Treatment of Age Related Macular Degeneration (AMD) - A Trial with Dietary Supplement of Vitamins and Minerals

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ABSTRACT

Purpose: *To find percentage of AMD and it's types among the patients visiting Eye Department of Sir Ganga Ram Hospital, Lahore and to asses the efficacy and long term implications of dietary supplement in terms of vision in AMD patients.*

Method: *This prospective study was started in December 2000 and up till this date 157 patients have been treated with combination of Vit-C 500 mg ,Vit-E 400 i.u., Beta Carotein 15mg, Zinc Oxide 80mg, and Cupric Oxide 2 mg. It is an on going study which will last for ten years to note long term effects and defects. Both male and female patients between 41 and 89 years of age ,with either wet or dry form of AMD were included. Out of 157 cases 114 had Exudative (Wet) form of AMD-Group I . Forty three cases had Non-exudative type of AMD- Group II. FFA was done to evaluate and document the type, nature and location of the disease. Dietary supplement therapy was instituted and the patients were followed every 4 weeks for six months. Therapy was abandoned after 4 months and FFA was repeated after 6 months. Later follow-up of such qualified patients was done every 4 months.*

Result: *Improvement in the disease and vision was better in Group-I. Ninety Three percent (93%) patients either had visual improvements by two lines with Snellen's Acuity (27%) or vision did not deteriorate (66%). But in Group II , 83% showed deterioration of vision. Only 2.4 % had visual improvement by one Snellen's line, and rest 14.6% had stable vision.*

Conclusion: *The modalities to treat AMD are Laser, Radiotherapy, PDT, Sub macular Surgery, Translocation of Macula and many more. Their success rate is variable. It has been reported in literature that vision may further deteriorate from complications, which they may produce in some of the eyes. The dietary supplement therapy is a safe and useful method of treating AMD and visual results are quite promising.*

INTRODUCTION

Age Related Macular Degeneration (AMD) is a serious blinding disease, which usually affects the people after 40 years of age. In western world it is one of the leading causes of blindness[1]. In Pakistan no statistical data is available up till now. We have started a study at Sir Ganga Ram Hospital Lahore, to find out the percentage of AMD and its types in our population. Simultaneously a trial has also been started to treat AMD with dietary supplements of Vitamins and Minerals.

The disease starts at molecular level. The enzymes concerned with phagocytosis of debris of outer segment of photorecepter cell, become deficient. The debris is collected at subpigment epithelial level in the form of drosen (Fig.1). The drosen may also be formed by focal thickening of Bruch's membrane. The nutrition of pigment epithelial cell and photorecepter cell gets disturbed and degeneration sets in. Sometime new vessels from choriocapilaris penetrate through the retinal pigment epithelail cells and spread between this layer and photorecepter cells. These new vessels may grow further to lie within the substance of sensory retina (Choridal Neovascular

Membrane-CNVM). This form of AMD, the neovascular or exudative (Fig.2) is commoner than dry type and if left untreated provokes fibrosis and scarring of macular area (Fig.3). Choridal Neovascular Membrane-CNVM may be extrafoveal, Juxtafoveal or foveal. According to its behaviour it may be called classic CNV or occult CNV.

Only about 30 years ago AMD was thought to be an incurable disease. With the advent of Argon Laser, people used this modality to treat extrafoveal AMD of neovascular type. The success rate, although was variable, however it was a major breakthrough[2]. Radiotherapy was used but the results were not encouraging. Transpupillary thermotherapy was also tried with poor results. Surgical removal of Choroidal neovascular membrane from underneath the macula has also been tried. In recent past Photodynamic therapy (PDT) has also been included in the list. Juxtascleral injection of Anecortave acetate 15mg is also under trial these days in USA. All the four mentioned methods do cause some damage to the retina. Therefore research on dietary supplement therapy was started; it may come out to be helpful or else shall not cause retinal damage.

MATERIALS AND METHODS

Study on AMD was started in Department of Ophthalmology FJMC and SGRH Lahore in December 2000. Patients attending the eye out patient department were screened for AMD. It is an ongoing study that will continue till 2010. It has two aspects. One is to find out the percentage of AMD and its types and the other is to assess to the efficacy of dietary supplements for treatment of AMD in this part of the world.

