

Visual Field Evidence of Macular Degeneration Reversal Using a Combination of EDTA Chelation and Multiple Vitamin and Trace Mineral Therapy

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ABSTRACT: A 59-year-old white, partially disabled female patient presented with a history of visual field defects and a diagnosis of Map-Dot-Fingerprint dystrophy. Examination further revealed retinal changes associated with moderate macular degeneration. The patient was treated with a combination of intravenous chelation therapy, using a series of 3 gram infusions of ethylene diamine tetracetic acid (EDTA) and multivitamins and trace minerals. After treatment, the patient's visual field defect improved. Her vision was restored to 20/25 in the right eye and 20/20 in the left eye and the quality of her central macular vision was greatly enhanced as measured by autoperimetry. The patient remains symptom free with restored vision one year later.

Introduction

This continues a series of papers analyzing the effects of intravenous ethylene diamine tetracetic acid (EDTA). In previous papers the main focus has been on the improvement in circulation in the carotid arte-

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ries (1-3), the lower extremities (4) and in functional cardiac improvement as measured through sub-maximal treadmill testing (5,6) and coronary angiography (7). In treating the patients that were subjected to these studies, it was noted that those with vascular disease and concomitant visual field deficits had significant subjective visual improvement, especially those with macular degeneration.

Map-Dot-Fingerprint dystrophy is also known as epithelial basement membrane dystrophy or Cogan's dystrophy. This entity is probably a dominantly inherited trait which involves the corneal epithelium and its basement membrane. It often causes recurrent corneal erosions and intraepithelial microcysts with sub-epithelial ridges. With a biomicroscope, these defects resemble a map, or fingerprint, thus the name which relates to its physical appearance (8,9).

Senile macular degeneration (SMD), now called age-related macular degeneration (AMD) was first described as a visual disease by Haab in 1885 (10). Although there is some disagreement as to what constitutes AMD, certain common phenomena seem to be present in the majority of patients who suffer from this visual impairment. The Framingham eye study (11) illustrated that it is a condition related to age. The prevalence rate is: 1.6% for those in the age group of 52 to 64 years; 11.0% for those in the age group of 65-74 years; and 27.0% in those patients 75 years of age and older. Since the elderly are the fastest growing segment of our society, health care professionals will be confronted with more and more of these patients. At present, it is the leading cause of severe visual loss for people over 65 years old. It is conventionally considered to be irreversible since no treatment is known.

Other major causes of visual loss in patients over 65 years, namely cataract, diabetic retinopathy, and glaucoma, all have some form of treatment which has at least some success in sparing visual acuity.

To our knowledge, this represents the first study showing objective data demonstrating the improvement in macular degeneration and is the focus of this article.

Case Report

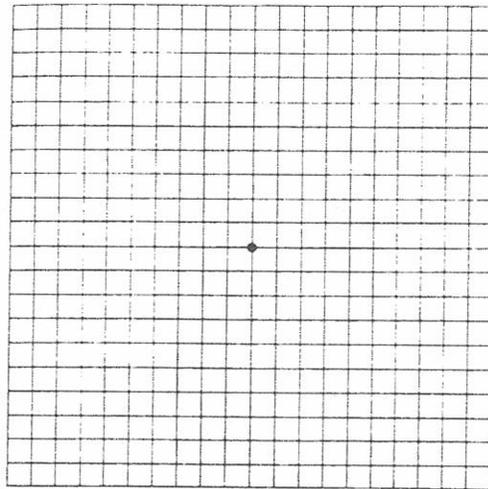
A 59-year-old white female patient presented to our clinic with a history of Map-Dot dystrophy. She had previously been diagnosed with this condition by her ophthalmologist in 1992 and was told that there was no effective therapy for this disorder. When first seen at this clinic in July of 1993, she was

subjected to a series of diagnostic tests on her vascular system. In addition, she was referred to Dr. Robert T. Samuel for consultation and autoperimetry studies.

The Dicon TKS 4000 Auto Perimeter (Visamed) was utilized for perimetry studies performed initially on July 23, 1993 with a follow-up on November 5, 1993. After the initial examination, the patient received a course of 30, 3 gram infusions of intravenous EDTA, together with multivitamins and trace mineral supplementation according to the protocol of the American Academy for Advancement in Medicine (12).

