AN ATTEMPT TO ESTIMATE NORMAL VALUES OF PERIPHERAL BLOOD IN TWINS AT THE FIRST, THIRD, AND SIXTH DAY AFTER DELIVERY

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A total of 26 healthy full-term infants from multiple pregnancies and a control group of 96 infants from single pregnancies, all from the Rzeszow district, were tested. Blood was taken from cranial veins at the first, third, and sixth day of life, always at the same time. All infants were kept under the same conditions. The results of the investigation show that (a) *twin infants have lower values of peripheral blood than singleton infants in their first six days after delivery, and* (b) *the second twin has higher values of peripheral blood as compared with the first one.*

Multiple pregnancy is a great strain to a woman's organism and, among other things, it often leads to delivery of children with poor iron supply. The mother's organism, which is doubly exploited, can give the children only a small amount of folic acid and other vitamins. These deficiencies negatively affect the hematogenesis of the twins. The purpose of this paper is to try to estimate the relation between the above mentioned deficiencies and the values of peripheral blood at an early stage of twin pregnancy.

MATERIAL AND METHODS

A total of 26 healthy full-term infants from multiple pregnancies and a control group of 96 infants from single pregnancies, all children of mothers living at Rzeszow, Ropczyce and Strzyzow districts, were tested. When the interview, physical testing, or clinical observation aroused suspicions of pathological conditions during pregnancy, delivery, and the early infant period, the infants were excluded from the study (Domagala 1972).

Only twin deliveries where the time between first and second childbirth did not exceed thirty minutes, were taken into account.

Only same-sexed twins were examined.

Blood was taken from cranial veins at the first, third, and sixth day of life, always at the same time, before second feeding. All infants were kept under the same conditions.

Blood was taken by means of one and the same equipment. Analysis was performed in a fixed order and by means of identically regulated equipment and tools, the error range of which was known (Krawczynski and Osinski 1967, Domagala 1972). The results were statistically analysed. After comparison of variants by means of the F-test, Student's t-test was applied to outline the differences.

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RESULTS

The results of our investigation (see Tables 1 and 2 and the Figure) show that:

1. On the first day there are no statistically pathognomonic features in the level of hemoglobin, leukocytes, erythrocytes, reticulocytes, thrombocytes, and hematocrit (t from 1.435 to 1.883).
2. On the third day twins exhibit statistically pathognomonic Hb values, lower than the control group ($t = 5.681$; $P < 0.001$).
3. On the sixth day pathognomonic Hb values persist.

Throughout our investigation Hb pathognomonic values appear to be much lower in twins than in singletons:

first day	$t = 2.067$	$P < 0.05$
third day	$t = 3.744$	$P < 0.001$
sixth day	$t = 2.691$	$P < 0.01$

Also hematocrit values were lower:

first day	$t = 3.536$	$P < 0.01$
sixth day	$t = 2.496$	$P < 0.02$

Comparing the average values in the first and second twin no significant differences were found except for a lower hematocrit value in the first twin ($t = 3.372$, $P < 0.01$ for the first day; and $t = 2.997$, $P < 0.01$ for the sixth day).

In order to prove that the above-mentioned differences are not caused by differences in maternal age, the hematocritic indicator was statistically analysed in both groups. The average ages of both groups are not significant in either day ($t = 1.915$, $P < 0.1$). Analysing the average results, the lower birth weight of infants has been shown to be significant ($t = 3.588$, $P < 0.001$).

DISCUSSION

The average percentage of twin deliveries in the last five years was 1.18%, which is similar to the statistics of other hospitals that deal with this problem in Poland (Sternadel 1968, Czarnik and Aleksandrowicz 1970).

The lower weight of twin infants is not abnormal; however, not all lower values of peripheral blood can be accounted for by twin pregnancy. It is generally assumed that the faster the organisms grow the lower hematologic values they have (Pozniak 1960, Lawkowicz and Krzeminska-Lawkowicz 1969).

Twin pregnancy affects, among other things, hormonal balance of mothers. Levels of estriol, chorionic gonadotropin, and pregnanediol were found to be higher (Borth et al. 1959). It is known that estrogens reduce erythropoiesis (Lawkowicz and Krzeminska-Lawkowicz 1969, Ryan and Coronel 1969) and affect the fetus (Jerzykowska-Kuleszyna and Zywicka-Twarowska 1964). Thence, the higher level of estrogens is often accompanied by lower values of peripheral blood.

