Am J Ophthalmol 1996; 9 (2)
Surgical Hospital "Dr. Carlos J. Finlay"
Ozone therapy and magnet therapy: new methods in the rehabilitation of patients with chronic simple glaucoma
Dr. Lourdes A. Mahojo Ferrer, 1 Dr. Daisy Santos Diaz, 2 Dr. Silvia Menendez and Dr. Zoila Perez Cepero3 Rodríguez4
Doctor of Medical Sciences. Second Degree Specialist in Ophthalmology. Surgical Hospital "Dr. Carlos J. Finlay".
I Specialist Degree in Physical Medicine and Rehabilitation. Surgical Hospital "Dr. Carlos J. Finlay".
Doctor of Science. Senior Investigator. Head of International Clinical Research Center of Ozone.
I Specialist Degree in Physical Medicine and Rehabilitation. Surgical Hospital "Carlos J. Finlay".
SUMMARY
Chronic simple glaucoma is the third leading cause of blindness and visual disability in the world. Given the mechanism of action of ozone therapy and magnet therapy and pathophysiology of the disease a study to evaluate the therapeutic effect of these techniques in chronic simple glaucoma. 200 patients were studied at different stages of the disease, which was applied three treatment regimens: ozone, magnetic field and the combination of both. Visual function was measured, the nerve and intraocular pressure. Was obtained visual acuity improvement between 69 and 72% of the visual field between 59 and 76%. There was a trend to lower intraocular pressure and decreased the latency of P100 (visual evoked potentials. These results demonstrated the effectiveness of tax treatment and functional recovery of nerve fibers partially inactive.

Keywords: Open Angle Glaucoma / therapy; ALTERNATIVE THERAPY, OZONE / therapeutic use; EVALUATION OF THERAPEUTIC RESULTS OF OPERATIONS, Visual Acuity, Visual Fields, intraocular pressure.
INTRODUCTION
The primary open-angle glaucoma is a chronic multifactorial in etiology, which is suffered by approximately 2% of the population over 40 years whose incidence increases with age, reaching in some countries up to 6% over 65 , 1 and reported in some populations 40 to 49 years to 11.26% .2
It is the third leading cause of blindness and visual disability in the world and ranks first in some developed countries. It is associated with diseases of major component vascular.3 is characteristic of the disease increased intraocular pressure, which together with circulatory deficits and metabolic changes in the retina and optic nerve, impair nerve function and lead to atrophy optical glaucomatosa.4, 5 Changes in the circulation result in changes in the rheological properties of blood: these alterations and modifications in the metabolism of oxygen, causing hypoxia compromises metabolic exchange and causes changes in the ocular tissue trophism .
In recent years, medical practice in ophthalmology for the treatment of primary open-angle glaucoma, along with local hypotensive, have been used drug complexes that contribute to the improvement of hemodynamics and the restoration of the oxidation process in ocular tissues with the aim of stimulating nerve function deteriorated, although with little evidence of improvement and very prolonged effects. We report these tratamientos6-8 visual acuity between 37 and 52% and visual field between 38 and 65%, mainly at early stages.

Among the complexes, medications, the most widespread is that comprising the bioestimulantes, angioprotectores, vitamin therapy and vasodilators, but their use is not systematic.
In order to work in this direction and the therapeutic effect of knowing ozono9-12 and-15 on field magnético13 oxygen metabolism and the rheological properties of blood, a study was performed in patients with chronic simple glaucoma.

MATERIALS AND METHODS

The sample consisted of 200 patients with chronic simple glaucoma from glaucoma consulting Surgical Hospital "Dr. Carlos J. Finlay", which were divided into 3 study groups, randomly, at a rate of 2:1:1 corresponding to ozone therapy, magnet therapy and the combination of both.
For the initial evaluation and evolution of patients screened for visual acuity with Snellen eye chart, visual field Bjerrum tangent screen and perimeter of Goldman tonometry with Schiotz tonometer indentation board Friedenwald, 1955 and visual evoked potentials Neuropack with IV equipment.

