid Magnesium*

| Groups | Serum | Amniotic fluid |
|---|---|---|
| Number of cases | 18 | 18 |
| Serum magnesium (mg.%) | 1.945 | 1.593 |
| Standard deviation | ± 0.456 | ± 0.413 |
| Standard Error | ± 0.107 | ± 0.097 |
| Coefficient of variation | 23.420 | 23.925 |

Table I represents magnesium levels in different groups. In normal nonpregnant group the mean serum magnesium level is 2.080 mg.%. After conception, in the first trimester, the value rises slightly to 2.096 mg%. Thereafter, a continuous fall is observed. The value reaches to 2.025

low levels may induce premature deliveries. The levels of magnesium in sera rather depend upon the intake of calcium during pregnancy. The depressed level of magnesium at the end of pregnancy may be attributed to the high intake of calcium and also to the placental trans-

port of magnesium ions. It is therefore advisable to clinicians that serum magnesium level signifies a diagnostic and prognostic value. To avoid premature births intake of magnesium is recommended so that the magnesium level in serum is within the range of 1.5-3.5 mg%. It, however, warns the clinicians that the administration of magnesium therapy may induce bad effects on both the mother and fetus. Since it is observed that high magnesium levels induce bradicardia and an eventual cardiac arrest, the occurrence of still births may be due to high magnesium transport to the fetus through cord blood.

*Summary*

1. Comparative study of magnesium has been carried out in amniotic fluid and maternal sera in the second trimester.

2. Authors suggest magnesium therapy during pregnancy to avoid habitual abortions.

3. It is suggestive that serum magnesium levels should be within the range of 1.5-3.5 mg%.

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