

Short communication

Cord blood IgE levels in the United Arab Emirates

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Cord blood IgE was assayed in 164 newborn babies from the United Arab Emirates. The serum IgE levels ranged between ≤ 0.1 –13.5 kU/l with a geometric mean of 0.28 kU/l. The cord blood IgE in the 89 babies without immediate family history of allergy was ≤ 0.1 –3.2 kU/l with a geometric mean of 0.25 kU/l and 1.13 kU/l as the 90th percentile. An influence of prenatal sensitization to helminth antigens on cord blood IgE level was not likely. The data are similar to cord blood IgE values reported in other populations. This indicates that ethnic differences do not influence cord blood IgE levels and that previously published studies on the predictive value of cord blood IgE determination in Caucasians are relevant also for other populations.

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The incidence of allergic diseases among children in western countries is high and it appears to be increasing (1). This has raised an interest in methods for early identification of infants with a genetically determined propensity for allergy, who would benefit from allergy preventive measures. An elevated cord serum IgE level may be an useful marker to identify such risk infants (2). The IgE in cord blood is of foetal origin. However, admixture with maternal blood could occur and this has been reported to be common, even in normal deliveries (3).

The mean cord IgE values reported in Caucasians range from 0.2 to 0.45 kU/l and levels above which there is a significantly increased risk for allergic disease vary from 0.7 to 1.2 kU/l (4–6) (Table 1).

Although the incidence of allergic diseases in developing countries is supposed to be lower than in western countries, clinical observations indicate that the prevalence of these diseases has increased in recent years in association with the economical and social development with subsequent changes in the environment and living conditions in the United Arab Emirates (UAE) children has not been investigated. The main purpose of this study was to determine neonatal IgE levels in the UAE as a reference for further evaluation of allergic diseases among children in this area.

Material and methods

Cord blood was obtained from 165 (71 boys and 94 girls) newborn babies in Dubai. All but four were products of normal deliveries, one baby was born by caesarian section, two by breech delivery and one by vacuum extraction. They were born at Dubai Hospital and Alwasel Hospital in Dubai in January 1989. All were born to UAE national parents, except 18 babies, whose mothers (non-UAE) were married to

Table 1. The geometric mean (GM) and upper normal limit of cord blood IgE levels

Author	Population	Number	GM kU/l	Upper level of normal kU/l
Kjellman et al. (10)	Swedish	24	0.22	1.28
Magnusson et al. (11)	Belgian	190	0.37	1.20
Michel et al. (12)	French	136	0.32	1.0
Tseng et al. (13)	Chinese	147	0.27	1.26
Haus et al. (8)	South African			
	white	52	0.12	–
	black	53	0.21	–
Businco et al. (6)	Italian	101	–	0.8
Chandra et al. (5)	Canadian	226	–	0.7
Croner et al. (4)	Swedish	1651	–	0.9
Thomas et al. (9)	USA black	93	–	92% < 0.5
Present study	Arab	164	0.28	1.13

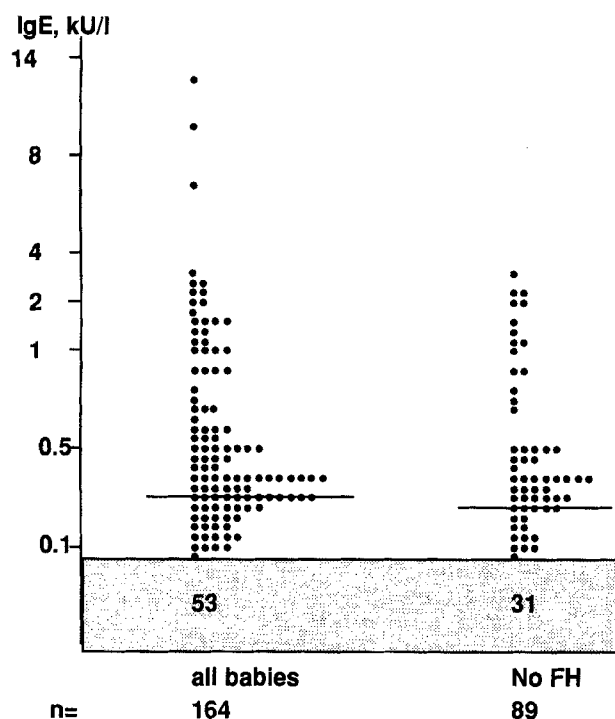


Fig. 1. Cord serum IgE of all 164 babies and 89 babies without a family history (No FH) of allergy. The lower dashed area indicates the values below the detection level (0.1 kU/l). The bars represent the geometric mean values of each group.

UAE national men. Of these 18 mothers, 7 were Indians, 5 Yamanies, 2 Egyptians, 2 British and 2 Philipinos. Other babies of non-UAE nationality born during this period were not included.