The patients who visited eye department had fundus examination and the patients with AMD were registered. They had a detailed evaluation of the visual function, associated ocular or systemic diseases; and had to undergo Amsler grid examination and Fundus Fluorescein Angiography (FFA) to be aware of the base line parameters. Total number of AMD patients was 157 in two years time. Group I was exudative variety and had 114 patients, while Group 2, dry type had 43 patients. Dietary supplements with Vitamins and Minerals were instituted to all AMD patients. The recommended dose for the treatment of AMD[3] is as follows:

Vitamin C	500mg
Vitamin E	400 I.U.
β-Carotein	15 mg
Zinc Oxide	80 mg
Cupric Oxide	2mg

Only prescribing Tablet Oculovit Extra fulfills the requirement of the recommend daily dose twice a day. This supplement was advised for a period of four months to all types of AMD dry or exudative, CNV occult or classic (Fig 4), and to all AMD locations (Fig.5). The same preparation is being used in USA for treating this disease[3]. The patients were examined every six weeks for measurement of visual acuity, Amsler's Test and Fundus Examination. FFA was repeated after six months.

RESULTS

The percentage of types of AMD in Dietary Supplement Study- Sir Ganga Ram Hospital Chapter (DSS- SGRH Ch.) has been depicted in Fig 4. Percentage of blindness in DSS- SGRH Ch. has been given and compared with the figures of American Academy of Ophthalmology in Fig.6.

Table-1:

Group	Type of AMD	No. of eyes	Success achieved	%
I	Exudative (wet)	114	105	93.0
II	Non-exudative (dry)	43	7	17.0

Table-2: Breakup of success

Type of AMD	Success rate	Visual improvement	Stable visual acuity
Exudative (wet)	93%	27%	66%
Non-exudative (dry)	17%	2.4%	14.6%

Visual results, six months after the onset of Dietary supplement therapy (DST) have been shown in Table 1 and 2. Success in the treatment means either cessation in progression of disease or improvement in visual acuity. The results were better in neovascular type of AMD than non-neovascular type. Visual improvement by 2 lines of Snellen's acuity was noted in 27% of neovascular

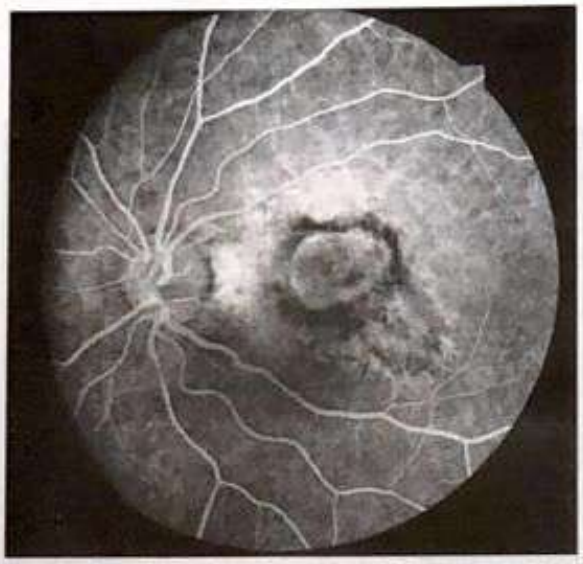

Fig.3A: FFA of Classic CNV leading to Fibrosis and Scarring of macula

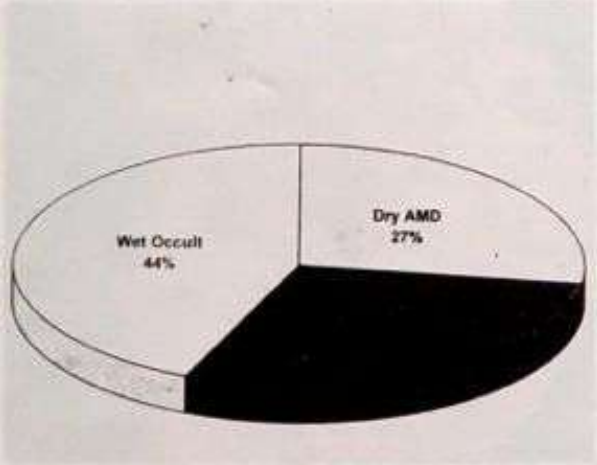

Fig.4: Percentage of Types of AMD in Dietary Supplement Study Sir Ganga Ram Hospital Chapter(DSS-SGRH Ch)

group claims visual improvement of 19% in neovascular AMD patients[3]. Our results are compareable. It is a known fact now that all degenerative processes in the human body are hallmarked by free radical formation. Under the effect of nutritional deficiency, ultraviolet light, blue light and inflammatory diseases, free radicals are formed by the loss of electrons or pair of electrons from orbit of molecules. To get stabilized the molecules steal electrons from other

