

STATUS OF ALKALINE AND ACID PHOSPHATASES UNDER THE INFLUENCE OF PROLONGED USAGE OF ORAL CONTRACEPTIVES

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SUMMARY

Prolonged usage of oral contraceptives has revealed that they are responsible for statistically significant elevation of serum alkaline phosphatase level but highly significant results were not obtained in both the cases i.e. alkaline and acid phosphatases. Effect of these contraceptives on acid phosphatase level was also studied and the results were same as mentioned in case of alkaline phosphatase except the oral contraceptive Lyndiol 2.5 in which case there has been observed no significant elevation.

Overall, it has been concluded that oral contraceptives do not affect much the serum alkaline and acid phosphatase levels, so as to confirm less side effects of negligible magnitude on these enzymic levels which is indicative of the fact that normal hepatic metabolism takes place during the prolonged usage of such pills.

Introduction

Phosphatases are very important as they have been understood to have great diagnostic value. These are widely distributed enzymes. The optimum pH for the action of alkaline phosphatase is in between 9-10, whereas for acid phosphatase 5-6.

Hopper *et al* (1952) reported a correlation between the degree of liver cell damage and the elevation of serum and hepatic alkaline phosphatase levels. Hard

and Hawkins (1950) Khanolkar (1952). Waenstein and Zak (1946) observed that the liver serves to excrete the alkaline phosphatase. When the parenchymal cells of the liver get damaged, the capacity of it to excrete the alkaline phosphatase is affected and hence retention occurs. The increasing value of alkaline phosphatase has been used for many years in infective hepatitis and post-hepatic jaundice (MacLagan, 1964). Very high values are obtained in liver diseases as in the case of biliary cirrhosis (Sherlock, 1963).

Determination of acid phosphatase is also of primary importance in malignant

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disease of the prostate and the metastatic cancer of the prostate (Herber, 1946; Dickson and Honocks, 1958). Besides this, a small increase in acid phosphatase level has also been reported in patients with carcinoma of breast (King and Jegathesan, 1959).

Material and Methods

This study was carried out in women (age 18-42 years) attending 'Family Planning Centre' of this Medical College. Only 129 non-diabetic, healthy and volunteer women were taken up for the present study and requested to co-operate fully up to the end of the study. They were also appraised of the theme of the present study. Subjects in question had not used any oral contraceptive for the last 1-3 month(s). Before the start of the study, their blood sample was withdrawn for the estimation of alkaline and acid phosphatases in their serum. Afterwards, they were given oral contraceptives of their choice continuously for 6 months and only after the completion of this period, their blood sample was again withdrawn to estimate alkaline and acid phosphatase levels. Constant chase was done in every case so that they might not forget to take the pill. Contraceptives used were Lyndiol 2.5, Eugynon, Ovulen Fe-28, Primovler Ed and dl Norgestrel. Eighty five per cent of the subjects belonged to middle and upper strata of the society, whereas the rest were from low socio-economic status and illiterate as well.

The estimation of phosphatases was done by the determination of liberate phenol with Folin-Ciocalteu reagent (King, 1964). In the end the data were compiled and analysed statistically for evaluation.

Results and Discussion

Serum phosphatases have been established to play a very important role in the diagnosis of several diseases. Aim of the current study has been to see the effect of various oral contraceptives (hormonal preparations) on these enzymes in Indian subjects about which scanty literature is available.

Prior to the intake of Lyndiol 2.5, Eugynon, Ovulen Fe-28, Primovler Ed and dl Norgestrel, the mean values of alkaline phosphatase were observed to be 8.49, 9.05, 9.27, 9.54 and 8.63 K.A. Units respectively (Table I); whereas after 6 months of continuous intake of the above mentioned contraceptives, the mean \pm S.D. values were observed to be 10.55 ± 1.08 , 10.86 ± 1.13 , 10.45 ± 0.88 , 10.48 ± 0.8983 and 9.51 ± 0.9337 K.A. units respectively. If we compare the levels of alkaline phosphatase before and after the intake of pills, then we find that statistically there is difference ($p < 0.01$) in case of all the contraceptives used in this study (Table I). This indicates that the administration of such hormonal preparations elevates the enzymic activity of serum alkaline phosphatase. However, elevation of the enzymic activity has not been found to be highly significant, hitherto, only significant ($p < 0.01$).

As regards the mean level of acid phosphatase prior to the intake of Lyndiol 2.5, Eugynon, Ovulen Fe-28, Primovler Ed and dl Norgestrel, the values observed are 2.76, 3.04, 2.78, 2.74 and 3.82 K.A. units respectively; however, after the intake of these contraceptives for continuous 6 months, the mean \pm S.D. levels of this enzyme have been found to be 2.9 ± 0.15 , 3.32 ± 0.12 , 3.14 ± 0.51 , 3.09 ± 0.27 and 4.1 ± 0.1166 K.A. units respectively (Table II). If we compare the levels of acid phosphatase before and

after the intake of pills, then we find that there is no difference statistically ($p > 0.05$) in case of Lyndiol 2.5 alone, meaning by that this hormonal preparation may be safely recommended with the least side effects on acid phosphatase level; however, there has been found statistically significant difference ($p < 0.01$) in cases of other contraceptives used like Eugynon, Ovulen Fe-28, Primovler Ed and dl Norgestrel (Table II).

This indicates that the administration of Eugynon, Ovulen Fe-28, Primovler Ed and dl Norgestrel is responsible for the elevation of acid phosphatase level, however, again this elevation has not been found to be highly significant statistically (Table II). In case of alkaline and acid phosphatases, although, the values obtained were in elevated state but within the normal accepted range which reveals the fact that usage of such contraceptives does not impair the normal metabolism of liver and in this context our study resembles with those of Swyyer and Little (1965). Fenton (1966) and Eisalo and Jarrinen (1965). It means that these contraceptives may be safely used as regards the question of alkaline and acid phosphatases levels because the release of such enzymes into the blood stream is slightly

affected and that too within normal accepted limits.

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