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VITAMIN E IN THE TREATMENT OF VIRAL HEPATITIS*

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Many reports have been published concerning the relationship between liver diseases and vitamin E; in vitamin E deficiency various kinds of liver diseases become aggravated whereas vitamin E produces a protective effect against toxic substances in the liver[1-4]. Because low plasma vitamin E concentrations have been reported in patients with acute viral hetatitis, we have hypothesized that vitamin E may help to reduce damage to the liver due to viral hepatitis, and we have studied the effects of vitamin E on serum transaminase levels in the course of this disease.

Material and Methods

The subjects of this study were 41 children with acute viral hepatitis. The diagnosis of acute viral hepatitis was based on the history and clinical and laboratory findings (high serum bilirubin, transaminase and alkaline phosphatase levels) of the patients.

The ages of the patients ranged from two to eleven years with a mean of 6.6 years in the study group and 6.2 years in the control group. Eleven patients in the control group and nine patients in the study group were girls. The mean duration of icter before admission was 1.5 days and 1.6 days in the study and control groups, respectively. The mean age, sex ratio, and mean duration of icter before admission to the study of the two groups were similar ($p > 0.05$).

In all patients hepatitis B surface antigen (HB_sAg) was negative; HB_sAg positive patients were excluded from the study. Twenty children were chosen randomly as controls and received no drug. The other 21 children were given 300 mg of vitamin E (Evigen®) Intramuscularly daily for seven days.

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Blood samples were taken to determine the levels of serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT) and alkaline phosphatase before the first dose of vitamin E and on the eighth day (the day after the last dose of vitamin E). SGOT and SGPT levels were determined by the Reitman-Frankel method[5], and the alkaline phosphatase level by the p. nitrophenol method[6].

Results were expressed as mean ± standard error of the mean. Data were compared using Student's *t* test.

Results

Serum transaminase and alkaline phosphatase levels of the patients with viral hepatitis are shown in Table I. In the study group receiving vitamin E, there was no striking depression in the levels of the serum transaminases or alkaline phosphatase on the eighth day compared with those of the control group ($p > 0.05$).

TABLE I

Serum Transaminase and Alkaline Phosphatase Levels in the Study and Control Groups

		Study group (n: 21)	Control group (n: 20)	p
SGPT	1st day	568 ± 75	582 ± 60	> 0.05
	8th day	132 ± 19	146 ± 21	> 0.05
SGOT	1st day	569 ± 83	575 ± 81	> 0.05
	8th day	97 ± 14	135 ± 19	> 0.05
Alkaline phosphatase	1st day	11.8 ± 1.6	12.8 ± 1.3	> 0.05
	8th day	8.1 ± 0.9	9.8 ± 0.8	> 0.05

Discussion

Vitamin E has been shown to act as a powerful antioxidant in membranes; it may also be required as a structural component in membranes containing polyunsaturated fatty acids and could act as a catalytic or regulatory agent in metabolism[7-9]. Various drugs have been used in the treatment of or for modifying the prognosis

of viral hepatitis, including levamisole and thiazolidine. We have chosen to focus our studies on the protective role of vitamin E against hepatocellular damage due to viral hepatitis.

We used vitamin E to reduce liver damage during acute viral hepatitis, based on the findings of Yoshikawa and Kondo[3].

According to the results of their study, serum levels of vitamin E are significantly depressed during acute hepatitis, fulminant hepatitis, and alcoholic hepatitis. It was also found that there is no correlation between the serum level of vitamin E and liver function tests including SGOT, SGPT and alkaline phosphatase, but that there is a significant correlation between the serum levels of vitamin E and β lipoprotein and cholesterol. It was suggested that the diminished serum vitamin E in patients with liver disease is ascribable to the depression in the serum level of β lipoprotein, a vitamin E carrier, since the liver is the major supply source of endogenous β lipoprotein[3,12,13]. In this study, we could not determine the β lipoprotein levels. Congenital biliary atresia and other disorders of the hepatobiliary system are associated with severe vitamin E deficiency and are often refractory to orally administered water-miscible vitamin E preparations[14]. Patients with these disorders have the greatest impairment in vitamin E absorption, since the conditions are associated with defective bile-salt production or secretion, which is essential for adequate vitamin E absorption[15,16]. For this reason we preferred to use parenteral vitamin E in this study.

