

A Clinical Study on Efficacy of Karpuranjana in Avarana Shukla (Corneal Opacity)

*Dr. Dattatraya Yalagi, Associate Professor, Department of Shalakyatantra

Corresponding Author: drdattayalagi@gmail.com, 9145204407

Dr. Ninad Sadvilkar, Assistant Professor, Department of Samhita-siddhant

Dr. Sachin Utpat, Associate Professor, Department of Panchakarma

MES Ayurveda Mahavidyalaya, Lote, Tal. Khed, Dist.- Ratnagiri, M.S.

Abstract: Background: Corneal opacity is one of the leading causes of blindness or impairs vision causing disturbance in daily activities. There is no any proven effective medicine or treatment except Keratoplasty for corneal opacity in modern ophthalmology. Considering clinical presentation, it can be correlated with Avrana Shukla mentioned in Ayurveda.

Objectives: To study the efficacy of Karpuranjana in Avrana Shukla.

Materials and Methods: Clinical trial was conducted in two groups having 30 patients in each. Trial group patients were given Karpooranjan on daily basis for 15 days. In control group, deionized water was advised for local application for 15 days. Assessment was done on basis of improvement of vision and reduction in size of corneal opacity.

Result: After comparing, partial relief was seen more in trial group which was 24 % in Nebula type and 4% in macular type of corneal opacity patients as Nebula is superficial and thin in opacity.

Discussion: Lekhana, Tikshna, Vranaropak and Laghu properties of Karpuranjana have worked to reconstruct the corneal epithelium in normal way. These gunas helped in reducing area of opacified cornea as well as the chakshusya property of both karpura and vatksir resulted in vision improvement of the patients.

Conclusion: Karpuranjana was more effective in superficial Avrana shukla. Another trial of prolonged or continuous use may reduce area of corneal opacity resulting in decrease in number of corneal blindness.

Key words: Corneal opacity, Karpuranjana, Anjana karma, Avrana Shukla.....

Visual impairment has emerged as significant public health problem in recent past. In ophthalmic practice, it is observed that corneal opacity is one of the leading causes of blindness¹. There is no complete medicinal treatment for corneal opacity at present. Only Keratoplasty² is answer for it, even not of complete assurance. This is the reason behind selection of this topic Avrana Shukla (corneal opacity) for study purpose.

Avrana Shukla is a krishna-mandal gata Netra Roga. The Lakshna of Avrana Shukla is thin cloudy patch with colour like Shankha, flower of Kunda or Kamal on krishna-mandal. This krishna-mandalgat vikara can be correlated to Corneal Opacity³ which may or may not be associated with pain and lacrimation. Corneal opacity occurs when the cornea becomes scarred⁴ and alters light from passing through the cornea to the retina due to corneal opacification. Infection, injury, congenital factors etc. cause corneal opacity. It is classified as nebular corneal opacity, macular corneal opacity, leucomatosus corneal opacity and others based on density⁴. The pathogenesis of any of these causes serious vision problems. In modern ophthalmology, there is no any proven effective medicine or treatment for corneal opacity except surgery and transplantation.

Almost all eye-diseases are borne from Abhishyanda¹². In Ayurveda various kriyakalpa like Anjana, Parisheka, Tarpan etc. are mentioned for treatment of Netra vikara⁵. Karpuranjana⁶ is one of the medicines mentioned for treatment of Krishnagata vikara. This combination was not observed evaluated clinically for Avrana Shukla, so it was selected for treatment of Avrana Shukla.

Materials and Methods

Objective: To study the efficacy of *Karpuranjana* in *Avrana Shukla* in comparison with control group.

Preparation of Medicine: Very fine powder of *Karpura* (camphor) was collected after passing through sieve number 120⁶. It was mixed with equal quantity of latex of *Vata* to prepare anjana.

Study Design: Randomized controlled trial

Group Allocation: Randomization was done through lottery method in to trial and control groups.

Source of Patients: Patients were enrolled from various medical camps arranged in Ratnagiri and surrounding area and those visiting to OPD, MES Mahavidyalaya, Lote, Ratnagiri. Their consents were obtained and study was started once they agreed to continue the treatment without any other medication.