Table 1

Day	Tested group	N	Mother's age	Birth weight		Hemoglobin in g/100		Erythrocytes in thous./mm³		Leukocytes in 1 mm³	Reticulocytes in 1000 erythrocytes		Thrombocytes in 1 mm³	Hematocrit in vd %	
			M	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*M*	*SD*	*M*	*M*	*SD*
I	A	35	27	3,401	500	18.1	2.5	5,062	625	13,717	45.3	14.1	203,371	56.5	6.8
	B	26	28.5	2,943	389	17.0	2.5	4,498	683	12,880	38.1	15.3	253,500	53.4	7.3
	C	13		2,845	363	16.4	2.8	4,327	545	12,840	37.7	10.0	257,250	48.3	7.9
	D	13		3,040	430	17.6	2.3	4,670	820	12,930	38.5	19.7	249,750	58.5	6.7
III	A	30	27.6	3,375	432	18.7	2.2	5,229	562	8,040	37.4	15.9	253,300	55.2	5.6
	B	26	28.5	2,943	389	15.8	1.6	5,020	400	7,490	36.0	13.4	210,300	57.5	9.2
	C	13		2,845	363	15.4	1.5	4,750	402	7,540	33.8	9.1	236,200	55.8	9.8
	D	13		3,040	430	16.2	1.8	5,290	349	7,440	38.2	18.1	184,400	59.2	9.8
VI	A	31	25.8	3,377	447	17.4	2.9	4,737	699	8,658	8.2	5.2	278,500	53.9	6.5
	B	26	28.5	2,943	389	15.5	2.1	4,475	401	9,155	8.2	3.6	283,315	51.8	5.3
	C	13		2,845	363	14.7	2.4	4,178	422	9,700	7.7	3.9	275,780	48.5	6.0
	D	13		3,040	430	16.3	1.9	4,773	413	8,610	8.8	3.7	290,850	55.4	4.9

N = number of infants; *M* = average value; *SD* = standard deviation; A = single pregnancy; B = twin pregnancy; C = twin I; D = twin II

Table 2

Day	Group	N	Young		Bacilliform		Multinuclear		Acido- and alcaliphilic		Lymphocytes		Monocytes		Normoblasts in 100 leukocytes	
			M	Mo	*M*	Mo	*M*	Mo	*M*	Mo	*M*	Mo	*M*	Mo	*M*	Mo
I	A	35	0.3	0.0	4.6	4.0	68.8	71	2.2	2.0	20.0	15.0	4.3	6.0	2.3	1.0
	B	26	1.1	0.0	4.8	5.0	58.8	64	2.1	0.0	28.7	26.0	3.9	4.0	2.2	0.0
	C	13	1.2	0.0	6.0	5.0	56.5	64	2.3	0.0	29.5	26.0	4.3	4.0	2.1	0.0
	D	13	1.1	0.0	3.9	3.0	61.1	58	2.0	0.0	28.0	26.0	3.6	4.0	2.3	0.0
III	A	30	0.5	0.0	4.0	5.0	51.7	54	4.4	4.0	32.1	38.0	7.3	6.0	0.3	0.0
	B	26	0.3	0.0	3.7	4.0	46.7	50	4.0	1.0	39.6	40.0	5.7	6.0	1.5	0.0
	C	13	0.2	0.0	2.6	2.0	45.2	50	5.4	5.0	40.2	33.0	6.3	6.0	1.2	0.0
	D	13	0.4	0.0	4.8	4.0	48.2	50	2.6	1.0	39.0	40.0	5.2	6.0	1.8	0.0
VI	A	31	0.2	0.0	3.9	2.0	33.1	34	3.7	5.0	52.3	51.0	6.6	8.0	0.0	0.0
	B	26	0.0	0.0	3.2	4.0	34.1	35	4.1	5.0	51.1	58.0	7.1	4.0	0.0	0.0
	C	13	0.0	0.0	3.2	4.0	34.7	35	4.6	5.0	51.5	58.0	5.8	4.0	0.0	0.0
	D	13	0.0	0.0	3.2	3.0	33.6	35	3.8	4.0	50.7	62.0	8.5	4.0	0.0	0.0

A = single pregnancy; B = twin pregnancy; C = twin I; D = twin II; N = number of infants; *M* = average value; Mo = modal value

