Management of Cataract with Ayurveda Treatment Modality; a Comparative Clinical Study

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Abstract- The comparative clinical study was designed to evaluate the effect of *Anjanavarti* in the management of Cataract in comparison with *Virecanakarma*. Thirty patients were selected, suffering from Cataract and randomly divided in to two groups as group A and B. For the group A *Anjanavarti* was applied after the *Virecana karma* for a period of thirty days. For the group B *Anjanavarti* was applied for a period of thirty days. After the *Anjanavarti* treatment in group A, visual acuity was tested by using Wilcoxon Signed Ranks test. It was significant (0.001) in 0.05 levels which can be concluded that there was considerable effect after the treatment of *Anjanavarti* followed by *Virecanakarma*. Group B also significant (0.001) in 0.05 level. Therefore, it was concluded that there was a therapeutic effect of *Anjanavarti* in individual application. While group A and B were compared using Mann-Whitney U test, which elaborated two groups were not identical to each other with respect to visual acuity at after the treatment. According to the mean rank and sum of ranks between two groups after treatments, it can be clearly identified that mean rank of group A is less than group B, which means that the treatment effect of Visual Acuity in group A is better than group B while considering the results after the *Virecana karma* p value of total cholesterol (0.132), LDL cholesterol (0.145), TGL cholesterol (0.147) and HDL cholesterol (Based on positive ranks) (0.176) were not significant in 0.05 level.

Index Terms- Cataract, *Anjanavarti*, *Virechana karma*, Cholesterol

I. INTRODUCTION

Cataract, defined by the World Health Organization (WHO) as a Visual Acuity (VA) of less than 3/60 in the better eye, is the leading cause of blindness in the world, while cataracts can be surgically detached, being a surgical process patients discourage in attending treatment procedure. Globally cataract is also a key root of low vision [1], as well a leading cause of visual impairment, other than uncorrected refractive errors and the greatest cause of preventable blindness globally [2]. Aging process is a key etiological factor of cataract [3]. Additionally cataract is much common in diabetes where superoxide in the mitochondria is elevated as a result of hyperglycemia [4]. Opacity over lens of eye is a direct result of oxidative stress. Global warming and ozone depletion also increase exposure to ultraviolet radiation which leads to a greater incidence of cataracts [5]. Some medications likewise corticosteroids, Psoralens, Chloropromazine and some glaucoma medications affect in cataract [6-7]. Addiction to alcohol or substance uses while pregnancy leads to infants born with cataract, as well as congenital cataract is common in 1:10,000 ratios [8].

In Sri Lanka, among 22 million populations around 200,000 people are believed to be blind as well 400,000 people are suffering from low vision. Majority of them have been affected with cataract [9]. Hence, introducing a cost effective treatment modality in spite of surgery to manage cataract is much advantageous in existing era.

Ancient Ayurveda literature elaborate that the cataract is almost equal to the '*kacha'* when premature cataract (*Timira*) leads to mature cataract (*kacha*) due to unavailability of treatments at the early stage. Furthermore, untreated *kacha* generates '*kapaja linganasha'* and cause blindness [10].

Instead surgical process, some treatment protocols for cataract has been instructed in authentic Ayurveda literature 'Susruta Samihita'. Among several modalities, application of *'Anjana'* (collyrium) is mentioned there as an effective measure of correction [11]. Ola leave manuscripts inherited to Indigenous system of medicine in Sri Lanka consists with multiple time tested recipes with effective clinical experience among practitioners. Therefore, the current study was based on an indigenous recipe of *Anjana* referred from an ola leave manuscript.

Efficacy and effect of application *Anjanavarti* and application of *Anjanavarti* after the *Virechana karma* (therapeutic purgation) in the management of Cataract were evaluated in the study while the study prioritized in effect of *Virechana karma* on visual acuity, Total Cholesterol level (TCL), Triglycerides level (TGL), High Density Lipoprotein level (HDL) and Low Density Lipoprotein level (LDL).