CRITERIA FOR IMPROVEMENT

VISUAL ACUITY

Very significant increase in 2 or more lines of Snellen eye chart or on 2 or more degrees of vision.
Significant: an increase in 1 line of Snellen optotype or 1 degree of vision.
No change: no change in visual acuity.
Decreased: decreased in one line of Snellen eye chart or a degree of vision.

VISUAL FIELD

Very significant increase of 10o or more in 2 or more isopters in perimetry and / or disappearance of scotomas.
Significant: an increase between 5 and 9 in 2 or more isopters in perimetry and / or reduction of scotoma.
No change: when not modified in the 5th.
Minus: decrease of 5 ° or more.
Therapeutic regimens
Maintain local hypotensive treatment if there was.
Keep other treatments for other diseases, except antioxidants.
Group I: daily treatment with ozone rectally for 15 sessions, with an ozone concentration of 50 mg / L.
Group II: a daily session of magnet, in the frontal and occipital simultaneously flux density of 270 Gauss, 50 Hz frequency for 15 sessions.
Group III: application of ozone therapy scheme and magnet therapy simultaneously for 15 sessions.
Statistical evaluation was performed by Fisher's exact test and chi-square, according to the different stages of disease and treatment schemes used.

RESULTS

Distributions, both by gender and by age, showed no significant differences between the study groups. 90% of patients are over 40 years, this coincides with the totality of the authors who view aging as a factor of great importance in causing glaucoma.1

Table 1 shows the associated diseases present in the study groups, there is correspondence with the authors that glaucoma associated with systemic vascular diseases (diabetes, hypertension and ischemic heart disease) .4

TABLE 1. Various associated diseases present in the patients studied, according to different treatment schedules
Diseases
Diabetes Treatment Hypertension Hypotension TN TG
O3 15 27 20 18 15
CM 20 10 8 7 5
O3 + CM 13 December 13 June 6
Note: TN: neurovegetative disorders. TG: Gastric disorders. O3: Ozone. CM: Magnetic field.
In experimental models of glaucoma have been observed destructive changes in the vessels and ocular tissues, mainly in the drainage system, which affects not only changes in intraocular pressure, but in the metabolic processes of tissue. In clinical studies in diabetic and hypertensive patients have observed the same changes in the drainage system and small vessels of the anterior eye segment. Hence the importance of knowledge and adequate treatment of this condition.
In relation to the behavior of visual function after treatment, visual acuity (Table 2) of the eyes initially subnormal, reached values of 72, 69 and 71% for ozone, magneto and the association of both no statistically significant differences between groups, while in the field of view (Table 3) the improvement was 76, 59 and 70%, respectively, with highly significant differences (p <0.008) between group and field ozone magnetic. These values for the 3 groups, are much higher than those reported for other therapeutic procedures.
With respect to the stages of the disease, did better visual function in those earliest.

TABLE 2. Behavior of visual acuity total, according to different treatment schedules
Initial visual acuity improvement
Normal Subnormal Very good Satisfactory No change Decreased
Treatment No. of eyes (%) (%) (%) (%) Total (%) (%)
O3 196 27 (14) 169 (86) 91 (75) 30 (25) 121 (72) 43 (25) 5 (3)
CM 100 8 (8) 92 (92) 46 (73) 17 (27) 63 (69) 25 (27) 4 (4)
O3 + CM 98 16 (16) 82 (84) 41 (71) 17 (29) 58 (71) 23 (28) 1 (1)
Note: O3: Ozone. CM: Magnetic field.

TABLE 3. Total visual field behavior according to different treatment schedules
Initial visual field improvement
Normal Subnormal Very good Satisfactory No change Decreased
Treat ment No. eyes (%) (%) (%) (%) Total (%) (%)
O3 196 21 (11) 175 (89) 97 (73) 36 (27) 133 (76) 42 (24) -
CM 100 12 (12) 88 (88) 30 (58) 22 (42) 52 (59) 31 (35) 5 (6)
O3 + CM 98 11 (11) 87 (89) 41 (67) 46 (33) 61 (70) 26 (30) -
Note: O3: Ozone. CM: Magnetic field.