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FIGURE 1

Amsler grid used as a quick screen for macular degenerative disorders.

She received no concomitant therapy other than that provided by this institution, and excellent results were obtained. Currently her visual problems are better. She has noted improvement in her visual acuity, peripheral vision and central macular vision. Studies of her macula were obtained both before and after our treatment with direct ophthalmoscopy and auto perimetry (Dicon TKS 4000). Amsler grids (Figure 1) presented to the patient before and after treatment indicated a reduction in visual disorder after treatment. An Amsler grid is a photograph of a narrow lined grid at which the patient stares. If there are macular disorders present, the patient will see wavy lines, whereas if there is no macular disease, the lines will appear straight and perpendicular to each other.

Results

Figures 2a and 2b represent the details of the pre- and post-treatment retinal studies done on this patient. The test performed on July 23, 1993 was a full threshold 80/30 and is represented as Figure 2a. The test performed on November 5, 1993 was the superthreshold 120/60 and is depicted in Figure 2b.

The peaks and depressions in Figures 2a and 2b illustrate the visual sensitivity to light stimuli. The exact center on these visual fields indicates the fovea centralis. This portion of the figure should exhibit the highest peak illustrating the area of vision with the greatest sensitivity to light. This is cone vision. As the topography rises and falls farther to the periphery from the center peak, these figures indicate greater or lesser sensitivity to light. The deep depression lateral to each central peak coincides with the optic nerve or physiological blind spot.

These two separate tests are not exactly the same because the instrument was upgraded by the Visamed company in the interim between testing. Even though not identical, they point to a significant improvement in the visual fields. This patient represents the first in a series of patients tested for improvement in visual fields before and after chelation therapy. Refinements have been made in subsequent studies which will undoubtedly produce more uniform findings. The patient was subjectively elated by her newfound vision.

Table 1 depicts the patient's visual acuity before and after therapy.

TABLE 1
Visual Acuity Studies

Eye	Pre-Therapy Visual Acuity	Post Therapy Visual Acuity
Right	20/60	20/25
Left	20/30	20/20

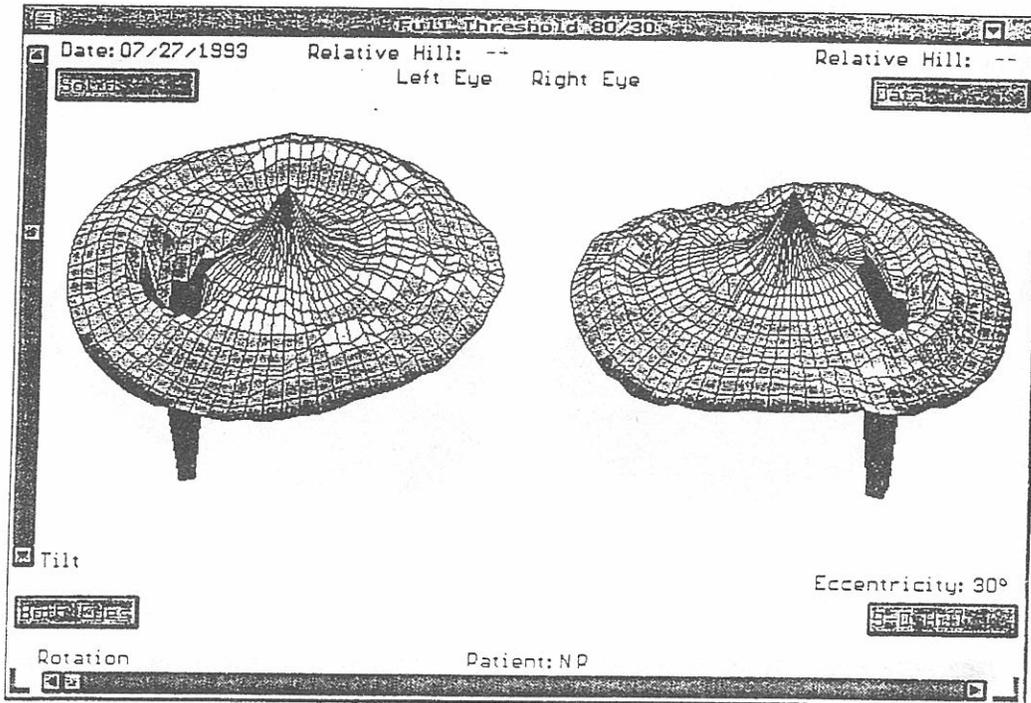


FIGURE 2a

Pre-treatment auto-perimetry studies on patient, NP.

