

ALKALINE PHOSPHATASE AND PLACENTAL ALKALINE PHOSPHATASE ACTIVITY IN SERUM OF NORMAL AND PREGNANCY INDUCED HYPERTENSIVE MOTHERS

A. Mangal*, U.Gaur*, A. Jain**, U.Goyal***, R.Tripathi#, G. Rath#

Departments of Anatomy*, Biochemistry** and Obst. and Gynae.*** Lady Hardinge Medical College and S.K hospital and Vardhman Mahavir Medical College and S.J Hospital#, N.Delhi. INDIA

Abstract: Human placental alkaline phosphatase (PLAP) is synthesized in placenta during pregnancy by placental syncytiotrophoblasts, however, its physiological role is unknown. The purpose of this study was to determine the role of total alkaline phosphatase (ALP) and placental alkaline phosphatase levels in serum of normotensive and pregnancy induced hypertensive (PIH) mothers for its early diagnosis and management. For our study, serum samples of 50 PIH patients and 50 control pregnant mothers were collected from Department of Obstetrics and Gynaecology, LHMC & SK Hospital, New Delhi. PLAP and total ALP levels were measured by thermal inactivation method and continuous monitoring procedure with the help of Synchron CX5 Clinical Chemistry Autoanalyser (Beckman) respectively. Our results showed that the total ALP and PLAP levels increase progressively in normal as well as in PIH patients with the advance of gestational weeks. Also it was found that total ALP and PLAP levels in PIH mothers were relatively higher than those in control group and were higher from corresponding normal figures in respective gestations from time of detection of disease till delivery. In PIH cases, a gradual rise in the percentage of PLAP to total ALP was observed with the progress of gestation and reaches to maximum of 50.82% at 36-38 weeks. The comparison in the values of ALP and PLAP between control and experimental group was found to be statistically significant ($P < 0.05$) in respective of gestations from 26-38 weeks of pregnancy. Although, aetiology of increased ALP and PLAP is still unknown but their significantly high values denote abnormality in placental function and thus confirms a direct relationship to clinical onset of PIH.

INTRODUCTION

Alkaline Phosphatase (ALP) is a group of isoenzymes, each of which is capable of hydrolyzing phosphate bonds at an alkaline pH. This reflects their catalytic properties characterized in vitro. Nevertheless, the physiological role of these enzymes is poorly understood. These isoenzymes have been shown to be derived from various organs such as liver, bone, kidney, collectively called tissue non-specific alkaline phosphatases (TNSALP), intestinal ALP (IALP) and placental ALP i.e. PLAP¹. The primary source of human PLAP is placenta, which synthesizes this enzyme during second and third trimesters of pregnancy by placental syncytiotrophoblast plasma membranes. This membrane forms an extensive interface between fetal tissue and maternal blood. As the gestation progresses, the concentration of PLAP increases and this can be caused by the detachment of ALP from the membrane into the maternal circulation. Lee and Levis² have reported a significant rise in ALP activity in PIH patients in comparison to non-pregnant women and normal pregnant patients during third trimester while Curzen and Morris³ did not notice any variation in ALP values in PIH patients. PLAP levels have also been shown to be significantly increased in PIH patients from 26-41 weeks by Aleem et al⁴ while Rodin et al⁵ observed decreased serum levels of PLAP in these patients. Our study

has therefore focused on measurement of both the activities (i.e., total ALP and PLAP) in serum and to correlate their levels in cases of normal pregnancy and pregnancy induced hypertension and thereby to understand their possible roles in onset of PIH.

MATERIAL AND METHODS

Sample collection and storage: The study group consisted of 100 cases comprising of pregnant females attending antenatal clinic or admitted in the antenatal ward of Smt. Suchita Kriplani hospital, New Delhi. The subjects were divided into two groups: 50 cases of normal pregnancy as control group and 50 cases of diagnosed pregnancy induced hypertension as experimental group. According to period of gestation, the control group was divided into 10 subgroups from 20 weeks of gestation upto delivery while the experimental group was divided into 7 subgroups from 26 weeks of gestation till delivery. All cases were subsequently followed up and their blood samples were collected at two weeks interval till delivery. The unavailability of an experimental group cases before 26 weeks of gestation is due to diagnosis of PIH at later stage. These blood samples were centrifuged at 1200 rpm for 10 minutes and their respective serum samples were stored in -20°C until assay was carried out. Sera samples were used to determine total ALP and heat stable fraction of ALP (PLAP) levels.

Inclusion criteria for Pregnancy induced hypertension: Patients presenting any two of the following symptoms were included (Table-1)- a) B P³ 140/90 mm Hg for first time during pregnancy

Correspondence : Prof. Gayatri Rath, Head, Department of Anatomy, Vardhman Mahavir Medical College and Safdarjang Hospital, Ansari Nagar, New Delhi-110029, India
Fax No. : 26589476 e-mail: gayatirath@rediffmail.com