LEUCOCYTIC ALKALINE PHOSPHATASE ACTIVITY AFTER TERMINATION OF FIRST TRIMESTER PREGNANCY (M.T.P.)* PAPER II

by

J. J. MIRCHANDANI,** M.D.

S. MITTAL,*** M.D.

and

P. SOOD,**** M.B.B.S.

Kaplow's (1955) histochemical method of demonstrating leucocytic alkaline phosphatase (L.A.P.A.), used semi-quantitatively to assess its activity, has been suggested as a diagnostic test of pregnancy and as an index of prognosis in threatened abortion and in cases of suspected placental insufficiency. It is a simple test and cheaper than other biological and immunological tests assessing hormonal status in pregnancy.

This test could possibly be used in follow-up of abortion cases. The initial study had shown LAP activity to return to normal levels 2 weeks after spontaneous abortion (Paper I). It takes six weeks after full term normal delivery when initial levels are higher.

The rate of decline of LAP activity after termination of normal early pregnancy has not been documented. In the present study, LAP activity is estimated at the end of first and second week after first trimester termination of pregnancy by suction evacuation.

Material and Methods

Cases studied are:

1. 50 cases of first trimester normal pregnancy.
2. 102 cases of first trimester M.T.P.

All cases had initial routine check up, haemoglobin, routine urine analysis and total leucocytic count.

Kaplow's technique was used for staining peripheral smear. One hundred neutrophils were rated for positive reaction as zero to four. Thus individual score varies between 0-400 (details in Paper I).

LAP activity was estimated before and after M.T.P. and reported 7 and 14 days later.

Observations

L.A.P.A. before M.T.P.

The initial levels of LAP activity in M.T.P. cases increase with duration of pregnancy and show no statistical difference from the levels in normal pregnancy of corresponding duration (Table I). Significant rise in L.A.P. activity is observed with every 2 weeks increase in period of gestation in first trimester. Coefficient of correlation with age and parity

---

*Part of Thesis accepted for M.D. Delhi University, 1978.

**Associate Prof. Department of Obstetrics and Gynaecology, Lady Hardinge Medical College and Associate Hospital, New Delhi.

***Lecturer, Department of Pathology, Lady Hardinge Medical College and Associate Hospital, New Delhi.

****Junior Resident.

Accepted for publication on 2-8-79.

TABLE I

L.A.P.A. Score in 50 Normal Pregnant Women and 102 Cases Before and After M.T.P. in First Trimester

Amenorrhoea in Weeks	Normal Pregnancy (A)		Before M.T.P. (B1)		After M.T.P. within 6 Hrs. (B2)	
	No. 50	Mean + S.D.	No. 102	Mean + S.D.	No. 102	Mean + S.D.
6- 7 Weeks	14	90.21 7.3	30	92.8 6.6	30	82.63 13.6
8- 9 Weeks	8	109.38 5.9	40	111.43 11.3	40	96.45 16.2
10-11 Weeks	10	120.8 8.3	16	123.19 14.2	16	102.75 16.6
12-13 Weeks	10	139.6 13	8	141.5 25.9	8	127.5 31.8
14 Weeks	8	143.0 16.1	8	146 20.5	8	131.9 21.3

Difference between A and B Nor significant.
Difference between B_1 and B_2.
6- 7 Weeks = P less than .001 Highly significant
8- 9 Weeks = P less than .001 Highly significant
10-11 Weeks = P less than .01 Significant
12-13 Weeks = P more han .3 Not significant

was not significant. The lowest level, of L.A.P. activity was 76 at 6 weeks of pregnancy. L.A.P. activity has positive coefficient of correlation with leucocytic count ($r = 0.658$ highly significant).

L.A.P.A. after M.T.P.:

Table I shows that L.A.P. activity falls within 6 hours of suction evacuation. The difference between initial levels and later levels within 6 hours of suction evacuation is highly significant (P less than 0.001) in all groups below 12 weeks period of amenorrhoea.

L.A.P.A. 7 days and 14 days after M.T.P.: (Table II)

Marked decrease in L.A.P. activity is observed by end of one week and decline continues further till 14th day. Mean score in M.T.P. of 6-7 weeks pregnancy was 92.8 initially, 27.33 on 7th day and 16.77 on 14th day Fig. I. Mean score in M.T.P. of 14 weeks period was initially 143, 38.13 on 7th day and 14.63 on 14th day. The differences between 7th and 14th day scores were significant in all groups.

Serial L.A.P.A. in Six Cases of Failed M.T.P.: (Table III)

In these 6 cases, scores on 7th day were between 88-120, showing no decrease from the initial levels and continued to rise further on 14th day. One case of 6 weeks' amenorrhoea with initial score of 80 had score of 105 after 5 weeks of attempted M.T.P. (Fig. I).