Number of Patients: 50

Assessment criteria: Calliper (Jyoti Surgical, Lucknow, India) was used to measure the corneal opacity (*Avarana Shukla*). The measurement included paracentral and central opacity. Nebular, macular and leukomatous opacities were observed based on scarring area (epithelial or stromal), destruction on stroma layers and appearance of perforation area^{10,11}. Visual acuity was measured by using standard Snellen chart with patients 6 meters away¹³.

Grading Scale:

Size of Corneal Opacity:

No Corneal Opacity	-	0
0.1 to 1.5 mm	-	1
1.6 to 2.5 mm	-	2
2.6 to 4.0 mm	-	3
4.1 mm and above	-	4

Visual Acuity

6/6	-	0
6/6 (p) to 6/12	-	1
6/12 (p) to 6/24	-	2
6/24 (p) to 6/36	-	3
6/36 (p) and more	-	4

Observations were recorded in tabulated form in case paper.

Intervention: *Poorva Karma: Snehana, Swedana* and *Vacha taila Shodhana Nasya* were performed for patients of both groups.

Pradhaana Karma: Freshly prepared *Karpuranjana* was used for *Anjana Karma* in trial group. In this *Karpuranjan* was applied daily in morning for 15 days to lower fornix with *Tamra Shalaka*. For control group deionized water was used in place of *Karpuranjana*.

Pashchaat karma - Netraprakshalan was done with deionized water and, then *Pratimarsha nasya* was given with *Bala taila* in both groups.

Duration: 15 days

Follow Up: 2nd, 5th, 10th and 16th day after completion of intervention.

Inclusion criteria:

- i. Patients were enrolled from all age-groups, irrespective of religion and gender.
- ii. Patients having corneal opacity of any shape, size and depth.
- iii. Patients having corneal opacity due to any causing factor.
- iv. One-eyed patients were also included.

Exclusion criteria:

- i. Patients having corneal opacity with ulcer were excluded.
- ii. Patients having corneal opacity with corneal edema were not included.
- iii. Patients having corneal opacity with iatrogenic corneal ulcer were not taken for study.
- iv. Patients having corneal opacity with iris prolapse were not selected.
- v. Patients having corneal opacity with anterior synechiae were taken.

Criteria for withdrawal:

- i. Discontinuation of treatment during trial.
- iii. Development of any complication at any point of time during the course of study.

Statistical Analysis: Wilcoxon signed rank test was used for comparison of effects before and after trial in both trial group and control group while observations of differences before and after trial in trial group and in control group were compared using Mann-Whitney test. SPSS software was used.

