

COUPLING AGENTS; COMPARISON OF EFFICACY OF 0.3 % ARTIFICIAL TEAR GEL WITH 2.5 % METHYLCELLULOSE IN VARIOUS PROCEDURES

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ABSTRACT..Objectives: To find out the uses of commercially available clear lubricant eye gel as coupling agent and compare it with 2.5 % methylcellulose in various procedures as 1. In Goldmann triple mirror for gonioscopy 2. In Abraham lens for Nd-YAG laser capsulotomy and iridotomy 3. In Area centralis lens for Grid laser photocoagulation 4. In Wide field lens for scatter or panretinal photocoagulation. **Study Design:** Prospective Comparative Study. **Setting:** Diagnostic and research Department of Ophthalmology, Allied Hospital, PMC, Faisalabad. **Period:** From 1st July 2008 to 31st December 2008. **Material and Patients:** Eighty patients, divided into two groups as each group having forty patients (40 eyes). One drop of topical anesthetic "Alcaine" proparacain hydrochloride was instilled twice in the eye, 5 minutes before starting the procedure. We used hydroxypropyl methylcellulose 0.3 % gel in the half of the patients eyes and used traditionally formulated hydroxypropyl methylcellulose 2.5% in the other half of the patients eyes and the findings were compared with each other. **Results:** 2.5 % methylcellulose was used in 40 eyes during Gonioscopy, Yag-laser iridotomy, Yag-laser capsulotomy and photocoagulation and was compared with 0.3 % hydroxypropyl methylcellulose gel in the same procedures in 40 other eyes. Post procedures clarity of view, comfort, irrigation of solution remnants, redness and stinging sensation were compared with the both coupling agents. The 0.3% gel showed good results.

INTRODUCTION

Under normal conditions the anterior chamber angle can not be viewed directly through the cornea, because light coming from the angle under goes total internal reflection at the tear film air interface¹. The Goldmann gonioscopic lens over comes total internal reflection and makes visibility of the angle structures possible. But at the same time a coupling agent is required between contact lens and the cornea. So our study was conducted to obtain an alternative fluid satisfying these criteria.

The gonioscopy is the procedure to identify the angle structures and thus to grade the angle types for diagnostic purposes. Some time this is done for therapeutic purposes e.g trabeculectomy. The Goldmann triple mirror is also used for detailed fundus examination especially to see the peripheral retinal changes as lattice degeneration, holes or breaks etc².

Similarly photocoagulation is easily done with fundus contact lenses. These lenses fit to the cornea and with suction effect, keep the eye ball in control. This facilitates the easy laser delivery to the desired retinal area. Other different contact lenses as Grid lens which is used for Grid laser, wide field lens for focal, scatter or pan retinal photocoagulation need a coupling agent or fluid between the cornea and the contact lens. Hydroxypropyl methylcellulose 2.5% is well established as the convenient gonioscopy solution. The methyl cellulose which is used for intraocular surgery is also used as a coupling agent for different contact lenses.

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The use of hydroxypropyl methylcellulose 2.5% and methylcellulose showed a lot of inconveniences due to prolonged blurring of the vision after their use and required frequent need for irrigation of their remnants. We started using hydroxypropyl methylcellulose 0.3% (Gen Teal gel from Novartis) as coupling agent and compared it to conventionally available hydroxypropyl methylcellulose 2.5%.

The ideal fluid for various contact lenses for gonioscopy and posterior segment examination and treatment at the slit lamp should be innocuous, nonirritant, transparent, non greasy, isotonic, water miscible or soluble, viscous, readily available and inexpensive³. So we conducted this study to obtain an alternative fluid satisfying above criteria.

PATIENTS AND METHODS

The study was carried out at diagnostic and Research Department of eye, Allied Hospital, Faisalabad from 1st July 2008 to 31st Dec. 2008. The patients were selected on the basis of history, examination and diagnosis. The history included the history of diabetes, hypertension, visual deterioration, ocular pain, medical and surgical details. The examination included, vision, refraction, SLE, IOP, and fundus examination. FFA was done to classify the CSME and NPDR or PDR.

The inclusion criteria was as :

1. age between 22-50 years
2. Any sex (male/Female)
3. Co-operative for examination, treatment & follow-up
4. Having Clear media

The followings were excluded from the study:

1. Age below 22 year and above 50 years
2. Cornea, lens or vitreous opacities
3. Having significant pterygium, allergic conjunctivitis
4. Corneal erosions or ulcers.
5. Having history of cataract extraction glaucoma

filtration surgery, PRK or LASIK etc.

6. Mentally retarded or uncooperative patients.

Considering the above criteria, eighty patients were selected and divided into two groups each having forty patients.

In group-I (40 eyes), the methylcellulose 2.5 % was used as coupling agent and in other group-II (40eyes), hydroxypropyl methylcellulose 0.3% gel was used as coupling agent.

We compared the clarity of view, comfort during and after the procedure (diagnostic, therapeutic), viscosity of the solutions, ease to use, need for irrigation of remnants of the fluid, rapid visual recovery following the procedure etc.

