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Effect Of MET & MFR on Primary Open Angle Glaucoma in Adult Aged Between 15-30 Years

A Pilot Study

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ABSTRACT

Background: Primary open angle glaucoma is one of the major cause of blindness and it have only surgical treatment and lifelong use of medication. Hence many side effects arise. To overcome this, the drugless approach is in practice but the importance of Muscle Energy Technique (met) and Myofacial (MFR) Release is not explored.

Objective: To determine the effectiveness of MET and MFR on primary open angle glaucoma in primary open angle glaucoma.

Setting: Tertiary care teaching hospital

Methods: 12 subjects with Primary open angle glaucoma was recruited through criteria based convenience sampling for the study. The age ranges from 15-30 years. MET and MFR was given to the subjects 30 mins/day, six days/week for three weeks. Intraocular pressure was assessed with Tonometer as dependent variable by Ophthalmologist. Pre and post treatment intraocular pressure change is established.

Result(s): Pre IOP and Post are 23.11 ± 1.98 mmHg and Post IOP is 20.05 ± 1.42 mmHg respectively. The mean pre-post difference is 3.1 ± 1.9 mmHg with significance difference of $p < 0.001$.

Conclusion: MET and MFR reduce intraocular pressure and relieve from other symptoms.

Key word: Eyes; glaucoma; physical therapy; pressure; rehabilitation.

INTRODUCTION

Glaucoma is the leading cause of blindness worldwide and therefore represents a considerable socioeconomic challenge^{1,2}. As loss of vision caused by glaucoma is irreversible, people of advanced age should have periodic eye examination as part of their routine care & the glaucoma needs lifelong medication to prevent irreversible damage which is caused by raised intra ocular pressure. In children it affects his or her activity of daily living so eye care is too necessary^{1,2,3}. Glaucoma affects an estimated 70 million people worldwide. Primary angle closure glaucoma (POAG) is more common in Asia, whereas POAG is more evenly distributed throughout the world. In the United States, Europe, and Australia, 75 to 95% of glaucoma in Caucasians is POAG^{2,4}, whereas POAG accounts for 70 to 90% of glaucoma in China and India⁴⁻⁶. Whites suffer more frequently from POAG.

Increased intraocular pressure (IOP) caused by obstruction of the outflow of aqueous humor is one of the most important but not the only risk factor for the development of glaucoma^{1,7,8}. Open-angle glaucoma, the most common type, often remains unnoticed by the patient for a long time as the eye pressure rises slowly to 20 – 30 mmHg (sometimes higher). For a long time elevated IOP was considered the main cause for the development of glaucoma. Today it is known that increased IOP is only one of many other risk factors⁹. Nevertheless elevated IOP continues to be considered one of the major causes in the development of glaucomatous damage. Normal IOP lies between 10.5 and 18 mmHg². As the risk of further progression of the disease reduces by approximately 10% per

each 1 mmHg by which intraocular pressure is lowered, it is crucial to investigate the exact IOP level in order to prevent further development of the glaucoma².

Sutherland considered glaucoma an obstruction of the venous outflow due to cranial membranous lesion. In osteopathic literature methods for the improvement of circulation in the eye and the drainage of aqueous humor are described. In osteopathic literature methods for the improvement of circulation within the eye and the drainage of the aqueous humor are described. Physiotherapy point of view IOP is raised due to autonomic dysfunction, osseous dysfunction and muscular dysfunction¹⁰. An imbalance in the tone of the ocular muscles can cause a movement dysfunction at the sphenoid bone, at the maxilla and at the ocular muscle nerves. Travel describes the development of ocular hypertension in case of a dysbalance of the occipital muscle¹⁰. The ocular muscles regulate the tension of the bulbus and the cornea. An elevation of pressure resulting from a dysbalance in the anterior chamber of the eye can be a reason for ocular hypertension. Contraction of the extraocular muscles leads to an raise in IOP. This is proved by the raise in IOP observed when eye movement is opposed by traction by the surgeon. Powerful muscular contraction of the orbicularis oculi which can raise IOP to >50 mm Hg; even normal blinking increases IOP by 10 mm Hg¹¹. It has previously been proposed that succinylcholine raises IOP by its depolarization and contraction of the extraocular muscles¹².

According to etiology there are basically four types of Glaucoma i.e. Primary open angle glaucoma, closed angle glaucoma, Normal or low tension glaucoma & Secondary glaucoma¹³. In the treatment of chronic glaucoma medication with eye drops is still the most common therapy and it aims at lowering IOP. Today there are several classes of medication which on the one hand decrease aqueous humor production and on the other hand increase the outflow of aqueous humor into the trabecular meshwork. In case the eye drops are not tolerated by the patient or the effect on the elevated intraocular pressure is not satisfactory, Dr. Teuchner suggests that only surgical treatment remains³. Complementary treatments are Homeopathic remedies, Physiotherapy, Yoga, & Osteopathy¹⁴.