Result

Chart Number: 1

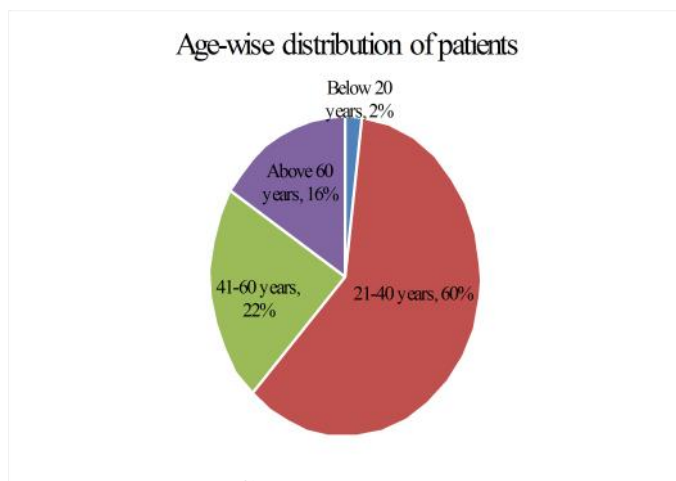


Chart Number: 2

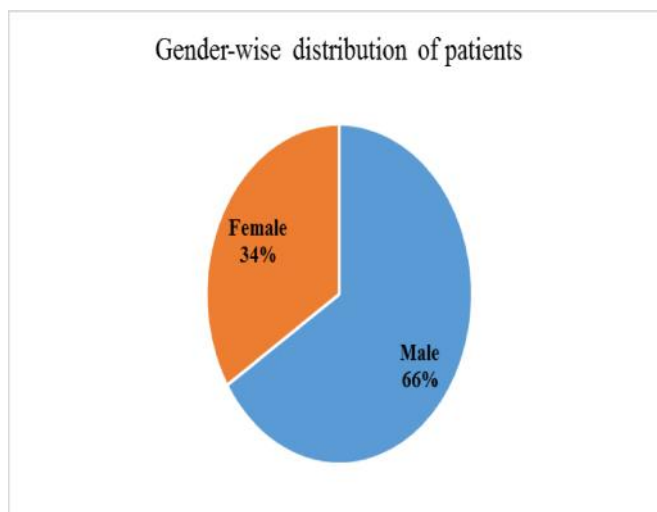


Chart Number: 3

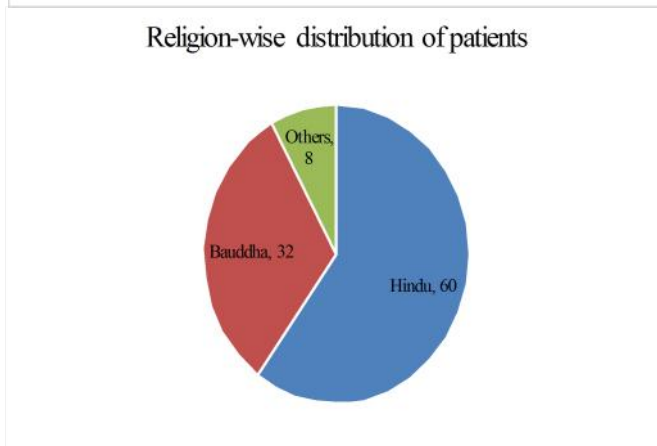
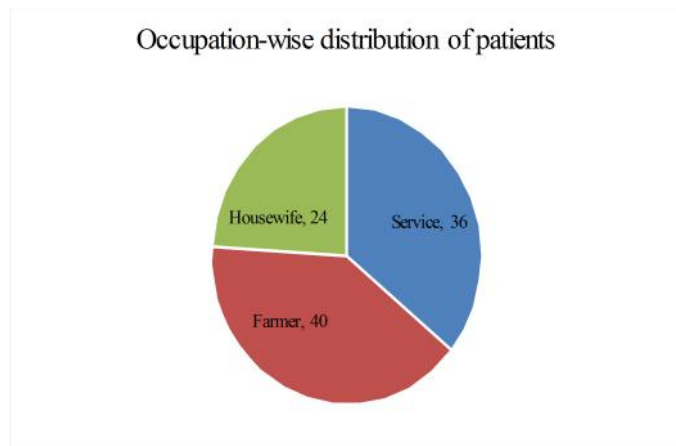