In relation to 3 forms of treatment in stage I (early glaucoma) improvement in visual acuity in the group treated with ozone was significantly higher (p <0.03) than in the other groups.

Regarding the visual field, the differences were statistically highly significant (p <0.007) in the ozone group, compared with magnetic therapy.
In stage II, behaved like the visual field, where the results of ozone treatment showed statistical significance compared to the magnetic field (p <0.006).
For stages III and IV, the remaining differences between groups were not statistically significant.
In terms of intraocular pressure (Table 4) between 53 and 58% of eyes that initially present abnormal values, normalized their eye strain, with the 3 variants of treatment. There were very significant differences between the group of ozone and magnetotherapy (p <0.005) and between ozone and the combination of both treatments (p <0.002), no significant differences between the magnetic field and its association with ozone.

TABLE 4. Classification of the eye as intraocular pressure (IOP) and its evolution

	Ozone O3			CM Magnetic Field		
	Before	After	Change	Before	After	Change
IOP	(%)	(%)	(%)	(%)	(%)	(%)
Normal	110 (56)	156 (80)	+24	63 (63)	83 (83)	+20
Moderately high	47 (24)	24 (12)	-12	24 (24)	13 (13)	-11
Added	39 (20)	16 (8)	-12	13 (13)	4 (4)	-9
	62 (63)	83 (85)	+22	19 (19)	11 (11)	-8
	17 (17)	4 (4)	-13			

Note: O3: Ozone. CM: Magnetic field. Normal: <21 mm Hg. Moderately high: 21-26 mm Hg. High:> 26 mm Hg.

In connection with the conduction velocity of the light stimulus (visual evoked potentials) (Table 5), was observed in all groups and stages of disease, a trend towards shorter prolongation of P100 latency, which is higher in more advanced stages. In general, most patients decreased the degree of severity in the prolongation of this parameter.

TABLE 5. Average values of visual evoked potentials (VEP) at the beginning and end of each treatment, according to disease stage

	Ozone O3 + CM Magnetic Field							
Stage	No. of eyes	Before	After	Before	After	No. of eyes	No. of eyes	Before	After
I	33	114	110	21	117.8	102.5	9	112.7	109
II	27	120.2	114.1	17	127.1	121.2	10	124.7	111.5
III	16	124.3	121.3	16	129	124.8	10	138	125
IV	11	135	130	5	135.8	131.2	3	146.2	130

Note: O3: Ozone. CM: Magnetic field. ENP normal: 118. Slightly altered: 119-125. Moderately disturbed: 126-130. Severely altered:> 130. In the case of ozone therapy group, in 7 eyes with stage IV could not be recorded VEP before treatment and in 2 cases was achieved after this.

DISCUSSION
The results in the improvement of visual function, intraocular pressure nervous and indicate the beneficial effect of treatments on functional recovery of the cells involved in these processes. These effects are attributable to various mechanisms related to the therapeutic properties of ozone therapy and magnet therapy, such as increased oxygen supply to these tissues as well as

nutrients that improve the trophism of these, to the activation of cellular metabolism in especially oxygen and stimulation of protective enzyme systems degenerative processes.
Similarly, other properties of these technologies appear to improve microcirculation and ocular hydrodynamics, especially the drainage system, and facilitate functional recovery nervous, at least partially.
These effects could also be related to the regulation of ATP synthesis and degradation, mainly for ocular function.
The benefits of rehabilitation in its early stages is to prevent deterioration of visual function and allows for human beings to their social and work activities, taking into account that this disease affects humans in stages of life where it has developed its full physical and intellectual.
Its application in advanced stages of disease improves quality of life of man (bearing in mind that life expectancy in our country has now reached 76 years) and allows a high percent of cases, their reintegration into society active.