The *Anjanavarti* is consisted with, dried fruit of *Terminalia chebula*, dried leaves of *Azadirachta indica*, dried legume of *Piper longum*, dried seeds of *Piper nigrum*, central part of the dried *Terminalia belerica* nut, ash from purified conch (*Bhashma*) of *Turbinella rapa* and purified Bisulphate of arsenigrealar while powder of all the said ingredients should be ground with goats milk till reach to paste consistency. Thereafter the shape of the *varti* should be molded and let it to be dried up in sun light.

II. METHODOLOGY

For the comparative clinical study, the study population was comprised with the patients attending to the eye clinic at Ayurveda

Central Dispensary, Kumarakanda, Dodanduwa, Sri Lanka. Among them, thirty volunteer patients diagnosed with cataract (VA ≤ 3/60 in better eye) were selected after obtaining written consent. These patients were randomly divided in to two groups consisting of 15 patients in each group.

Inclusive Criteria

1. Both gender, age between 50 – 70 yrs
2. Visual Acuity ≤ 3/60 in better eye

Exclusive Criteria

1. Age below 50 yrs and above 70 yrs
2. Visual Acuity ≥ 3/60 in better eye
3. Having medicine for chronic disorders

Method of Investigation

1. Visual Acuity (VA) was determined using Snellen's chart (in better eye)
2. Blood glucose level was determined by FBS test followed 12 hours fasting period (By automated chemistry analyzer)
3. WBC/DC (By automated chemistry analyzer)
4. Lipid profile followed 12 hours fasting period (By automated chemistry analyzer)

All the investigations were done before the treatment (BT) as well after the treatment (AT).

Method of Treatment

Group A: application of *Anjanavarti* for 30 days followed by *Virechana Karma*

Group B: application of *Anjanavarti* for 30 days

Sesame seed size amount of *Anjanavarti* was applied over middle part of the conjunctiva of lower eye lid once a day mixed with water between 09.00 am to 12.00 noon daily. While the treatment period, all the cases were instructed to continue recommended wholesome diets and behaviors.

Table 01: Treatment Protocol of Group A

Day	Treatment
1 to 5	240 ml of *Dhanyapanchaka* Decoction + 2.5 g *Manibadra Choorna* twice daily
6 to 12	(Ghee) *Achchapana Wardhamana Snehana*
13	*Sarvanga Swedana*
14	Pitta *Virechana* using *Thriphala* decoction
15	Resting Day
16	Day of serum investigations and Visual acuity check up
17 to 46	*Anjanavarti*

Table 02: Treatment Protocol of Group B

Day	Treatment
1 to 30	*Anjanavarti*

Follow up: visit the clinic fortnightly up to 01 month period.
Data Analysis: IBM SPSS version 22 was used.

III. RESULTS AND DISCUSSION

Majority of the sample represents with female patients as 70% rest of 30% represented by male patients. Referring age of participants, 53.33% of the respondents were included in 66-70 years of age while 23.33% were belongs to 61-65 years age, 6.67% of them were belongs to age range of 56-60 years and 16.67% were represented 50-55 years age group.

Hypothesis testing was performed to identify the effect and the efficacy of treatments. All the tests were carried out under 5% level of significance.

The Wilcoxon signed-rank test used when comparing two related samples, matched samples, or repeated measurements on a single sample to assess whether their population mean ranks differ (i.e. it is a paired difference test). Mann-Whitney U test has used to check whether the two groups (i.e. Group A and Group B) are identical to each other or not with respect to Visual Acuity (Better Eye).

