

LEUCOCYTE ALKALINE PHOSPHATASE IN CASES OF ABORTION AND ABNORMAL PREGNANCY

by

NISHAT I. ASHRAF,* M.D.,

S. P. TYAGI,** M.D.

and

KUSUM SAXENA,*** M.S.

Leucocyte alkaline phosphatase (LAP) has been studied by cytochemical methods in normal pregnancy by different workers. A gradual rise of LAP activity in pregnancy with maximum score reaching during labour has been observed by most of the workers except Harer and Quigley (1961), Climie *et al* (1962), Chang (1963), Joshi and Gupta (1967) and Beal *et al* (19677) who have failed to demonstrate any relation between the elevated levels of LAP and duration of pregnancy.

Besides normal pregnancy LAP activity has been assessed in cases of abortion and in abnormal pregnancy to predict the outcome of pregnancy in such cases.

The authors also tried to study the behaviour of LAP activity during normal pregnancy and the results are still under publication.

The present communication mainly deals with their observations in cases of bleeding in early pregnancy and of abnormal pregnancy.

*Lecturer in Pathology.

**Reader in Pathology.

***Reader in Obstetrics & Gynaecology.

From the Departments of Pathology & Obstetrics & Gynaecology, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh (U.P.).

Accepted for publication on 17-4-76.

Material and Method

The cases for the present study were selected from the pregnant women attending the antenatal clinic of the Department of Obstetrics and Gynaecology. They included 79 control cases (non-pregnant healthy females), 548 normal pregnant women, 27 with bleeding in the first half of pregnancy, 8 of anaemia associated with pregnancy, 6 of infection with pregnancy and 4 of toxæmia of pregnancy. The technique adopted for demonstrating LAP was that of Hayhoe and Quaglino (1958) which is a modified technique of Kaplow (1955). The scoring was done by the method of Kaplow (1955) and was based on the intensity of staining and the appearance of the precipitated dye in the cytoplasm of 100 consecutive neutrophils.

Results

In control group the LAP score was found to vary from 7 to 61 with an average of 36.8.

In normal pregnancy cases a significant gradual rise in the average LAP score was observed up to the 9th month of pregnancy as shown in Table I.

LAP Score in Cases of Bleeding (abortion)

In all 27 cases were examined for LAP

TABLE
Average LAP Score in Different Months
of Pregnancy

Duration of Pregnancy in Months	Total Number of cases	Average LAP score
1	29	63.0
2	54	65.0
3	64	81.2
4	58	87.1
5	61	114.6
6	64	117.6
7	67	136.7
8	65	140.6
9	86	171.3

activity who had bleeding during their first half of pregnancy. The cases were grouped into 3 categories depending on the final diagnosis. Table II depicts the results of LAP activity in these cases.

The results of LAP activity in these cases were compared to the average LAP score pertaining to the particular month of normal pregnancy. The results thus obtained were summarised in Table III and Graph 1. In all these cases duration of bleeding had no significant relation with LAP activity.

TABLE II
LAP Values in Cases of Bleeding in First Half of Pregnancy

Group	Cases	Duration		LAP score	Outcome of Pregnancy	
		Gestation in months	Bleeding in days			
(a) Threatened abortion	B.G.	3	3	116	Continued	
	S.D.	3	10	149	Continued	
	N.D.	3½	4	193	Continued	
	12 cases	N.S.	2	5	93	Continued
	R.R.	3	6	61	Continued*	
	A.	2½	15	99	Continued	
	S.K.	3	8	91	Continued	
	R.B.	2	1	85	Continued	
	Q.J.R.	2½	1	163	Continued	
	B.	3½	12	208	Continued	
	G.D.	3	4	81	Continued	
	R.L.	3	5	49	Continued*	
(b) Missed abortion	G.D.	6½	Previous history of bleeding	21	Terminated	
	H.B.	6	"	47	Terminated	
	3 cases	R.	Bleeding 4 days	166	Terminated	
(c) Inevitable abortion	M.S.	5	15	31	D & C	
	R.B.	3	3	248	D & C	
	A.J.	3	10	70	D & C	
	12 cases	S.	3	69	Terminated by itself	
	U.A.	2½	10	31	D & C	
	U.D.	3	2	36	Terminated by itself	
	M.W.	4	20	63	D & C	
	Q.S.	3	8	85	D & C	
	P.L.	4	16	73	D & C	
	H.B.	2½	3	49	Terminated by itself	
	M.	3	5	86	D & C	
	R.W.	3	4	96	D & C	

* Developed missed abortion later on.