The Food and Nutrition Board of the National Academy of Sciences, USA, recommended daily dietary allowance of α-tocopherol equivalents is 8 mg for women and 10 mg for men[17]. In therapeutic terms, approximately a ten-fold intake of α-tocopherol is required to double the plasma concentration, with a similar or smaller increase occurring in the tissues[18]. There is no evidence that plasma concentration elevated by a factor of more than two times the normal concentration is any less effective than higher elevations in producing a measurable response[2]. In most adults with normal intestinal absorption this magnitude of blood increase should be attained in two to three weeks with oral doses of 100 or 200 mg three times daily[2]. We used 300 mg per day of vitamin intramuscularly for one week in this study, but we have found no effect on the transaminase and alkaline phosphatase levels of the viral hepatitis patients.

Summary

Vitamin E therapy was compared with no treatment in a randomized, prospective trial of treatment of viral hepatitis in children. Patients received either vitamin E (n: 21) 300 mg/day intramuscularly every 24 hours, for seven days, or no treatment (n: 20). The mean age, sex ratio, and mean duration of illness before admission to the study of the two groups were similar. No difference was noted in

the mean serum transaminases or alkaline phosphatase levels either on the first or the eighth day in the treatment group compared to the group without treatment.

REFERENCES

1. *Biology of Vitamin E.* (Ciba Foundation Symposium No. 101). London: Pitman, 1983.
2. Bieri JG, Corash L, Hubbard VS. Medical uses of vitamin E. *N Engl J Med* 308:1063, 1983.
3. Yoshikawa T. Kondo M. Role of vitamin E in prevention of hepatocellular damage, clinical and experimental approach. *Ann NY Acad Sci* 393:198, 1982.
4. Skaare JU, Nafstad I. Interaction of vitamin E and selenium with the hepatotoxic agent dimethylnitrosamine. *Acta Pharmacol Toxicol* 43:119, 1978.
5. Bauer JD, Ackermann PG, Toro G. *Clinical Laboratory Methods.* St Louis: CV Mosby Co, 1974, pp 493-495.
6. Sigma Technical Bulletin No. 104, 1979.
7. In Machlin LJ (ed). *Vitamin E* (Basic & Clinical Nutrition Series Vol 1). New York: Marcel Dekker, 1980, pp 289-317.
8. Diplock AT, Lucy JA. The biochemical modes of action of vitamin E and selenium: a hypothesis. *FEBS Lett* 29:205, 1973.
9. Schwarz K. The cellular mechanisms of vitamin E action: direct and indirect effects of tocopherol on mitochondrial respiration. *Ann NY Acad Sci* 203:45, 1972.
10. Özsoylu Ş, Sargın C, Koçak N. Levamisole treatment in acute hepatitis. *Clin Pediatr* 20:497, 1981.
11. Özsoylu Ş, Koçak N, Tiftikçi P. Akut hepatitte Heparogen'in gereksizliği. Pediatrik Hepatoloji Kongresi, 2-5 Temmuz 1980, İstanbul, 1981, s 181.
12. Peake IR, Windmueller HG, Bieri JG. A comparison of the intestinal absorption, lymph and plasma transport, and tissue uptake of α- and γ-tocopherols in the rat. *Biochim Biophys Acta* 260:679, 1972.
13. Burk RF, Seely RJ. Distribution of α-tocopherol in human plasma lipoproteins. *US Army Med Res Nutr Lab Rep* 335:1, 1973.
14. Bieri JG, Farrell PM. Vitamin E. *Vitamin Hormone Adv* 34:31, 1976.
15. Farrell PM, Bieri JG, Fratantoni JF, et al. The occurrence and effects of human vitamin E deficiency. A study in patients with cystic fibrosis. *J Clin Invest* 60:233, 1977.
16. Göransson G, Norden A, Akesson B. Low plasma tocopherol levels in patients with gastrointestinal disorders. *Scand J Gastroenterol* 8:21, 1973.
17. Food and Nutrition Board. *Recommended Dietary Allowances* (9th ed). Washington DC: Natl Acad Pr, 1980, pp 66-68.
18. Bieri JG, Evarts RP. Tocopherols and polyunsaturated fatty acids in human tissues. *Am J Clin Nutr* 28:717, 1975.