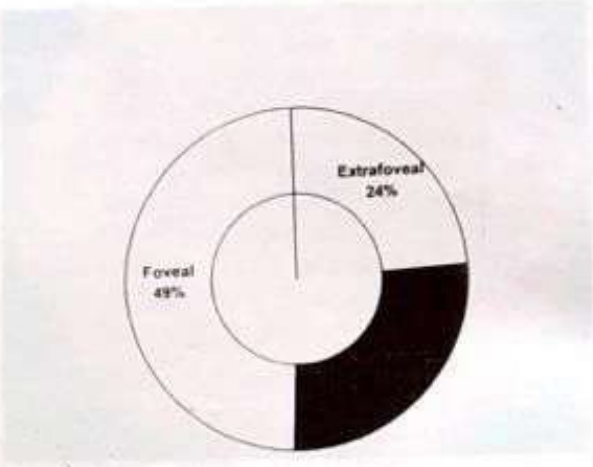

Fig.5: Location of AMD (DSS-SGRH Ch)

molecules, which in turn become free radicals. Thus a chain develops which causes cellular and tissue damage (photoreceptors and retinal pigment epithelial cells). Therefore it becomes important to check the process of free radical formation. Vitamin C and E are antioxidants and donate electrons to the molecules, which had become free radicals. These molecules thus become stabilized after receiving electrons and chain of degenerative chemical processes comes to a stop[5]. Neovascular membranes leak blood and ooze fluid , which induces inflammatory process and ultimate fibrosis of chorioretinal complex. The DST retards the degenerative mechanisms and therefore the oedema fluid and blood gradually absorbs and pressure on photoreceptors and pigment epithelial cells is released. Zinc and Copper are important elements for most of the chemical reactions[6].

It is suggested that during DST close liaison with internist should be maintained as β- Carotein increases the risk of Carcinoma of lung in smokers; high Zinc level can cause genito urinary problems and sometimes Zinc supplements may cause copper deficiency. Following suggestions may be helpful in preventing the disease and probably for the treatment as well.

1. Protect the eye from ultraviolet and blue light.
2. Take a balanced diet
3. Avoid smoking
4. Take Vitamins and Minerals after the age of 40 years