TABLE III
LAP Values in Cases of Abortion

Group	Final Diagnosis	No. of Patients	LAP score		
			Normal	Low	High
1	Theatened abortion	12	7	2	3
2	Missed abortion	3	-	2	1
3	Incomplete abortion	12	3	8	1

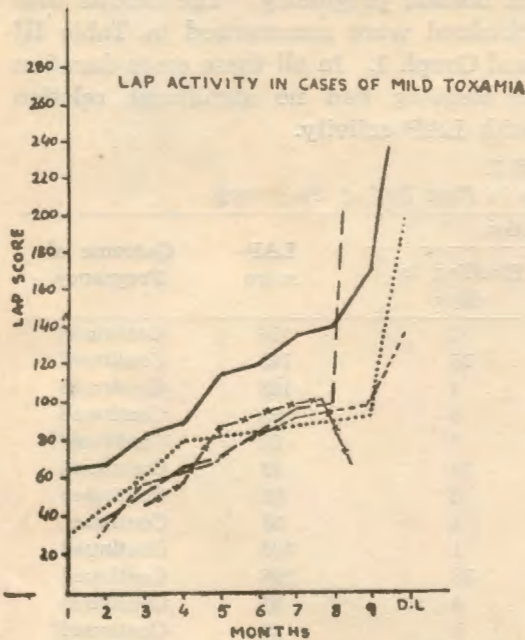


Fig. 1

LAP activity in Cases of Abnormal Pregnancy

(a) Anaemia with Pregnancy (8 cases):

Haemoglobin values were found to vary from 5 to 8 gms% and the peripheral blood showed the picture of microcytic hypochromic anaemia. LAP activity was found towards the upper limit of the normal pregnancy range.

(b) Infection with Pregnancy (6 cases):

Five cases gave the history of sore throat or urinary tract infection. There was mild degree of neutrophilic leucocytosis in these cases. LAP activity was

found to be on the higher side of the normal pregnancy range and it returned to normal after infection was cured. One case was having pulmonary tuberculosis. The LAP score was well within the normal range comparable to the period of gestation.

(c) Toxaemia of Pregnancy (4 cases):

LAP was estimated in 4 cases of mild toxaemia of pregnancy at different periods of gestation. The activity was very much below or towards the lower limit of normal values (Graph 2). Dur-

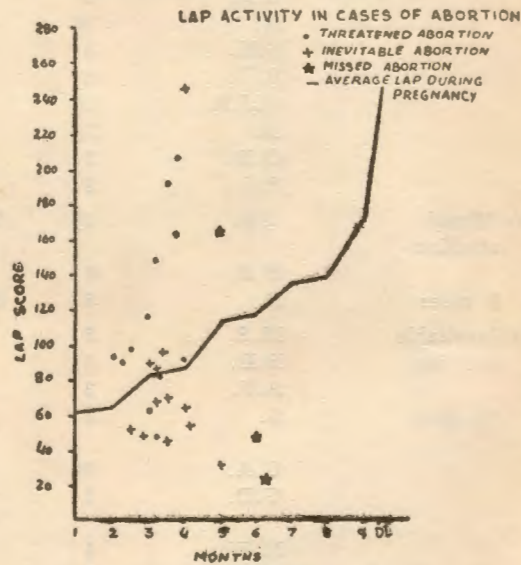


Fig. 2

ing 8th month 2 cases had caesarean section due to foetal distress. At that time LAP score was high in one case while below normal in the other.