Muscle energy technique (MET) is a series of muscle energy techniques designed to balance extra-ocular muscle tone. These techniques utilize traditional muscle energy principles with the physician applying resistance against the ocular globe as the patient attempts to look in a specific direction¹⁵⁻¹⁸. More indirect goals include emotional release, deep relaxation, or general feelings of connection and well-being. Myofascial release, literally "release of muscles and fascia," is so encompassing and because the roots and application of myofascial release are so diverse so the myofascial release normalize the tone and relax the muscle which leads lowering of IOP.¹⁹

METHODS

The ethical clearance was obtained from the Institutional Ethical Committee of Maharishi Markandeshwar Institute of Physiotherapy & Rehabilitation, Mullana, Ambala and Ethics Committee CTRI - 2014 - 09 - 004986. All subjects had given an informed consent agreeing to participate and after fulfillment of the inclusion and exclusion criteria. The participants were included from Tertiary Care Teaching Hospitals, Mullana. Participants were included according to the fulfillment of the inclusion and exclusion criteria respectively. Diagnosed case of Primary open angle glaucoma, intraocular pressure more than 19 mmHg and less than 30 mmHg, age between 15-30 years both genders was the inclusion criteria. The subjects who have other type of glaucoma, change of medication during treatment protocol, systemic diseases, apoplexy, skull-brain injuries, treatment with anticoagulants, any neurological disorder, strabismus, nystagmus, vestibular dysfunction, hypersensitive and who underwent any surgical interventions in eyes and skull were excluded from the study. The subjects were recruited by an Ophthalmologist after full eye examination. Subjects were assessed for headache, eye strain, and eye pain. 12 subjects with Primary open angle glaucoma was recruited through convenience sampling for the pilot study.²⁰

OUTCOME MEASURES

IOP: Aplanation Tonometer was used to measure the IOP by an Ophthalmologist.

Headache & Eye pain: HIT6 and VAS was used to measure the headache and eye pain.

INTERVENTIONS

Before the intervention on all the subjects the eye effleurage technique performed for 3 minutes. Effleurage over the eyelid and globe is often beneficial with edema of the eyelid and scleral edema. Effleurage (Fig. 1) with the patient's eyes close, the physiotherapist apply a gentle pressure over the eye globe and the move his finger in circular direction. Ruddy Technique which is a series of muscle energy techniques designed to balance extra-ocular muscle tone. Ruddy Technique (Fig. 2) with the patient's eyes closed, the physiotherapist places a finger across the eyelid from lateral to medial. With a finger of the other hand, a light percussion is performed over finger that lies on the closed eyelid. Orbital bony MFR (Fig. 3) with the patient's eye closed the therapist apply a gentle pressure on orbital bone and then gently lift up during this the pressure would not be released.

RESULTS

Statistical analysis for the present study was done manually as well as using SPSS version 16 so as to verify the results obtained. Various statistical measures such as mean, standard deviation, and test of significance such as paired t – test were used. Probability values <0.05 were considered statistically significant <0.001 were considered highly significant.

Total 12 subjects of both genders were included in the study out of which 75% were male and 25% were female and the mean age of the subjects were 24±4.95.

The mean of pre and post IOP (Fig. 5) were 23.11±1.98 mmHg and 20.05±1.42 mmHg respectively. The mean pre-post difference was 3.1± 1.9 mmHg with significance difference of p< 0.001

Headache and eye pain was secondary outcome it was documented but did not take in statistical calculation.

DISCUSSION

The hypothesis of the present study demonstrate the effectiveness of MET and MFR on primary open angle glaucoma. The present study showed MET and MFR reduce intraocular pressure and relieve from other symptoms. In some previous studies such as Roddy and Ellemberg²¹ concluded that “There is a clear effect of exercise on the reduction of IOP ranging from 1 to 5 mmHg. Although we could not compute a global effect size because the 21 conditions did not each come from independent groups, they observe certain patterns in the results. First, the active and sedentary participants appear to benefit equally from exercise. Second, there is an almost two times reduction in IOP from the mild to moderate intensity conditions. Finally, the duration of exercise appears to influence outcome for the mild but not moderate intensity conditions. The relationship between intensity and duration needs to be analyzed further in a longitudinal study that focuses on individuals at risk for POAG.

Natsis et al²² proved that the moderate aerobic exercise decreases the IOP of healthy individuals (athletes or non athletes). Aerobic exercise also decreases the IOP following instillation of a β -blocker, a prostaglandin analogue or α -agonist. Exercise reduces the IOP of glaucoma patients already under antiglaucoma treatment. Regular moderate aerobic exercise (walking, jogging, bicycle etc) has been proven beneficial and should be encouraged for glaucoma patients. But there is very limited study by which we could determine the effect of MET & MFR on POAG. In this study, result reveals that there is significant effect of MET and MFR on POAG.

The finding need to be considered in light of limitations of the present study can be taken up to evaluate the long term effects of the specified study. As the study conducted on small sample size, the study did not take all types of Glaucoma. Future study can be researched by taking large sample size and all type of Glaucoma.

CONCLUSION

The present study concludes that there is significant effect of MET and MFR on POAG. This study will Increase the knowledge of physiotherapists and contributes towards evidence based practice, and also help in determining the best and effective physiotherapy intervention used for the treatment of Intra ocular hypertension.

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