IMMUNOGLOBULIN LEVELS IN INTRA-UTERINE GROWTH RETARDED NEONATES AND THEIR MOTHERS

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SUMMARY

Serum Immunoglobulins (IgG, IgM & IgA) were estimated quantitatively in 40 I. U. G. R. neonates and their corresponding mothers and 10 normal weight neonates and their corresponding mothers. There was no statistically significant difference in the serum levels of these immunoglobulins in the mothers of test and control groups. In comparison to the neonates of control group, serum IgG levels of test neonates were found to be significantly low and that of IgM and IgA high (in 22.5% and 25% of neonates respectively). Test neonates also showed significantly low IgG levels in comparison to those of their corresponding mothers.

INTRODUCTION

Intra uterine growth retardation (I. U. G. R.) which is defined as babies born after 37 weeks of gestation but with birth weight less than 2500 gms. is an important cause of infant mortality in our country (Kramer, 1987). Intrauterine infections, malnutrition and unregulated fertility are considered as possible major factors responsible for the high incidence of low birth weight (L. B. W.) infants in India. Since the immunological system in man largely develops and matures before birth, intra uterine malnutrition and growth retardation probably affects the immuno competence of the infant. Estimation of serum immunoglobulins in intrauterine growth retarded neonates and their mothers was therefore undertaken to look into this aspect of the problem.

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MATERIAL AND METHODS

This study included 50 neonates delivered after 37 weeks of gestation and their corresponding mothers. Mothers with any obvious cause leading to I. U. G. R. or premature rupture of membranes were excluded from the

study. On the basis of birth weight of the babies, these pairs were divided into two groups.

Group I (40 test pairs) : This included neonates with birth weight less than 2.5 Kg. and their corresponding mothers.

Group II (10 control pairs) : This included neonates with birth weight more than 2.5 Kg. and their corresponding mothers.

Clotted blood samples were collected from the mothers during parturition and from the severed placental end of the cords after delivery of the neonates. Quantitative estimation of Immunoglobulins (IgG, IgM & IgA) was done by single radial immuno-diffusion technique of Mancini et al (1965) using separate Tripartigen plates for maternal and foetal sera.

RESULTS AND DISCUSSION

In the present study (Table I) there was no statistically significant difference in the serum levels of IgG, IgM & IgA immunoglobulins in the mothers of test and control groups ($P > 0.10$). Similar findings have been reported by Raghvan et al (1976), Haridas and Acharya (1983) and Bhardwaj et al (1987).

Comparison of the levels of serum immunoglobulins in neonates of the two groups (test group and control group) showed significantly lower level of IgG in the cord sera of test neonates ($P < 0.001$, Table I). These results are in agreement with those obtained by other workers (Paramjeet et al, 1979; Haridas and Acharya 1984, Bhardwaj et al, 1987). However, Washburn (1965) and Berg (1968) found no appreciable difference in the cord serum IgG levels of neonates of these two groups. Cord serum IgM was detected in 100% neonates of the test and control groups but only 9 (22.5%) neonates of the test group had IgM levels more than 34 mg percent (Table I) which could be measured by Tripartigen plates employed in the present study. Lechtig Mata (1970) in their study reported higher mean IgM levels in a large umber of infants of low socio-

Table I

Immunoglobulin levels in 40 tests and 10 control pairs.

Group	Serum levels of immunoglobulins in mg/dl		
	IgG	IgM	IgA
Test group (40)			
a) mothers	1430.54 ± 238.10	238.81 ± 53.21	239.81 ± 46.51
b) neonates	1250.55 + 230.62	Positive (40)	Positive (1)
		42.63 (9)	56.61 (4)
		34.0 (31)	27.0 (6)
Control group (10)			
a^1) mothers	1511.52 ± 233.45	240.94 ± 58.56	230.01 ± 42.36
b^1) neonates	1928.32 + 203.04	Positive (10)	Positive (2)
		34.0 (10)	51.20 (2)
a : a^1	P > 0.10	P > 0.10	P > 0.10
b : b^1	P < .001	—	—
a : b	P < 0.01	—	—
a^1 : b^1	P < 0.05	—	—

economic group in developing countries. Bhardwaj et al (1987) observed higher levels of IGM in cord sera of 4.44% test neonates. However, Chandra (1975) reported no significant difference between serum IgM levels in cord blood of intra uterine growth retarded and normal weight babies. Serum IgA was detected in 25% of the test neonates and 20% of neonates of control group. 4 (10%) neonates of the test group had measurable IgA levels (> 27 mg%) with mean value 56.61 mg% (Table I). Raghvan et al (1976) observed serum IgA in the cord blood of 31% of I. U. G. R. neonates and 33% of the full term normal weight babies. Bhardwaj et al (1987) also reported raised IgA levels in 4.44% of test neonates.

Of the 9 (22.5%) test neonates who had shown raised IgM levels 4 (10%) had raised IgA levels also. This could probably have resulted from some subclinical intrauterine infection which ultimately produced I. U. G. R. Raised levels of IgM and IgA in the remaining 12.5% and 15% of the test neonates respectively could possibly be because of maternal foetal transfusion during labour. The same could also be the reason for raised IgA levels in 20% control neonates since corresponding mothers of these neonates also showed raised IgA levels.

Levels of serum IgG observed in test maternal neonatal pairs showed statistically significant lower values in the neonates when compared to their corresponding mothers. In control group, in 90% cord sera IgG levels were more than the corresponding material levels. These findings are comparable with the results of Raghvan et al (1976) and Bhardwaj et al (1987). Higher cord serum IgG levels in normal weight babies have been reported by Allansmith et al (1969). However, Mandenhall (1970) reported no appreciable difference in the cord and maternal serum IgG levels. Since it has now been established beyond doubt that some amount of IgG is synthesized by the fetus itself (Kohler and Farr 1966, Steihm et al 1975), intrauterine malnutrition might have decreased immune response in the fetus resulting in low levels of IgG in these neonates which may have been the cause of increased rate of infection and morbidity and mortality in these new borns.

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