Table 03: Comparative effect of treatments

Investigation	Z		Asymp. Sig. (2-tailed)		Negative / Positive Rank	N		Mean Rank		Sum of Ranks	
	Group A	Group B	Group A	Group B		Group A	Group B	Group A	Group B	Group A	Group B
TCL (AV) – (BV)	-1.507[d]		.132		Negative	4[a]		7.12		28.50	
					Positive	10[b]		7.65		76.50	
					Ties	1[c]					
					Total	15					
TGL	-1.45[d]		.147		Negative	5[a]		6.90		34.50	

(AV) – (BV)					Positive	10[b]		8.55		85.50	
					Ties	0[c]					
					Total	15					
HDL (AV) – (BV)	-1.355[e]		.176		Negative	9[a]		8.22		74.00	
					Positive	5[b]		6.20		31.00	
					Ties	1[c]					
					Total	15					
LDL (AV) – (BV)	-1.481[d]		.145		Negative	2[a]		8.25		16.50	
					Positive	13[b]		7.96		103.50	
					Ties	0[c]					
					Total	15					
Visual Acuity (Better Eye) (AV) – (BV)	-2.889[e]		.004		Negative	10[a]		5.50		55.00	
					Positive	0[b]		.00		.00	
					Ties	5[c]					
					Total	15					
Visual Acuity (Better Eye) (AT) – (BT)	-3.332[e]	-3.416[e]	.001	.001	Negative	14[a]	14[a]	7.50	7.50	105.00	105.00
					Positive	0[b]	0[b]	.00	.00	.00	.00
					Ties	1[c]	1[c]				
					Total	15	15				

a. After < Before
b. After > Before
c. After = Before
d. Negative Effect
e. Positive Effect
BV – Before *Virechana*
AV – After *Virechana*

Comparisons of both Groups

Table 04: Mean rank and Sum of ranks between both groups

Investigation	N			Mean Rank		Sum of Ranks	
	Group A	Group B	Total	Group A	Group B	Group A	Group B
Visual Acuity (Better Eye) - BT	15	15	30	15.20	15.80	228.00	237.00
Visual Acuity (Better Eye) - AT	15	15	30	13.03	17.97	195.50	269.50

Table 05: Significance values of Mann-Whitney U test before and after treatments

	Visual Acuity (Better eye) BT	Visual Acuity (Better eye) AT
Mann-Whitney U	108.000	75.500
Wicoxon W	228.000	195.500
Z	-.206	-2.582
Asymp. Sig. (2-tailed)	.837	.014
Exact Sig. [2*(1-tailed Sig.)]	.870[a]	.026[a]

a. Not corrected for ties
b. Grouping Variable: Group

According to above statistics, since the significance value (0.837) is greater than 0.05, the null hypothesis was accepted under 5% level of significance; Therefore, before the treatment two groups are identical to each other with respect to visual acuity. Since the significance value (0.014) is lower than 0.05, the null hypothesis was rejected under 5% level of significance; Therefore, after the treatment two groups are not identical to each other with respect to visual acuity.

Even though, acceptance of null hypothesis under level of 5% significance, *Virechana karma* was not effective in reduction of TCL, TGL, LDL and increment of HDL, as well under level of 5% significance, *Virechana Karma* was effective on Visual Acuity while under level of 5% significance, *Anjanavarti* also effective in Visual Acuity referring both of group A and B.

According to the above 'Mean rank and Sum of ranks between two groups after treatments table which can be clearly identified that mean rank of Group A is less than Group B. Which means that the treatment effect of visual acuity in Group A is better than Group B since when scaling the visual acuity variable, the lower values have given to the better visual acuity.

Group A was treated using ghee for *Achchapana*, hence TCL, TGL, LDL levels were increased, while HDL level was decreased among them. Instead of saturated fatty substance like ghee, replacing an unsaturated fatty substance may vary the therapeutic effects of Group A with much efficacy.

IV. CONCLUSION

Before treatment both groups were observed with much similar visual acuity. After the treatment of *Anjanavarti* for thirty (30) days both the groups were observed with increased visual acuity, comparatively Group A shows highest efficacy. Referring obtained results, efficacy of *Anjanavarti* was comparatively high when followed by *Virecana karma*. After the *Virecana karma* visual acuity was increased. Therefore *Virecana* was effective on Visual Acuity. As well, *Anjanavarti* followed by *Virecana karma* is more effective than *Anjanavarti* alone on visual acuity.

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