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HÆMATOLOGY

Haptoglobin Patterns in Cord Blood Serums

ALTHOUGH haptoglobin is almost always present in normal adult serums, it is demonstrable in only about 10 per cent of cord blood serums by the technique of starch-gel electrophoresis[1]. The factors accounting for this large percentage of ahaptoglobinæmic new-borns are obscure. The present communication is based on a survey of cord-blood serums undertaken in an attempt to evaluate some of the factors accounting for the high frequency of ahaptoglobinæmia in the new-born. At the same time, work was carried out to substantiate that the new-born baby with detectable haptoglobin produced it himself.

Two hundred and twelve cord blood serums were subjected to the horizontal starch-gel electrophoresis technique of Smithies[2], using Poulik's discontinuous buffer system[3]. Before electrophoresis, sufficient hæmoglobin was added to each serum to saturate completely any haptoglobin present. One half of each resultant gel pattern was stained with amido black 10*B* to detect protein bands, and the other half with a dilute benzidine stain to locate the haptoglobin–hæmoglobin complexes[4].

Of the 212 cord blood serums examined, 27 (13 per cent) had detectable haptoglobin. As had been noted[5], the patterns, though characteristic, were frequently faint or not detectable with the amido black, and clearly definable only with the more sensitive benzidine stain. Haptoglobin typing of these new-born babies' parents revealed no exceptions to the genetic hypothesis of Smithies and Ford-Walker[6]. No unusual haptoglobin types were encountered.

Comparison of hæmoglobin, hæmatocrit and serum bilirubin-levels between the ahaptoglobinæmic new-borns and those with detectable haptoglobin revealed no evidence to suggest that *in vivo* hæmolysis caused ahaptoglobinæmia (Table 1).

Of fourteen cord blood serums examined from new-born babies with birth-weights less than 2,500 gm., three showed haptoglobin. The smallest tested, with an estimated gestational age of 28 wk. and a weight at birth of 1,106 gm., had haptoglobin of the 2–2 type. The mother had haptoglobin type 2–2 as well.

Table 1. COMPARISON OF NEW-BORN BABIES WITH AND WITHOUT HAPTOGLOBIN

Determinations*	Ahaptoglobinæmic new-born babies			New-born babies with haptoglobin		
	No. tested	Mean	Range	No. tested	Mean	Range
Hæmoglobin, gm. per cent	182	17·3	12·0–23·2	27	16·9	13·6–21·2
Hæmatocrit, per cent	180	58	40–78	26	59	45–80
Serum bilirubin, mgm. per cent	182	6·4	1·0 –18·0	26	5·7	2·0–14·0

* Performed at 2 days of age.

A higher number (13 of 27) of new-born babies with *Hp* 1–1 was found than would be expected in a randomly selected, predominantly Caucasian population such as this series represented. This was probably due to the greater technical ease of detecting the single band *Hp* 1–1 type when the total serum haptoglobin concentration is low.

In 12 of the 27 instances of cord blood serums with detectable haptoglobin, the mother's type differed from that of her offspring. This finding is indicative of the production of haptoglobin *in utero* by these twelve new-born babies. Of these twelve heterospecific baby–mother haptoglobin combinations, nine new-born babies showed *Hp* 1–1. For these nine it might be argued that the smaller molecular weight haptoglobin 1 species crossed the placenta from their *Hp* 1–2 mothers, to give *Hp* 1–1 patterns in the new-born serum. However, in the remaining three heterospecific baby–mother combinations, the new-born was *Hp* 1–2. The mothers of two of these had *Hp* 2–2 patterns, so their offspring must have produced the *Hp* 1 species of molecule *in utero*. The mother of the third new-born had *Hp* 1–1, giving evidence that her *Hp* 1–2 offspring must have produced the *Hp* 2 species of molecules under its own genetic control. This evidence for the fœtal production of haptoglobin corroborates the findings of Galatius-Jensen, who reported four mother new-born haptoglobin combinations with differing types in mother and baby[5].

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Serum Factor *Gm*^{a} among the Iranians

OF all the genetically determined serum constituents which have been called *Gm* factors, the factor *Gm*^{a}, discovered by Grubb[1], is the most frequently studied from the point of view of its distribution among different populations. Hitherto, the proportion of *Gm*(*a*+) subjects found among persons of the white race has varied between 67 and 39 per cent (Table 1).

We have examined 296 Iranian subjects, coming from different regions, whose blood samples were taken at the Transfusion Centre of the Iranian Army, at the time of their medical examination for military service. These subjects were twenty years old and apparently in good health.