Comments

Alkaline phosphatase activity in leucocytes is determined at the time of leucocytogenesis in the bone marrow, and persists for the life span of the cell

TABLE II

L.A.P.A. Scores 7 and 14 days after M.T.P.

Weeks of Amenorrhoea	102	7 Day		14 Days		Statistical Evaluation	
		Mean	S.D.	Mean	S.D.	P less than	Significant
6- 7	30	27.33	7.7	16.77	5.3	.001	H.S.
8- 9	40	27.73	6.1	17.1	5.6	.001	H.S.
10-11	16	26.5	6.3	15.8	3.6	.001	H.S.
12-13	8	30.5	7.0	21.5	6.3	.05	S.
14	8	38.13	12.1	14.63	4.0	.001	N.S.

S. = Significant.
H.S. = Highly significant.
N.S. = Not significant.

TABLE III

Serial L.A.P.A. in Six Cases of Failed M.T.P.

Weeks in Amenorrhoea	Before M.T.P.	After MTP within 6 hrs.	One Week later	Two Weeks later	Three Weeks later	Four Weeks later	Five Weeks later
6	80	85	88	92		98	105
6	88	80	92	98			
6	92	80	97	100			
6	91	95	90	100			
8	100	100	120	113	122		
8	109	80	92	111			

(Climite *et al*, 1962). Normal levels of it are reached 6 weeks after normal delivery (Pritchard 1957; Quigley 1960; Karna 1975; Ashraff *et al* 1977) and within 2 weeks after spontaneous abortion. Though to start with, levels are higher than spontaneous abortion, even after M.T.P. of first trimester it takes 2 weeks for leucocytic alkaline phosphatase activity to return to normal levels.

Stress is known to cause leucocytosis, increased adrenal cortical hormones and increased L.A.P. activity. However, scrores prior to M.T.P. were same as those of normal pregnancy of corresponding duration, and total leucocytic count levels were not different from non-pregnant, thus stress was not an important factor. Even within 6 hours, significantly lower levels of L.A.P.A. were obtained. This fall is not easily explained. Small rise was observed in 18 (16.6%) of the cases. Coefficient of correlation of L.A.P. activity with age and parity was not significant.

The mean scores on 7th day after 102 complete M.T.P. cases were significantly lower than initial levels, the mean score was 49 and 56 for M.T.P. of 6-8 weeks and 14 weeks respectively, the difference according to duration of pregnancy was still observed. The scores of L.A.P.A. obtained on 7th day fall within the possible range of cases of incomplete abortion. However, the levels obtained on 14th day were clearly those of normal non-preg-

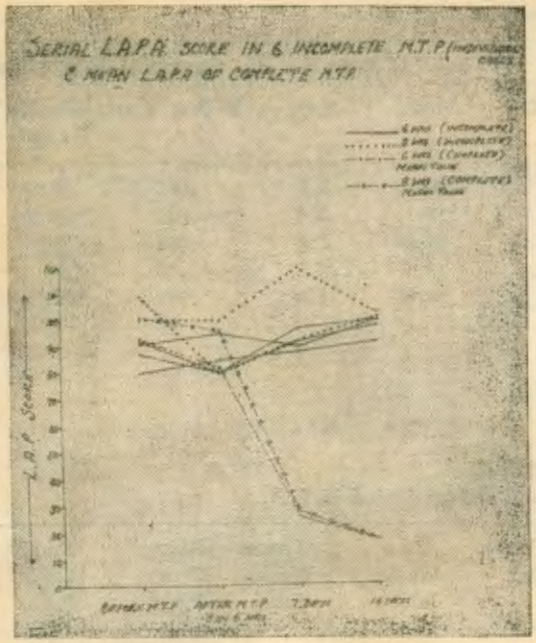

Fig. 1.

nant, the levels being significantly lower than those of 7th day.

The serial L.A.P.A. score in 6 cases (Table III) indicate that uninterrupted pregnancy can be easily determined even on 7th day after M.T.P.

Though incomplete abortion is reported to occur in 14/1000 M.T.P. cases (I.C.M.R. annual report 1977), as many as 15.5% of the cases followed up had persistent vaginal bleeding; nearly a quarter of these were treated with curettage by Gupta *et al* (1977) who were able to have 80% follow-up of 3081 cases. Curettage is often unnecessary and may even be harmful, determination of L.A.P. activity on 14th day may help in treating more cases conservatively.