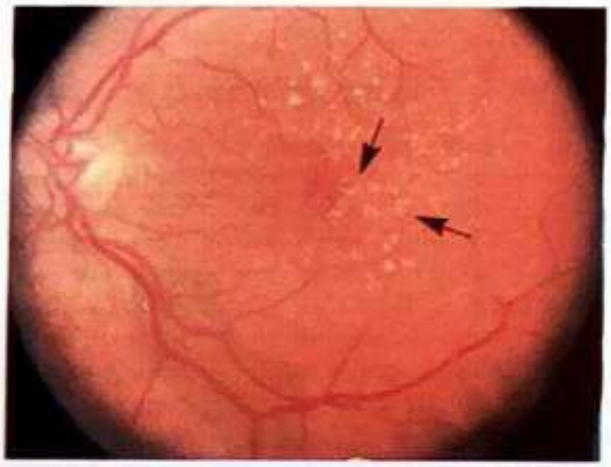

Fig.1: Shows drusen in the fundus picture

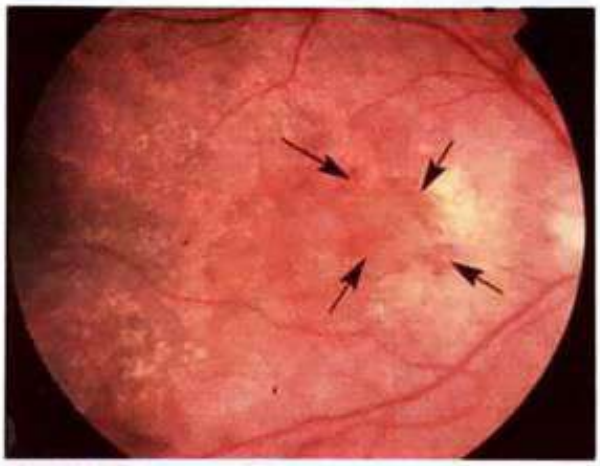

Fig.2: The arrows indicate the site oi formation of CNVM

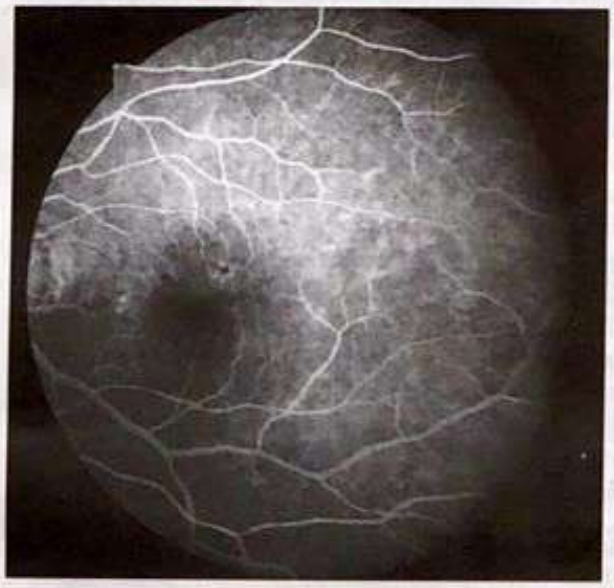

Fig.1A: FFA of Juxtafoveal CNVM

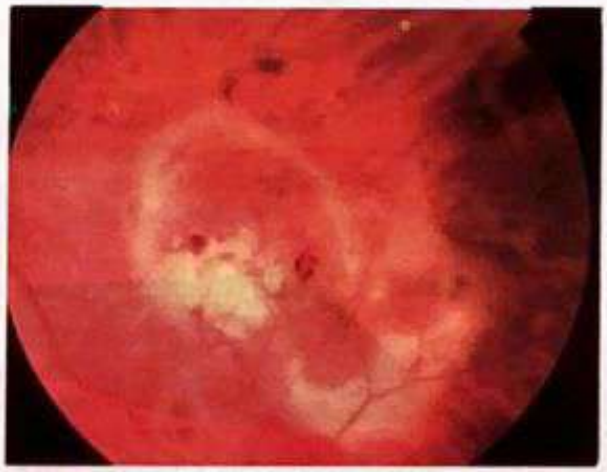

Fig.3: Fundus picture shows the area of detached RPE and fibrosis below it.

AMD patients and 1 line improvement in vision was observed in 2.4% of non neovascular AMD patients. Remaining exudative AMD patients had stable vision i.e.; progression of disease was stopped. It is hypothesized that check in disease process or visual improvement could be due to halt in degenerative chemical chains and resorption of oedema fluid[4]. It is not difficult to appreciate this hypothesis in neovascular form, but in dry AMD it is probably the pre-existent partial integrity of foveal center that disease was checked but only in 17% after resolution of Oedema fluid.

DISCUSSION

Age related Eye diseases Study(AREDS) in USA concluded after 10 years of research that dietary supplement has no effect on any degenerative eye disease except AMD. AREDS

5. Annual fundus examination after the age of 60 years[7].
6. Patients with hypertension and Ischaemic heart disease and smokers should have the annual examination after the age of 50 years[8,9].

CONCLUSION

DST has been found to be effective in all forms of AMD and in all AMD locations. It does not have destructive effect on retina, while damage and visual acuity drop has been documented in other treatment modalities like PDT, Argon Laser[10], TTT[11]. It is an ongoing study, which will last for another eight years to look into its long lasting effects in AMD. In the next two years step, control group will also be added to previous group. Third two years step would be to find the cause of failure of treatment. Fourth two years step is to evaluate the risk factors i.e. what diseases can directly or indirectly effect the eye to lead to AMD and why?. Fifth would be final and collaborative step.

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