Peripheral vascular studies were negative. The carotid arteries showed mild plaque development at the bifurcation bilaterally.

Discussion

These data indicate that chelation, in combination with multivitamin and trace mineral therapy, had a dramatic effect upon the patient's visual acuity. From past clinical experience with nutritional supplementation in the treatment of macular degeneration, this result was much faster and there was a more significant improvement in the patient's visual acuity than with nutritional therapy alone.

Although it is not possible in this one case report to separate the effectiveness of nutritional therapy from that of chelation, the fact remains that highly significant clinical improvement occurred in a condition which is traditionally considered to be intractable. Our experience (2,3) is that chelation has a marked beneficial effect on small

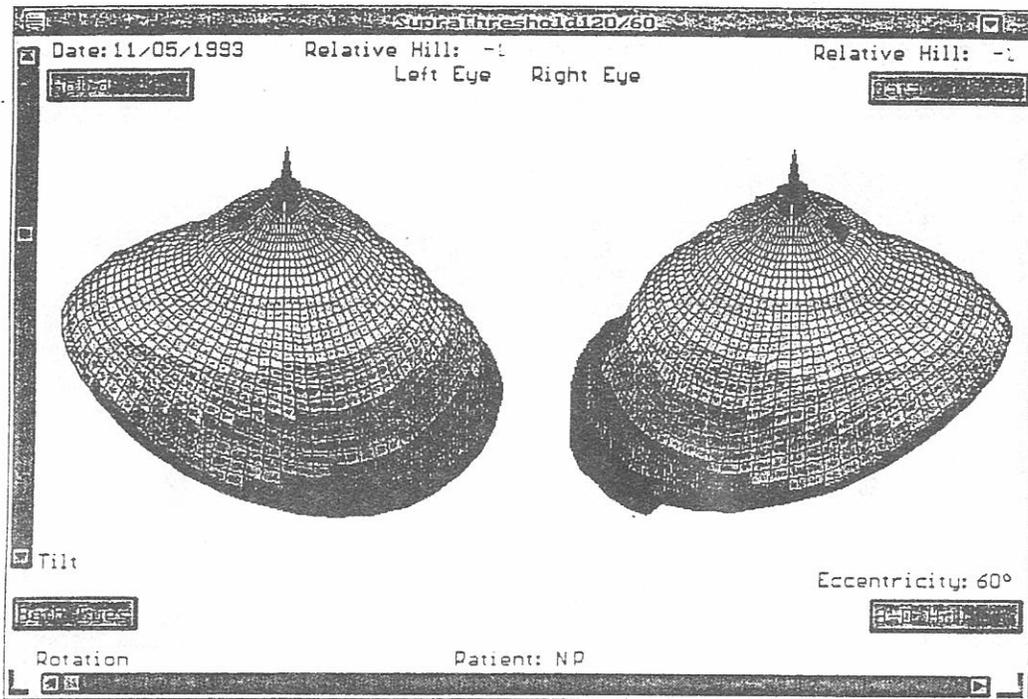


FIGURE 2b

Post-treatment auto-perimetry studies on patient, NP.

blood vessels in the carotid distribution. It is therefore postulated that it has a similar effect on the terminal arterioles in the retina, thus enhancing oxidative perfusion in the tissues. It is to be noted that the vascular studies performed on this patient did not show evidence of peripheral vascular disease. The carotid arteries showed some mild plaque development at the bifurcation bilaterally (15-30% occlusion) but obviously the study did not visualize the arterioles in the retina. We are left with some degree of speculation which can only be confirmed by further study of the effects of chelation therapy in the disease.

To understand AMD, one must first consider the physiology of the retina, especially the macula (13), the central area of the retina inside the vascular arcade which has at least two areas of nuclei in the ganglion cell layer. Inside the macula is the fovea, a zone of slightly greater pigmentation defined by the rim of the concave slope and approximately 1.5 mm in size. Under this area is the thicker choroid or vascular layer, and at its center is the foveola (350 μ m), which is free

of cells except for the outer segments, containing red and green cones. The fovea contains the highest concentration of "macular yellow." The foveal light reflex (UMBO) is produced by a small depression in the center of the foveola. The macula is closely associated with the retinal pigment epithelium, Bruch's membrane and the underlying choriocapillaries from which the macula receives its nutrition (14,15).