CONCLUSIONS

About 90% of patients improved in one way or other subjective symptoms and visual function.
The 3 forms of treatment had satisfactory results. In stages I and II disease, better results were obtained in visual function, with the application of ozone therapy and in reducing intraocular pressure.
General improvements in visual acuity and visual field are in the order of 69 to 72%, respectively. In the early stages of disease improvements are achieved over 90% in acuity and visual field, while the latter are in the order of 50% for the field and 40% for visual acuity.
Over 50% of patients with abnormally high intraocular pressure, before treatment, the same normalized.
In 37% of patients, who underwent visual evoked potential study, showed a shortening of driving time retinocortical.
Treatment should be applied in cycles (15 sessions per cycle) to achieve stabilization of the process.
There was a better response of patients when there oftalmotono normalization.
Reduces or replaces the use of some medications, such as bio-stimulants, angioprotectores, vasodilators, vitamin therapy and others.
These treatments have an economic advantage for the low cost of the same and the benefits the patient in their social or work life.

SUMMARY

Simple chronic glaucoma Constitutes the third cause of blindness and visual impairment worldwide. Taking Into account the mechanism of action of ozone therapy and magnetotherapy and the pathophysiology of the disease, to study WAS Conducted With The aim of avaluating The Therapeutic effect of These Techniques for the Treatment of Simple chronic glaucoma. Two hundred Patients in Different stages of the disease and three Were Studied Were Different Treatment Schemes Applied: ozone, magnetic field and a combination of the two. the visual and the nervous function, as well as the intraocular pressure Were Measured. An improvement of visual acuity Between 69 and 72% of the visual field and Between 59 and 76%, WAS Obtained. There Was a trend to a Reduction in the eye pressure and a DECREASE in the latency of P100 (visual evoked potentials). These results PROVED the Effectiveness of the Treatment prescribed and the functional recovery of the Partially inactivated nervous fibers.

Key words: Glaucoma, OPEN-ANGLE/therapy, Alternative Therapies, OZONE / Therapeutic use; Evaluations OF RESULTS OF THERAPEUTIC interventions; VISUAL ACUITY, VISUAL FIELDS; INTRAOCULAR PRESSURE.

REFERENCES

Speath GL, Jandra LF. Glaucoma can impair your vision. Exec Health Rep 1989.
Tielsh JM. Racial Variations in the Prevalence of primary open angle glaucoma. The Baltimore Eye Survey. JAMA 1991; 17:369-74.
Kashintseva LT. Results of experimental and clinical Investigations of pathogenesis of glaucoma. The Academic Filatov Odessa Research Institute of the Eye Disease and Tissue Therapy. Reports of the International Conference Rehabilitation of Patients with pathology of the eye. Odessa 1986.
Kashintseva LT, Kribinski AK. Pathogenetic fundamentals in the treatment of open angle glaucoma. V Congress of Ophthalmologists of the USSR [Thesis T.2]. Moscow: 1979.
Mukha AK. Study of Rheologic properties of the blood in Patients with open angle glaucoma. Vest Ophthalmol 1990; 106 (2) :7-9.
Count LA. Influence of a complex new drug on nerve function in patients with primary open-angle glaucoma. Vest Ophthalmol 1977; 6:14-6.
Count LA, U.S. Gurtobaya. Vest Ophthalmol 1977; 3:15-7.
AP Nesterov. Glaucoma. Moscow: Medicine, 1982:189.
Viebahn R. The physical-chemical basis of ozone therapy. EHK 1975, 24:129.
Zobina LV, LS Omslovskaya. Effectiveness of magnetotherapy in optic nerve atrophy. Vest Ophthalmol 1990; 106 (5) :51-3.
Bogoliubova VM. Kurortology and physiotherapy. Moscow: Medicine, 1985:452.
Received: October 13, 1994. Approved: October 20, 1994.
Dr. Lourdes A. Mahojo Ferrer. Clinical Hospital "Dr. Carlos J. Finlay". Street corner 114 to 31, Marianao municipality, Ciudad de La Habana, Cuba.