Eye Pressure Lowering Effect of Vitamin C

Herschell H. Boyd, M.D.[1]

Purpose

To document the pressure before the use of vitamin C and after the daily intake of maximum amounts of vitamin C, three times a day.

Methods

Thirty patients (16 men and 14 women) were advised to take three divided doses of vitamin C in capsule form each day until loose stools occured and then back down slightly from this amount (bowel dosage) for a daily intake. Average daily intake for all patients was 10 grams per day.

Results

The greatest lowering of pressure was 13 mm as measured with a Goldmann tonometer. The least lowering of pressure was 1 mm. The average for 30 patients was 10 mm. Thirty patients were controlled only with vitamin C. Twenty patients were forced to use eye drops to lower the pressure below 20 mm of mercury as they refused to take vitamin C.

Conclusion

In this series of 30 patients there was no occasion in which the pressure was not lowered with vitamin C. All drugs for glaucoma are seriously toxic, and vitamin C has no toxicity yet known. The patients experienced many other good side effects from vitamin C such as clearing of sinusitis, allergy symptoms, arthritis improvement, cholesterol lowering, laxative effect, diuretic effect for heart disease patients, and other improvements associated with vitamin C intake of "several grams per day" level. Ophthalmologists may awaken to the marvels of vitamin C in treating glaucoma!

Introduction

Vitamin C has been used since the transformation of glucose, $C_6H_{12}O_6$, into vitamin C, $C_6H_8O_6$, in the early 1930s. Its use in lowering the pressure in glaucoma dates back to 1962 as reported in Experimental Eye Research.[1] Since then there have been many references in the foreign literature, but in the U.S. it has escaped the attention of the ophthalmologists. This study consists of fifty consecutive patients who presented with intraocular pressure greater than 20 mm of mercury as measured with the Goldmann applanation tonometer from August 1993 through March 1995. The highest pressure was 36 mm of mercury in the study. Out of 50 patients, 20 patients refused to take vitamin C and eye drops were used to lower the pressure in the standard manner.

Age Distribution

30-39	40-49	50-59	60-80
1	6	5	18

Visual Fields

No defects were found in any of the 50 patients.

Gonioscopy

All 50 patients had open angle, and no angles were particularly closed.

Vitamin C Taken

The most vitamin C taken was 35 grams per day divided in three doses at mealtime. This lady had chronic sinusitis and was quite pleased to be relieved of this problem after several years of unsuccessful drug therapy. The least amount taken was one gram per day in two patients. The average for the 30 patients was 10 grams per day. It was suggested that patients take "bowel dosage" and then back down, but this advice is almost always ignored by patients as they feel the idea is unreasonable and generally have this reinforced by friends and relatives who give statements of shock and dismay. But 20 out of 30 patients did take ten or more grams per day so perhaps we should be pleased with this result.

1. Eastview Professional Building, 1370 - 116th Avenue N.E., Suite 212, Bellevue WA 98004-4679.

Average Drop in Eye Pressure

Right Eye:	4.8 mm
Left Eye:	6.3 mm
Both Eyes:	5.6 mm

It is an interesting observation that individuals who take vitamin C regularly and have their intraocular pressure taken on a routine basis for their eye exam have pressures in the range of 10-13 mm of mercury commonly. It has been my experience that I have yet to find the first patient with a pressure over 20 mm who comes into the office and admits to taking any amount of vitamin C daily. It also seems to be generally true that those people who do have pressure elevated for the first time are those treating themselves with various toxic drugs, smoking, eating processed foods, and living a life style saturated with free radicals. I assume the little amount of vitamin C they eat in a day is not enough to keep the eye pressure normal. Another interesting observation is that patients who already have taken medication for years are generally unable to stop the medication and reverse the high pressure with vitamin C. This group seems to fit the picture of the diabetic group who finally are placed upon insulin by needle and cannot later usually get off the needle, whereas, before that the diabetes may be reversed.

Greatest Drop in Pressure

One patient had the pressure decrease in one eye by 13 mm. Seven eyes dropped by 10 to 13 mm of mercury.