Summary and Conclusion

Levels of L.A.P.A. estimated by semi-quantitative histo-chemical method return to normal non-pregnant levels 14 days after M.T.P. This test may be used 7 days after attempted menstrual regulation to detect uninterrupted pregnancy, or 14 days later to select cases of possible incomplete abortion out of all cases with persistent vaginal bleeding after M.T.P.

Acknowledgement

We are grateful to Dr. S. Chawla, Principal and Medical Superintendent Lady Hardinge Medical College, New Delhi for permission to publish this study. We are also grateful to Dr. Y. Pinto de Rosario, Professer and Head of Department of Obstetrics and Gynaecology and Dr. G. Bazaaz Mallik for permitting this study in their departments. Thanks are also due to Mr. Chopra and staff of both departments for their co-operation.

References

1. Ashraf, N., Tyagi, S. P. and Saxena, K.: J. Obstet. Gynec. India. 27: 310, 1977.
2. Climie, A. R. W., Heinricha, W. L. and Foster, J. J.: Am. J. Clin. Path. 38: 95, 1962.
3. Gupta, N. G., Kornar, M. and Chanda, C. K.: J. Obstet. Gynec. India. 27: 637, 1977.
4. I.C.M.R. Annual report p. 71, 1977.
5. Kaplow, L. S.: Blood, 10: 1023, 1955.
6. Karna, S.: J. Obstet. Gynec. India. 25: 464, 1975.
7. Polishuk, W. Z. Zuckermann, H. and Diamont, Y. Fert. and Steril. 19: 901, 1968.
8. Pritchard, J. A.: Labr. Clin. Med. 50: 432, 1957.
9. Quigley, H. J. and Richards, R. J. and Sheir, K. J.: Am. J. Obstet. Gynec. 106: 340, 1970.

A Study of T and B Lymphocytes—Upreti et al. pp. 803-809

Fig. 1
Slide preparation of E. Rosette (Methyl violet 7 x 40)

(Thymus dependent lymphocyte on surface of which more than three erythrocytes are attached).

Vesicular Mole Associated with Viable Foetus—Chhabra pp. 837-838

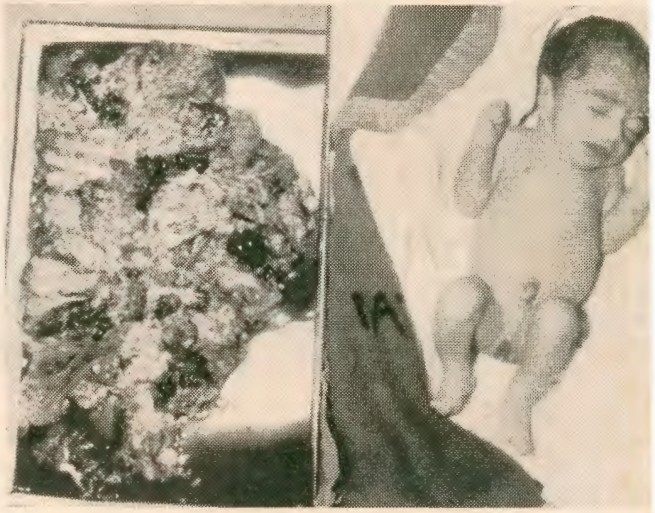

Fig. 1
Foetus and vesicular mole.

Advanced Abdomnal Pregnancy with a Living Baby—Datta et al. pp. 835-836

Fig. 1
The living female baby (3.2 Kg) immediately after birth in a case of advanced abdominal pregnancy.

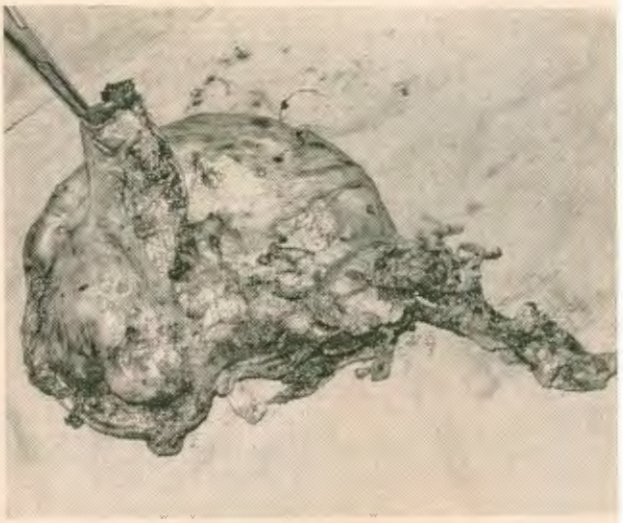

Fig. 2
Shows placenta with fallopian tube (left) in a case of advanced abdominal pregnancy.