Effect of Vitamin C on Serum Cholesterol in Patients with Hypercholesterolemia and Arteriosclerosis

By Paul Samuel, M.D., and Olya B. Shalchi, M.A.

Russian authors reported 1 that the administration of high doses of vitamin C reduced serum cholesterol levels in patients with hypercholesterolemia, after observing that vitamin C reduced the hypercholesterolemia and atherosclerosis of cholesterol-fed rabbits. 2 Anderson, Grande, and Keys 2 in normocholesterolemic patients failed to observe significant reduction of serum cholesterol levels at a Minnesota State Hospital, following daily oral doses of 1 Gm. of vitamin C. They noted however, 3 that this was not in contradiction to previous Russian results, since the Minnesota patients had average control cholesterol levels between 160 and 200 mg. per cent, whereas Sedov reported 4 decreases following only initial levels of 200 mg. per cent or higher. In the present study the effect of vitamin C in patients with hypercholesterolemia was investigated.

Material and Methods

Fourteen patients were studied in 18 experimental periods of 5 to 16 weeks. Eight patients were male and 6 were female with an age range of 9 to 56 years. The food intake of the patients was uncontrolled, but they were instructed to adhere to their customary diets. Patients were weighed weekly and blood counts, tests of urine, blood urea nitrogen, blood sugar, serum bilirubin, serum transaminase, and cephalin flocculation were carried out periodically.

Total serum cholesterol concentrations were determined once a week in the fasting state by the method of Abell et al. 5 Control serum cholesterol levels, prior to the administration of the drug, were observed for periods of 6 weeks or longer. Average control serum cholesterol concentrations were 300 mg. per cent or higher in each patient. Serum cholesterol concentrations were determined in 10 patients for 5 to 20 weeks after the experimental medication was discontinued. Vitamin C was given orally in two divided doses at daily dose levels of 1 Gm., 2 Gm., 4 Gm., and 6 Gm.

Results

The results of oral administration of vitamin C are included in table 1. There was no noticeable difference in serum cholesterol concentrations during the administration of different doses of the drug as compared to control periods, except in one patient (H. F., 46 M.). In this patient, following the administration of vitamin C, the average serum cholesterol level was reduced from 436 mg. per cent to 323 mg. per cent, and remained at this lower level for 20 weeks after vitamin C was discontinued. The weight of all the patients remained within the limit of 2 lbs. variation. No side effects were noted during the administration of the drug.

Discussion

The reasons for the obvious discrepancy between reported Russian studies and the present results are not apparent. Although oral administration of vitamin C is advised by Russian authors, 3 the intravenous use of the drug is emphasized by many. 4 To verify the possible difference by this route of administration, two patients with control serum cholesterol levels of 237 mg. per cent and 323 mg. per cent were given 500 mg. of vitamin C intravenously daily for 2 weeks and 4 weeks, respectively. There was no noticeable difference in serum cholesterol concentrations following the intravenous use of the drug in these subjects.

Although in the present study the diet was uncontrolled, it is reasonable to assume that the participants consumed an "average American diet," containing amounts of vitamin C sufficient by far to cover daily requirements. Although data on daily vitamin C contents of Russian diets are not available, it is highly questionable whether a shortage of this substance exists, and, if so, whether it can explain...
the present discrepancy. Willis reported that in the guinea pig hypercholesterolemia and atherosclerosis were promoted by vitamin C deficiency. Simonson and Keys quoted Tolmachev, whose paper is not available to us, stating that scorbutic patients have elevated serum cholesterol levels. Since in the Western literature, to our best knowledge, increased frequency of hypercholesterolemia and atherosclerosis has not been reported in patients with vitamin C deficiency, this aspect of the discussion remains highly speculative.

**Summary**

The daily oral administration of 1 Gm., 2 Gm., 4 Gm., and 6 Gm. of vitamin C for 5 to 16 weeks to 14 patients with hypercholesterolemia (300 mg. per cent or higher) and arteriosclerosis, failed to alter the concentration of serum cholesterol in all but one patient. This finding is in contradiction to previously reported Russian studies.

**References**


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PAUL SAMUEL and OLYA B. SHALCHI

Circulation. 1964;29:24-25
doi: 10.1161/01.CIR.29.1.24

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