Chart Number: 5

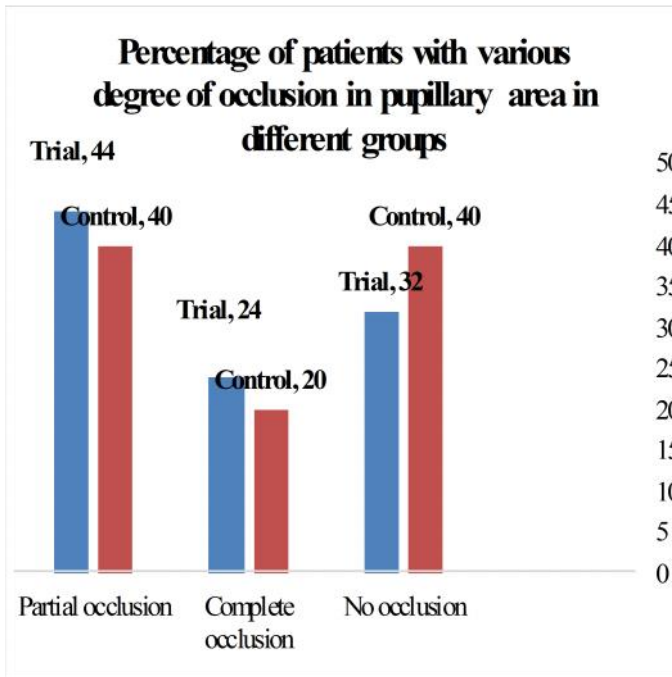


Chart Number: 6

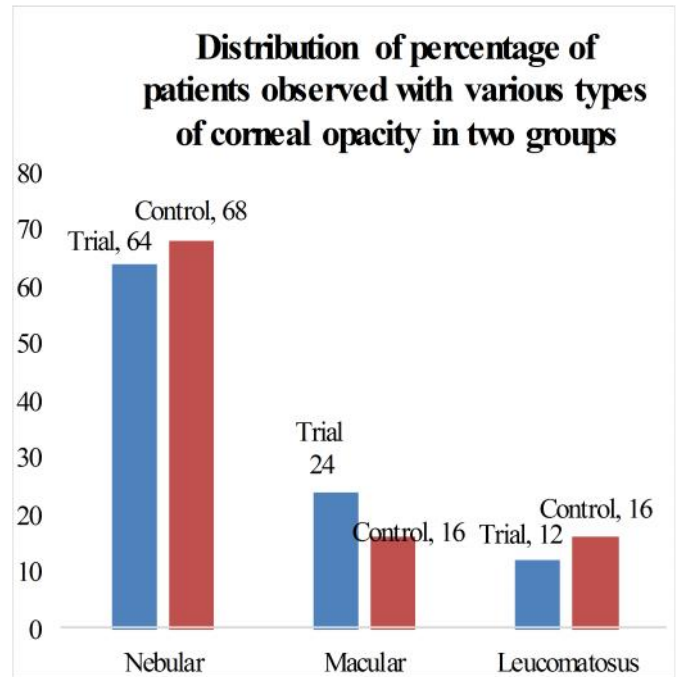


Table Number: 1: Comparison of before and after treatment in both trial and control groups for size of corneal opacity and visual acuity

Size of corneal opacity							
Group	Day-0		Day-16		Percentage Improvement	Wilcoxon Signed Ranks Test	P
	Mean score	Std. dev.	Mean score	Std. dev.			
Trial	3.08	0.702	2.56	1.254	16.9	2.739	< 0.05
Control	2.76	0.970	2.68	1.03	2.9	1.414	> 0.05
Visual acuity							
Trial	2.64	1.254	2.36	1.44	10.6	2.646	<.05
Control	2.52	1.005	2.52	1.005	0.0	0.0	>0.05

Table Number: 2: Comparison of difference in scores of size of corneal opacity and visual acuity from trial and control groups after treatment

Size of corneal opacity					
	Mean difference score	Std. dev.	Mann-Whitney score difference	Mann-Whitney Z	P
Groups	1.50	0.51	186.50	3.132	< 0.05
Visual acuity					
Groups	1.50	0.50	225.00	2.824	< 0.05

Discussion: Above 60% patients were having nebular type of corneal opacity. The minimum number of patients were having leucomatosus type. As corneal scarring obstructs normal pathway of light due to lost normal transparency of cornea visual problems are commonly observed. Overall significant result was obtained for both corneal opacity size and visual acuity in trial group in comparison to control group. Trial group also exhibited significant response in pre and post treatment, which was not observed in control group. However, the recovery was not so promising as

nebular corneal opacity revealed better result, but in case of leucomatosus corneal opacity, improvement could not be yielded as leucomatosus corneal opacity is due to damage of deeper layers of cornea like stroma, descemet's membrane and endothelium. Deep structures of cornea contain elastic fibers which lose their elasticity after any traumatic injury/ ulceration. Healing of this injury is followed by fibrosis and unrecoverable damage.

Lekhana, Tikshna, Vranaropak and Laghu properties of *Karpuranjana* are proved for breaking the *samprapti*⁹ of *Avrana Shukla* and also to reconstruct the corneal epithelium in normal way. Camphor reduces the cytochrome P (CYP) 4504B₁ activity¹⁴ and CYP4B1 is associated with neovascularization of corneal in animal models¹⁵. *Vatakshira* (latex) contains -sterols and triterpenoids¹⁶ and latex is having anti-inflammatory effects¹⁷. Anti-inflammatory drugs are observed with positive responses against corneal opacity¹⁸. So, combination of camphor works through two different modes. A detailed study with various types of vehicles for present formulation is required.

Conclusion: *Karpuranjana* was more effective in superficial *Avrana shukla*. Prolonged or continuous use reduces area of corneal opacity resulting in decreasing number of corneal blindness.

