Doubts on the Value of Serum Heat-Stable Alkaline Phosphatase Estimations in Pregnancy


SUMMARY

The normal range of serum heat-stable alkaline phosphatase in pregnant African women is shown to be similar to that reported in Caucasian women.

The test was used in 52 subjects with pre-eclampsia and in 21 subjects with essential hypertension. The test correlated well with the clinical state of the patient in only one instance. This test adds little to careful clinical management of patients with raised blood pressure during pregnancy.

Serial estimations of the serum heat-stable alkaline phosphatase (HSAP) have been proposed as a reliable test of placental function. The main advantage of the test is its simplicity in comparison with urinary oestriol assays.

We had two aims in this work, completed between January 1970 and September 1971 in a busy African hospital with some 6,500 deliveries annually. Project 1 aimed at confirming that the normal range of HSAP levels in pregnant African women was similar to that reported in Ulster by Hunter. Project 2 was intended to evaluate the use of HSAP assays in pregnancies complicated by conditions predisposing to placental insufficiency.

RESULTS

Project 1

Since the number of assays varied from 1 to 6 per pregnancy, these results are not suitable for statistical analysis, but are shown in Fig. 1 superimposed on Hunter's 95% confidence chart.

There appears to be no difference between African and Caucasian subjects. In the triplet pregnancy HSAP levels ran straight up the middle of the fairway.

Project 2

Pre-eclampsia. In the 3 groups a comparison of the mean diastolic blood pressures with the mean HSAP levels shows statistical correlation to be highly significant (0.01 > P > 0.001; one-tail) with the correlation coefficient on the 52 patients being +0.345. These results are in keeping with those of Curzen and Morris.

However, comparison of the serial HSAP estimations and the clinical course of the individual patients showed no consistent relationship to the progression or improvement of the pre-eclampsia, foetal condition at birth, birth weight or the appearance of the placenta.

Case 44, with severe pre-eclampsia, showed a return of HSAP levels into the normal range, which gave us a false
sense of security since the foetus died in utero 3 days later. Case 49 with severe pre-eclampsia failed to settle on bedrest and was induced at 35 weeks with delivery of a 2.15 kg infant with an Apgar score of 10.

Case 40 had moderate pre-eclampsia with a rapid rise in HSAP levels. Her blood pressure of 165/100 mmHg settled on bedrest to 130/80 mmHg and at 37 weeks she delivered spontaneously a 2.60 kg baby with an Apgar score of 10. Case 10, with mild pre-eclampsia and a serial rise in HSAP levels well out of the normal range, was induced at 38 weeks and delivered a healthy baby of 2.78 kg and a normal placenta. Case 32, with mild pre-eclampsia, had very low HSAP levels and was induced at term to deliver a 2.95 kg infant and normal placenta.

Essential hypertension: With the same scoring method as for the pre-eclamptic patients no statistical relationship was found between blood pressure and HSAP, the correlation coefficient being -0.205.

In case 46 the HSAP levels did correlate with the mother’s worsening condition. Caesarean section at 32 weeks produced a small infarcted placenta and a 936 g infant who died 16 days later. In case 83 the dramatic rise in HSAP levels influenced the decision to induce labour, but both the 2.95 kg baby and placenta were normal.

Diabetes: Only 1 patient had raised HSAP levels (maximum 19.0 KA units at 37.5 weeks) and induction resulted in a 4.14 kg infant. This patient had only a mildly abnormal glucose tolerance test, whereas the other 8 mothers were severe diabetics on careful insulin control.

Small-for-dates babies: Twelve infants had birthweights below the tenth percentile for the stage of pregnancy at delivery. Six mothers were hypertensive and 6 normotensive. All HSAP levels were within normal range, except in 1 patient who had two peaks just above the upper limit of normal.

Stillbirths: There were 3 intra-uterine deaths, of which case 44 with pre-eclampsia has been discussed already. Case 82 delivered a macerated stillbirth at 38 weeks due to syphilis and had a single HSAP assay of 11 KA units. Case 35, a mild pre-eclampsia with a maximum HSAP level of 17.8 KA units at 39 weeks, was induced surgically but subsequently sectioned too late for cervical dystocia.

DISCUSSION

Despite the statistical correlation between blood pressure and HSAP levels in pre-eclampsia, we feel this test adds little to careful clinical assessment and was misleading in most of the cases illustrated. The only significant correlation between the test and the clinical picture was in case 46 with essential hypertension, this case lending weight to the contention of Benster that the test is only of use before 35 weeks of pregnancy.

In general this purely clinical study supports the more detailed work of Watney et al.1, Elder,2 and the revised opinion of Curzen and Henzel,3 that HSAP estimates on their own are of little value in assessing the state of the foetus or the placenta.

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REFERENCES