The mothers were interviewed on the next day post partum about presence of allergic diseases (allergic rhinitis, eczema, urticaria and bronchial asthma) among the immediate relatives of the newborn (parents, siblings). Data regarding gestational age and birth weight of the babies were obtained from medical records. The gestational age of all but 5 babies ranged from 37 to 42 weeks, with a mean of 39 weeks. Five babies were born prematurely with a gestational age <37 weeks.

To minimize contamination with maternal blood the cord blood samples were collected by direct needle aspiration of the umbilical vein before delivery of the placenta. The samples were centrifuged and the sera were frozen within 1–2 h. The sera were then transported in frozen state to Sweden for laboratory analysis.

Of 133 newborns in whom a family history could be obtained from the mothers, 89 had no history of any allergic disease among their first degree relatives, while in the remaining 44 allergic disease was present among immediate family members i.e. mothers, fathers or siblings. The history of allergy was considered definite in individuals with bronchial obstruction more than three times, eczema in

the face or flexural or extensor side of extremities, associated with itching, and/or allergic rhinitis diagnosed by a doctor. Hypersensitivity to drugs was not considered. Only in 14 babies the immediate family history of allergic diseases was considered as definite, while in the remaining infants the family history indicated possible or probable allergic disease. The IgE levels in the 89 newborns with no family history of allergy were used to establish reference cord blood IgE levels.

The mothers were also questioned regarding previous helminth infestation. One of them was helminth infected during pregnancy and had not been treated. Of the remaining mothers, 26 reported that stool analysis had been done during the last 5 years; two of whom had been infected 2 and 3 years ago and had received treatment. Faeces analyses for helminth ova and cysts were performed only in 18 mothers post partum as the mothers were discharged on the second day after normal deliveries due to shortage of beds.

Total IgE was determined with a modification of the Phadebas PRIST (Pharmacia Diagnostics, Uppsala, Sweden) as described elsewhere (7). The detection level was 0.09 kU/l. For statistical analysis, the IgE-values were log-transformed.

To exclude contamination with maternal blood serum IgA levels were measured by immunodiffusion method using "Nor-Partigen IgA" plates (Behring-werke, Germany) in sera with IgE values above 0.5 kU/l. The test was done according to the manufacturer's instructions.

Results and discussion

Of the 165 cord blood samples one sample with an IgE level of 66 kU/l was excluded due to detectable IgA content. The remaining 164 newborns comprised 71 boys and 93 girls.

Cord blood IgE values ranged from ≤ 0.1 kU/l, with a geometric mean value of 0.28 kU/l (Fig. 1). In babies born to non-UAE mothers ($n=18$) the geometric mean (GM) cord blood IgE was 0.3 kU/l. In the 5 premature babies with a gestational age of 32–36 weeks the IgE levels were <0.1; 0.11; 0.93; 0.49; and 1.28 kU/l respectively. Two of the premature babies, with IgE levels of 1.28 and 0.11 kU/l, had a family history of allergy.

The cord IgE levels in the newborns without family history of atopic diseases, ranged from ≤ 0.1 kU/l to 3.2 kU/l with a geometric mean value of 0.25 kU/l. This value is close to those reported in newborns in other studies (Table 1). The values were non-Gaussian in distribution even after logarithmic transformation as shown in the figure. Therefore, the 90th percentile of cord blood IgE value in babies

with no family history of allergy was considered as the upper level of normal. This corresponded to 1.13 kU/l. There was no sex difference in any of the groups with regard to IgE levels.

The cord IgE levels in the newborn with a family history of allergy ranged from ≤ 0.1 to 13.5 kU/l with GM of 0.32 kU/l. Thus, the levels were similar in babies with and without a family history of allergy. In the 14 babies with a definite family history of allergy the geometric mean was 0.62 kU/l. This was significantly higher than in babies without a family history of allergy ($p=0.01$, student's t-test).

It has been suggested that ethnicity may affect cord blood IgE concentration (8). Thus, black newborns have been reported to have higher IgE levels than white newborns (8), though this difference was not demonstrated in another study (9). The fact that the cord blood IgE levels in our study were similar to those reported in several other populations indicates that it may not be mandatory to establish separate reference values for cord blood IgE levels in each population.

Only one of 18 mothers, in whom analysis of the faeces was done, was helminth infected (*Hymenilopis nana* and *Trichomonas huminis*). The cord blood IgE level in her baby was <0.1 kU/l. The IgE level in the baby whose mother was infected during pregnancy was also <0.1 kU/l. In those babies whose mothers were helminth infected 2–3 years ago and had received treatment, the CB-IgE values were 0.48, 0.50 (twins) and <0.1 kU/l. The geometric mean IgE values in babies of mothers in whom faeces analysis for helminths was negative was 0.28 kU/l, which was not statistically different from the levels in babies of mothers with no history of helminth infestation and in whom no analysis of the faeces was done.

In conclusion, cord blood IgE levels in UAE babies are similar to that in populations of European, African and Chinese origin. This indicates that ethnic differences have no influence on the cord blood IgE concentration. Thus, the higher incidence of allergic diseases among children in western countries as compared to other parts of the world may be a consequence of environmental factors, rather than differences in genetic propensity.

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