Side Effects

No side effects were encountered as vitamin C apparently has none. All drugs we use in glaucoma have multiple side effects including death.

Discussion

It is said that the aqueous fluid in the eye has 25 times the amount of vitamin C as in the blood. This may explain why the pressure decreased with the increased intake of vitamin C with an opening of the many channels called Schlemm's canal. Any swelling in the area would be removed with the antihistamine effect of vitamin C. Further research could explain the possibility.

Another explanation of the lowering effect of vitamin C could be the ability of vitamin C to increase the T4 cells. Maybe debris is removed from the Schlemm's canal by T4 cells so iris pigment and inflammatory cells are unable to plug the outflow of the eye. Further studies could answer this question.

In 1969, Dr. Erich Linner explained that the fall in pressure in ocular hypertension was due to a reduction in the rate of aqueous flow and possibly by "bulk drainage by way of posterior uveo-scleral routes".[6]

Since the patients in this study would not take "bowel dosage" of vitamin C, or that amount needed to loosen stools and then back down in dosage, the effects of vitamin C could be further improved from those obtained in this study. The reparative effects of vitamin C are certainly demonstrated and in my experience can be seen as well in other eye diseases.

Since vitamin C makes collagen needed to strengthen the blood vessel walls, diabetics quit bleeding in the retina and of course elsewhere in the body. This reduces the need for laser treatment to the retina and in many cases in the development of late glaucoma. In diabetes with an electron microscope the collagenous reticulum is absent at the site of retinal microaneurism. These develop in long standing diabetes and indicate a derangement in some slow metabolic process.[4] The obvious savings financially for various payers is staggering. We may see the day when these people are told to take vitamin C by the insurers as they are totally cost oriented and are unemotional in their thinking.

It is generally agreed that macular degeneration occurs in 25% of the U.S. population over 55. This group can be helped enormously with antioxidants to improve what macula is left and protect the macular from worsening. People with glaucoma also become a major problem in management. In many cases my experience is that the vision may improve dramatically with vitamin C and other antioxidants. Here, too, it seems logical to effect life style changes to eliminate free radicals.

Cataract removal represents the largest surgical expense in Medicare, and there are many patients in my practice who improve several lines of vision on the Snellen eye chart. One dramatic example was a lady with 20/40 who achieved 20/20 in eight weeks

with 12 grams of vitamin C each day. She was a smoker in her early fifties, and she has continued to smoke with good reason to cease.

Glaucoma accompanies the cataract patients so a daily intake of vitamin C could save the country literally in the billions of dollars. This would admittedly be detrimental to the financial health of ophthalmologists, but of course this is not the issue.

Ascorbic acid has been reported to be of therapeutic benefit in numerous pathological conditions, and researchers vary in their estimates of the daily requirement needed by man. Animals which are capable of synthesizing their own ascorbic acid usually have tissue levels approaching saturation.

Therefore in man it would seem desirable to ensure the intake of ascorbic C is sufficiently high for tissue saturation.[5] This paper shows that in glaucoma, tissue saturation is needed to lower intraocular pressure. In a modern world of processed foods and excess free radicals, it is surprising that we have a relatively small group of glaucoma patients.

Ascorbic acid concentrations have been shown to change in the body under various conditions of stress such as trauma, surgery, exposure to cold, after the administration of cortisone or ACTH and during infection.[5] In ophthalmology we need to give vitamin C supplements for any of the glaucoma surgeries and for that matter with all our surgeries.

The lens in the eye is necessary for maintaining the normal level of ascorbic acid within the aqueous humor, vitreous body and the cornea. The diminution of the intraocular ascorbic acid content does not take place when traces of lens fibers are present in the eye.[3] This could be an interesting study for glaucoma and cataract removal.

The structure of the vitreous body depends upon both the integrity of the mesh work of collagen fibrils and on the maintenance of the polymeric state of the mucopolysaccharide hyaluronic acid. With a deficiency in vitamin C, abnormal mucopolysaccharide formation occurs. Disorganization of the vitreous body with the formation of vitreous bands is often associated with retinal detachment.[5] Here also the association of glaucoma with these people would be an interesting observation.

