

Phagocytosis in the small-for-dates newborn

By

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The phagocytic activity of leukocytes has been investigated in small-for-dates newborns. In such infants, a statistically significant decrease in the phagocytosis index was found, in comparison to normal newborns. The clinical importance of this finding is discussed and some metabolic peculiarities are postulated to be responsible for the decreased phagocytic activity of the leukocytes.

Small-for-dates newborns are known to be more susceptible to infections than normal newborns [11, 12]. The factors responsible for the increased susceptibility are, however, not completely elucidated [11]. Phagocytosis is known to form part of the cellular defence mechanism [1, 10]. This capacity depends on the ability of polymorphonuclear granulocytes to engulf microorganisms and to kill them intracellularly.

From the clinical point of view the problem is of basic importance in the proper treatment and special management of high risk infants, and we have therefore investigated the phagocytosing capacity of small-for-dates and normal newborns.

MATERIAL AND METHODS

The material comprised 37 small-for-dates and 28 normal newborns. They were all born at term and classified according to the rules set by the Expert Committee on Maternal and Child Health [5].

Phagocytosis was estimated according to JACOBS [3] with *Staphylococcus aureus* Oxford-209 P as the test organism. The ratio of bacteria to leukocytes was 3–8 : 1. The phagocytosis index was calculated from the number of microorganisms ingested by 100 phagocytosing granulocytes.

RESULTS

Results are summarized in Fig. 1. The phagocytosis index in the small-for-dates ranged from 3.01 to 6.22, whereas in the normal newborns from 6.51 to 8.80, with a mean of 4.85 and 7.65, respectively. The highest phagocytosis index in the small-for-dates, 6.22, was lower than the lowest value, 6.51, in the normal newborns. Statistical evaluation of these findings is presented in Table I; the difference between the groups was significant statistically, $p < 0.001$.

DISCUSSION

It is intriguing to speculate on the mechanism responsible for the de-

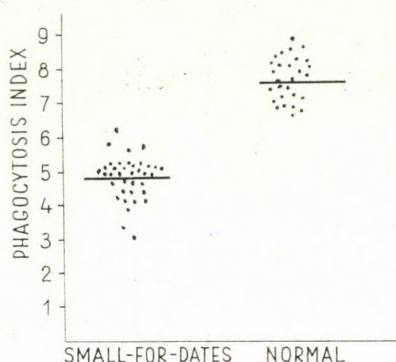


FIG. 1. Phagocytosis index in small-for-dates and normal newborns

TABLE I
Statistical evaluation of data

M. V.	Full-term newborn	Small-for-dates	4.85
		Normal	7.65
S. D.	Full-term newborn	Small-for-dates	0.10
		Normal	0.13
E	Full-term newborn	Small-for-dates	0.017
		Normal	0.024
$t = 94.29$			
$p < 0.001$			

pressed phagocytosis in small-for-dates babies. Metabolic disorders [6] may affect the production of energy needed for the uptake of microorganisms by granulocytes [7], and it is known that the glycogen content in the liver and muscles is lower in small newborns than in normal ones [6], and that the leukocytes too might be poor in glycogen. In addition, small-for-dates display a hyperpotassaemia and this also inhibits phagocytosis [8, 9], and the decreased level of calcium in the plasma of such babies reduces

the ratio of cytoplasm to nucleus in the leukocytes. All this might serve to explain the diminished resistance of the small-for-dates to bacterial infections.

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