Discussion

The main object of the study of LAP activity in cases of bleeding during first half of pregnancy was to determine to what extent this could indicate placental dysfunction.

Out of 12 cases of threatened abortion, 7 had LAP activity within the normal range and delivered normally. In 3 cases where LAP score was on the higher side of the normal pregnancy range, stillbirth was reported in 2 while normal delivery in one. In 2 cases where LAP score was low were cases of missed abortion and the pregnancy was terminated. Out of 3 cases of missed abortion LAP was below the normal range in two while in one it was well above the normal range.

In the third category of 12 cases of inevitable abortion, 4 had LAP score within normal range of pregnancy, 7 had low scores while in 1 it was high. Normal values in these cases are indicative of still adequate placental function. High value of LAP in cases of abortion could be attributed to different factors e.g. associated infection which was not detected in the present case; stress (Diamant *et al*, 1970); fall of progesterone with relative influence of oestrogen (Polishuk *et al*, 1968 and Diamant *et al*, 1970) or it might be representing the stage of termination of pregnancy as in cases of labour.

A sudden rise or a sudden fall during normal course should be interpreted to have some abnormal outcome. The overall findings in cases of early bleeding in pregnancy in the present series were akin to those of Diamant *et al* (1970). They observed normal score in 2 out of 53 determinations in 25 instances of missed abortion. Quite contrary to our findings Pritchard (1957), Climie *et al* (1962) and Chang (1963) have experienced ele-

vated levels in missed abortion cases.

Though the number of cases of infection with pregnancy were small in the present series, however, it could be judged that acute infection is responsible for a high LAP score and chronic infection is associated with normal score. An appreciable change in LAP was evident when the total count was above 10,000/cmm. irrespective of period of gestation.

The characteristic finding in 4 cases of toxemia of pregnancy was a persistently low LAP score which was well evident even much earlier than the clinical signs of toxemia developed. A sudden rise or fall in LAP score was observed to be associated with foetal distress and caesarean section had to be performed in 2 cases. They have further reported an inverse relation of LAP activity with severity of toxemia. Before accepting low score of LAP as indicative of placental dysfunction one should always exclude the possibility of the other causes of low LAP activity.

Thus, in the opinion of the authors estimation of LAP activity is a quite important and easy method to assess the outcome of pregnancy in cases of abortion or abnormal pregnancy.

Summary

The present communication deals with the observations of leucocyte alkaline phosphatase (LAP) activity in cases of bleeding in early pregnancy and of abnormal pregnancy. Persistently low LAP score or a sudden rise or a fall was associated with bad obstetric outcome in abortion cases.

LAP score on the higher side of normal pregnancy range was observed in cases associated with acute infection and anaemia.

In cases of toxemia of pregnancy a

persistently low LAP score was obtained much earlier to the development of frank clinical picture of the disease.

References

1. Beal, R. W., Read, W. M. F. and Turvey, P. A.: J. Clin. Path. 20: 749, 1967.
2. Chang, I. W.: Amer. J. Obst. & Gynec., 86: 903, 1963.
3. Climie, A. R. W., Heinrichs, W. L. and Foster, I. J.: Amer. J. Clin. Path. 38: 95, 1962.

4. Diamant, Y. Z., Zuckerman, H., Sadovsky, E. and Polishuk, W. Z.: Amer. J. Obst. & Gynec. 106: 872, 1970.
5. Joshi, K. P. and Gupta, D. P.: Indian J. Path. & Bact. 10: 138, 1967.
6. Polishuk, W. Z., Diamant, Y. Z., Zuckerman, H. and Sadovsky E.: Amer. J. Obst. & Gynec. 107: 604, 1970.
7. Vaccari, F., Sabottz, B. and Manzini, E.: Blood, 10: 730, 1955.
8. Valentine, W. N., Follettefi J. H., Solomon, D. H. and Reynold, J.: J. Lab. Clin. Med. 49: 723, 1957.