Michele Virno, M.D. used intravenous vitamin C of 0.4 to 1.0 gram per 1 kg body weight to induce a "marked ocular hypotony in approximately 60 to 90 minutes". These good results instigated the idea to use vitamin C by mouth to lower intraocular pressure.[3]

Virno found in 1967 that 0.5 g per 1 kg of body weight of vitamin C in all patients with glaucoma a reduction of intraocular pressure was obtained. The C was given 3 to 4 times per day, and in some patients who could not be controlled with diamox and 2% pilocarpine[1]it was possible to obtain almost normal pressures.

Erich Linner, M.D. gave only 0.5 gram vitamin C twice a day for 4 to 6 weeks and only decreased the pressure by 2 to 3 mm Hg after two days of use. As Michele Virno, M.D. concluded, this was not enough, but the idea was good in 1964.[2]

Irwin Stone, Ph.D. in his book of 1972 made the remark "of all the disorders afflicting man, blindness causes the most widespread disability. Yet in spite of significant advances in eye research, the incidence of blindness is increasing. Megascorbic therapy might one day help to reverse this trend."

Doctor Stone reports that from 1965 to 1969 there were numerous papers reported on the prompt reduction of the intraocular pressure with two American journals in 1966 and 1967 reporting on the good results from Italian workers. There have been no American authors reporting on this exacting research or treatment of their patients.[7]

Doctor Stone made the very accurate observation that "research should be started immediately on population groups near forty and older to determine the long-term effect of the inhibition of glaucoma by means of the continued daily intake of about 3 to 5 grams of ascorbic acid. This will help to determine if a simple and harmless ascorbic acid regimen can be worked out which will prevent blindness in our senior citizens." Cataracts and macular degeneration that are more common than glaucoma would have immense benefit.

It is the experience of this author that private patients do not present with macular degeneration, cataracts to remove, or glaucoma who have taken vitamins for years with ascorbic acid. One has to ask why it is that physicians in ophtahlmology don't tell

every patient to take the antioxidants with tissue saturation levels of vitamin C? The answer may be:

1. It is not taught in medical school.
2. Friends and associates don't use it.
3. Medical literature does not have it currently.
4. Standard of care does not include this treatment.
5. Fear of being out of "main stream" medicine.
6. Fear of a lawyer charging that the "standard of care was not met".
7. Double blind studies have not been done recently.
8. No office has a drug salesman selling vitamin C as there is not profit.
9. Many patients cannot accept a treatment that does not involve drugs, as they always get from all other doctors.
10. Fear of losing the confidence of a patient, his friends and his family.
11. Insurance payors will not reimburse the patient for treatment not on their toxic drug list.
12. In glaucoma with even the best of drug therapy an adverse result may occur with a resulting lawsuit and no help from the experts in glaucoma called upon to testify.

Why don't Medical Schools do research on vitamin C? As a past member of the Advisory Board in the medical school at Vanderbilt in Nashville, Tenessee, this same question was asked of the Vice Chancellor. The response was that at Vanderbilt Medical School the salaries of the workers there are paid by research grants from drug companies and from the National Institute of Health in Washington, D.C. These two areas don't fund vitamin C. If a source of private money could be found, the medical school would be pleased to do studies as desired. A private foundation may be the salvation of the glaucoma patients, and, of course, the many other areas we need to treat.

Conclusion

1. Vitamin C does lower the intraocular pressure in all patients with elevated pressure.
2. Toxicity is non-existent.
3. Side effects of vitamin C were all positive; a) clearing of chronic sinusitis of many years, b) improvement of arthritis symptoms, c) lowering of cholesterol, d) improvement of visual acuity in macular degeneration.
4. Twenty of 50 consecutive patients refused to take the vitamin C as instructed and preferred to be treated with eye drops.
5. The largest drop in pressure was 13 mm Hg.
6. The average drop was 5.6 mm Hg.
7. The average amount of vitamin C taken daily was 10 grams in three divided doses at meal time.
8. "Bowel dosage" was resisted by patients.
9. All other vitamins were included with vitamin C.

References

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