Conflict of Interest: No Conflict of Interest

References:

- Rodriguez, J., Sanchez, R., Munoz, B., West, S.K., Broman, A., Synder, R.W., Klein, R. and Quigley, H. (2002). 'Causes of blindness and visual impairment in a population-based sample of U.S. Hispanics'. *Ophthalmology* Vol. 109 (4): 737-743.
- Oliva, M.S., Schottman, T. and Gulati, M. (2012). 'Turning the tide of corneal blindness'. *Indian Journal of Ophthalmology*. 60(5): 423-427.
- Agarwal, R., Bhardwaj, A., Dhiman, K.S. and Rani, M. (2016). 'Clinical Aspect of Diseases of Cornea in Ayurveda'. *International Journal of Ayurvedic Medicine*. 7(4):130-135.
- Khurana, A.K. and Khurana, B. (2007). 'Diseases of Cornea'. *Comprehensive Ophthalmology*. 4th ed. p.121-122. New Age International (P) Limited, Publishers, New Delhi.
- Kabade, R.D. and Gowda, S.T. (2017). 'Overall Review on Netra Kriyakalpa'. *Journal of Ayurveda and Integrated Medical Sciences*., 2(4): 176-180.
- Borkar, D.B. (2005). *Sartha Yogaratnakara*. Reprint. Vol 2. Netrarog Nidan, Chapter 42, p.568. Rajesh Ramesh Raghuvanshi Publications, Pune.
- Chunekar, K. (2010). *Bhavaprakash Nighantu*. Revised ed. Adhyaya 2, Karpooradi Varga, Shloka number 2-3, p. 166. Chaukhambha Bharati Academy, Varanasi.
- Ibid. Adhyaya 5, Vatadi Varga, shloka no. 2, p.501.
- Dhiman, K.S. (2013). *Shalakya Tantra Kriyakalpa Vigyan*. Anjan Vidhee, p. 110. Chaukhambha Vishwabharati Publication, Varanasi.
- Nema, H.V. and Nema, N. (2012). *Textbook of Ophthalmology*. Sixth Ed. pp.60-61. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
- Jogi, R. (2009). *Basic Ophthalmology*. Fourth Ed. p.111. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
- Kshemaraja Srikrishnadas. Transl. *Sushruta Samhita*. Uttaratantra 6/3. p.21. Srivenkateshwara Publishers, Mumbai.
- Jeffrey, H.L and Kozarsky, A. (1990). 'Visual Acuity'. Walker, H.K., Hall, W.D. and Hurst, J.W. Edi. *Clinical Methods: The History, Physical, and Laboratory Examinations*. 3rd Edition. Chapter 115. Butterworth-Heinemann, Boston.
- Mastyugin, V., Aversa, E., Bonazzi, A., Vafaes, C, Mileyal, P. and Schwartzman, M.L. (1999). 'Hypoxia-induced Production of 12-hydroxyeicosanoids in The Corneal Epithelium: Involvement of a Cytochrome P-4504B1 Isoform'. *The Journal of Pharmacology and Experimental Therapeutics*. 289(3): 1611-19.
- Nakano, M., Lockhart, C.M., Kelly, E.J. and Rettie, A.E. (2014). 'Ocular Cytochrome P450s and Transporters: Role in Disease and Endobiotic and Xenobiotic Disposition'. *Drug Metabolism Reviews*. 46(3): 247-260.
- Khaliq, H.A. (2017). 'A Review of Pharmacognostic, Physicochemical, Phytochemical and Pharmacological Studies on *Ficus benghalensis* L.' *Journal of Scientific and Innovative Research*. 6(4): 151-163.
- Mahajan, M.S., Gulecha, V.S., Khandre, R.A. Upaganlawar, A.B., Gangurde, H.H. and Upasani, C.D. (2012). 'Anti-edematogenic and Analgesic Activities of *Ficus benghalensis*'. *International Journal of Nutrition, Pharmacology, Neurological Disorders*. 2(2):100-104.
- Lim, H. and Koh, J.W. 'Effect of Anti-Inflammatory Eye Drops on Bacterial Keratitis'. *Biomedical Journal of Scientific & Technical Research*. 19(1): 14038-42.