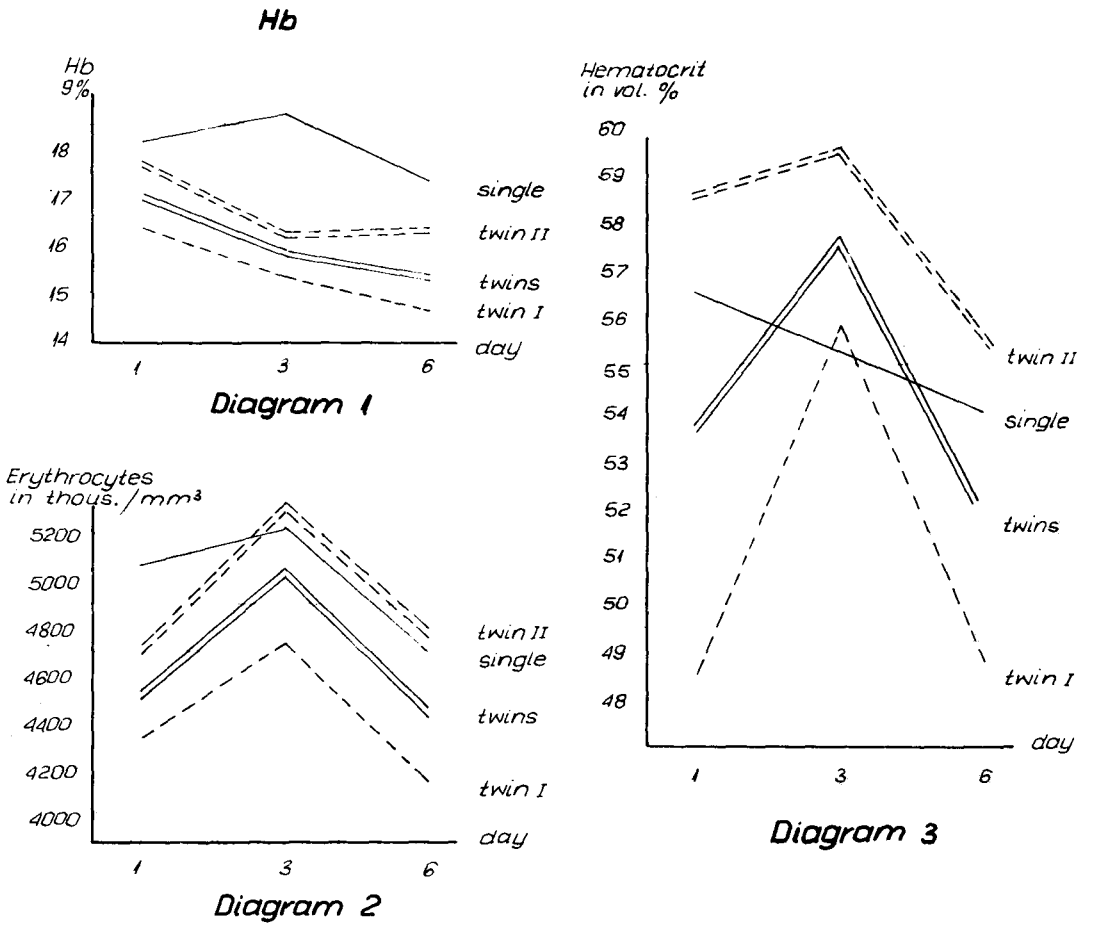

Fig. 1

Erythropoietin influences hematogenesis. The level of such hormone is higher in pregnant than nonpregnant women (Przala and Bielecki 1969). This can be the result of increasing needs of the fetus. Theoretically, there is a possibility of transition of mother's erythropoietin to fetus. This is indicated by the presence of the hormone in the umbilical blood, its absence (Halversen 1963) or its low level in a newborn infant (Radwanska et al. 1965). Taking this possibility into consideration in twin pregnancy there would be two recipients, and therefore the amounts obtained by the individual fetuses would be lower, which in turn might explain poor hemopoiesis.

If we assume that the number of reticulocytes is an additional indicator of erythropoiesis, then the lower values found in twins would prove the above reasoning. To explain much higher values of peripheral blood in the second twin, one should take into account the possibility of pressing out larger amounts of blood from placenta (placental transfusion)

during the shrinking of uterus after delivery of the first twin. This hypothesis is supported by statistically higher pathognomonic hematocritic indicator in the second twin.
The material was not analysed to establish and describe the order of pregnancies, origin, and sex, as it is known that such parameters do not affect the values of peripheral blood (Domagala 1972).

CONCLUSIONS

1. In the Rzeszow region, twin infants have lower values of peripheral blood than singleton infants in their first six days after delivery.
2. The second twin has higher values of peripheral blood than the first one.

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