The normal aging process begins to produce changes in the layers beneath the macula that results in AMD. It is usually bilateral in nature and makes its first appearance as sharply defined drusens which are thickened patches of hyalinization from Bruch's membrane. As these drusens spread, fine granular deposits form, thus causing the clinically visible appearance of disturbances of the pigment and increased visibility of the choroidal vessels.

Bruch's membrane continues to thicken and impinges more on the choriocapillaries. At this point, the drusens have less distinct margins and seem to grow together. Pigment clumping becomes more evident, causing greater distortion and atrophy of the photoreceptors. The blood vessels in the choroid are narrowed, thus reducing the supply of both oxygen and nutrients to the macula. Neovascularization follows, forming a fragile vascular network under the macula. These changes lead to very distinct areas of depigmentation referred to as geographic atrophy. Vision in this type of AMD is called "dry" or atrophic AMD and may survive in this state for a long period of time (16).

The second type of AMD is called "wet" or exudative AMD. This type causes detachment of the retinal pigment epithelium and hemorrhages from the fragile sub-macular neovascular net. This causes rapid, severe visual loss. According to the Framingham eye study, 80% are dry or atrophic AMD, 8% wet or exudative AMD and 12% are questionable (11). Certainly any treatment that provides improved circulation to the choroid has a hope of delaying the onset of AMD.

Macular degeneration spares no race. Some studies have indicated that it is more prevalent in whites than blacks (17), although other studies have pointed to an equal distribution between races (18). Orthodox medicine has very little to offer. The nutritional approach has, in recent years, been considered a viable alternative as the cones of the eye contain disproportionately high levels of zinc when compared to the rest of the body. It has been demonstrated that zinc therapy, using doses of ionic zinc in the range of 50-100 mg per day has a beneficial effect on the disease (19). Although zinc supplementation was used in this patient, we do not believe that the effects on the

macula could be attributed wholly to zinc supplementation. As a matter of fact, it has been our experience and that of others (20,21) that zinc excretion increases 6,170% after EDTA chelation therapy, thus creating a transient zinc deficiency which must be replaced by supplementation. We believe that the clinical improvement in this patient was directly related to chelation therapy since zinc supplementation is unlikely to create a positive balance with the degree of loss due to EDTA.

It has been reported that dietary supplementation of anti-oxidants, including vitamin A, beta-carotene, vitamin E and vitamin C as well as zinc, copper, selenium, manganese and riboflavin may help AMD (22). It is a known fact that the elderly are often deficient in these substances. The therapy is tolerated well and has low risk.

Since the initiating factor is not well defined, it is postulated that if the vascular integrity of the choriocapillaries was maintained, then this age-related sequence of events that leads to macular degeneration might be prevented. Any treatment that would restore the circulation in the very distal branches of the macula, thus allowing more nutrient delivery to it, would be logical. The evidence is that chelation has this effect.

It has been previously established that infusions of EDTA combined with a multi- and trace vitamin mineral therapy could reverse atherosclerotic occlusive disorders in the larger, more proximal trunk branches of the ophthalmic artery, namely the common and internal carotid arteries (2), but its effect on the terminal branches of these arteries has never previously been demonstrated.

To our knowledge, this is the first article in which autoperimetry demonstrated improvement in AMD after the combination of EDTA chelation and multivitamin, trace mineral therapy. The patient was relatively free of visual problems at its conclusion. She has been followed for 1 year and has suffered no relapse in her visual acuity at the time of this writing.

Conclusion

Macular degeneration is one of the leading causes of visual loss in the elderly in this country. Annually, it is estimated to cause serious visual loss in approximately 30% of people over the age of 75. While not associated with a high mortality, it can cause great disability and morbidity by robbing the elderly of their vision when it is so impor-

tant to the quality of life in retirement. With today's escalating, if not astronomical, health costs, it is reassuring that there exists a therapy that has a multi-fold potential. This technique is a relatively low-cost therapy for this and other degenerative visual disorders. It may offer a solution to the chronic problem of visual loss in the elderly.

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