

AN OPEN-LABEL CLINICAL TRIAL TO PROVE THE EFFICACY OF HIRUDOTHERAPY IN REDUCING THE INCREASED INTRA-OCULAR PRESSURE IN GLAUCOMA

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ABSTRACT

Glaucoma is a chronic disease condition prevalent globally leading to blindness. It results in optic neuropathy which is very difficult to manage. An increase in intraocular pressure is a cardinal feature in most cases. This study aims at lowering the intraocular pressure by leech therapy, which is a conventional treatment method described in Ayurveda. Leech therapy was conducted in the selected patients and intraocular pressure before and after treatment were recorded. The study showed clinically and statistically significant changes in the intraocular pressure.

Keywords: Leech therapy, glaucoma, intraocular pressure

INTRODUCTION

Glaucoma is one of the leading causes of blindness worldwide. It is a group of diseases resulting in optic neuropathy which has got the characteristic changes in the optic nerve head and progressive visual loss. Raised intra-ocular pressure (IOP), optic nerve damage and field defect are the triad of signs seen in glaucoma. A sustained increase in IOP may be due to increased formation of the aqueous humour, blockage in

its outflow or a raised pressure in the episcleral veins. The pathogenesis of glaucomatous damage can be attributed to a combination of factors affecting axonal health.

The two main influences are:

(i) mechanical changes due to the rise of intraocular pressure and

(ii) vascular perfusion of the optic nerve head. Primary open-angle glaucoma is slowly progressing one which causes gradual vision loss whereas angle-closure glaucoma is well known to cause sudden loss of vision. The management of glaucoma ranges from topical medications to surgical interventions as well as laser treatments. Even though many such medical and surgical methods are available, treating glaucoma with protecting vision is still the biggest challenge faced by ophthalmologists. Various randomized controlled clinical trials have shown that lowering intraocular pressure does reduce the progression of primary open-angle glaucoma. However, there is a lot of interest in nonpharmacological options that include lifestyle adjustment and alternative and complementary therapy (ACT). Hirudotherapy (HT), the application of medicinal leeches (*Hirudinae medicinalis*) for therapeutic use, is used by Ayurveda for the treatment of such eye diseases for many centuries. It is considered the safest mode of bloodletting as per Ayurveda and is advised in all age groups without any absolute contraindication. It is seen to give a very quick response in many acute conditions of the eye. The present study was conducted to assess the efficacy of leech therapy in reducing the increased intraocular pressure in patients diagnosed with glaucoma.

MATERIALS AND METHODS

30 diagnosed patients of chronic open-angle glaucoma (>5 years) in the age group of 40-60 years were included in the present study. Those who had an intraocular pressure of more than 25 mm of hg with antiglaucoma medications were selected for a clinical trial. Live healthy leeches of the family *Hirudinae medicinalis* were used for the treatment. Leech therapy was conducted for 10 sessions over a month in three-day intervals. The site for therapy was around the limbus (ciliary vessels) or inside the palpebrae (palpebral vessels). An indentation tonometer was used to check the intraocular pressure. IOP was measured before and after each therapy session. The values of IOP measured on Day 1, Day 12, Day 21 and Day 30 of Hirudotherapy were taken for analysis. Patients were given ayurvedic eye drops (drops made from *Moringa Oleifera*) after 30 days and a follow-up IOP was taken at 3 months (Day 90). Difference of IOP of each sitting analysed using paired t-test. The difference of IOP between the first sitting and last sitting as well as 3 months follow-up was also analysed using paired t-test.

Day	IOP BT	IOP AT	% CHANGE
1	33.8 ± 8.4	30.1 ± 7.7*	10.1%
12	29.9 ± 6.9	26.7 ± 5.9*	10.7%
21	26.2 ± 5.8	23.9 ± 5.5*	08.8%
30	23.7 ± 5.8	22.5 ± 4.6	05.1%

RESULTS

Patients had a mean age of 49.33±3.62 years. There were 21 female and 9 male patients with mean chronicity of 7.33±1.58 years. Mean IOP at Day one was 33.8±8.4 and after treatment IOP was 30.1±7.7 which was statistically significant (p<0.05) using paired t-test. The results were statistically significant on Day 12 and Day 21 too (p<0.05). The mean variation from Baseline to Day 30 and follow-up on Day 90 were 32.2±9.3,

22.5±4.6, 20.7±4.9 respectively. There was a mean change of 12 mm of Hg in IOP which was highly statistically significant using paired t-test (p<0.01).

Probable mode of action of Leech therapy

Leech saliva has certain chemical constituents namely hirudin, hyaluronidase and hematine. Hirudin is a thrombin inhibitor and so functions as an anticoagulant. Hyaluronidase is the enzyme that breaks down hyaluronic acid which is a bonding material of connective tissue, and this increases blood flow. The active sucking of blood by the leeches lets out the blood and

causes a decrease in the pressure of the episcleral vessels. This in turn increases the aqueous outflow into

the episcleral veins which reduces the intraocular pressure of the eyes.



Demographics

Age	49.33±3.62
Gender	Male 09
	Female 21
Mean Duration of Disease	7.33 ± 1.58
Antiglucoma Medication*	Timolol 29
	Latanoprost 13
	Brimonidine 04
	Dorzolamide 11

The overall change in condition after 1 month

Baseline	End of Therapy %
OP IOP change	
32.2 ± 9.3	22.5 ± 4.6* 30.1%
*<0.01	

CONCLUSION

Several well designed randomized controlled trials have demonstrated that lowering the IOP reduces the rate of glaucomatous damage of the optic nerve. The present study looked at the effectiveness of Leech therapy in Chronic Open-Angle Glaucoma in uncontrolled IOP with anti-glaucoma drops. The study showed clinically significant and statistically significant (P<0.01) changes in immediate reduction and long-term reduction of IOP. Out of all 30 patients, no dropouts were there. The patients had no other complications due to

the treatment. The application of leeches (Jalukavacharana) removes not only blood from the body but also injects biologically active substances which help to manage various ailments. The present study indicates the use of Leech therapy as an alternative method for treating Primary Open Angle Glaucoma. Follow up studies will look into continuing efficacy of the therapy in sustaining the IOP, improvement in the Visual field and Neuroprotection.

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