RESULTS

The group 1st consisted of 40 eyes of forty patients (35 male and 5 female); while group-II had 40 eyes (30 male and 10 female patients). The grid lens was used in 20 eyes (20 patients) in group-I and 20 eyes (20 patients) in group-II. Wide filed lens for PRP was used in 10 eyes (10 patients) in group-I and 10 eyes (10 patients) in group-II, Abraham lens for ND-YAG laser was used for 5 eyes (5 patients) in each group. The Goldmann gonioscopic lens was used in 5 eyes (5 patients) in group-I and 5 eyes (5 patients) in group-II.

Table-I. Sex Determination

Group	Male	Female	Total
Group-I	35.(87.50%)	5(12.50%)	40(100%)
Group-II	30(75%)	10(25%)	40(100%)

Table-II. Coupling agents in various lenses

Group	No.of patients in which 2.5% methylcellulose Used	No. Of patinets in which 0.3% gel used	Type of lens
I	10	10	Grid
I	05	05	PRP
I	03	02	Abraham
I	02	03	Goldmann
Total	20	20	40

Table-III. Coupling agents in various lenses

Group	No.of patients in which 2.5 % methylcellulose used	No.of patients in which 0.3% gel used	Type of lens
II	10	10	Grid
II	05	05	PRP
II	02	03	Abraham
II	03	02	Goldmann
Total	20	20	40

Table-IV. Findings after use of coupling agents

Findings	25% Methylcellulose	0.3 % Gel
Clarity of view after 5 min	Good	Good
Comfort	Good	Good
Ease of use	Good	Good
Need of irrigation of solution remnants	Always	No need
Visual recovery after 5 min	Good	V. Good
Time of solution dripped out from contact lens	(Average) 8 Sec	7 Mints
Ease of removal of lens after use	Good	Excellent
Burning, Redness+Stinging sensation redness	Not seen	Not seen

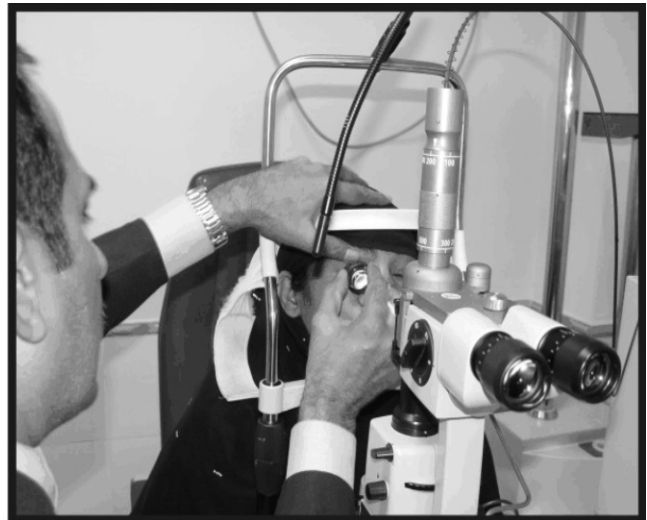
We discovered that there is no need to irrigate the various substances from the corneal surface or the eye

lids with the gel while it is often necessary following use of hydroxypropylmethyl cellulose 2.5%. There was no

stickiness on the cornea or eye lids after using gel. The gel could be easily washed off the contact lens with tap water without leaving any residue or film. The lens was

more easily removable after using the gel than methylcellulose. There was significant delay of slippage of gel (7 min average) than methyl cellulose (8 seconds).

Using Different Contact lenses in Different Procedures



DISCUSSION

The Gen Teal gel is a preservative free, aqueous solution containing hydroxypropylmethyl cellulose 0.3%, sodium chloride, boric acid, potassium chloride and sodium perborate, formulated by Novartis as lubricant for use in severe dry eye conditions and is available in squeezable

eye tubes⁴.

The most of the gonioscopes (Goldmann Gonio lens), and wide field lens need a coupling agent for their proper diagnostic or therapeutic usage. There is established wide use of 2.5% methylcellulose. The artificial tears and

normal saline are also used for the above purpose¹.

The researchers used K-Y jelly in the past for coupling agent. When we used the 2.5% Hydroxypropylmethyl cellulose in contact lens it dropped out faster from the lens as it was held in air, facing contact surface down. This effect was delayed with 0.3%gel Hydroxypropyle methylcellulose. So the gel 0.3% Hydroxypropyle methylcellulose allowed more time to put the lens up in the eye. The Hydroxypropyle methylcellulose 2.5% frequently causes matting or stickiness of the lashes. It needs proper cleaning, or washing of the eyes and lids after its use. Most of time it requires to wash the lids, Conjunctival Cul-de-Sac. Similarly it is difficult to wash from the ophthalmic instruments. If it retained on the lens for some time, it produces whitening or scaling over the lens. These finding were comparable to the international observations⁵.

In contrast, the gel does not require washing the eyes; it does not cause scaling over the lens surface. Simply wiping of the closed eye once is sufficient to clear off the gel.

The vision clears immediately following the use of gel, further it has added effect of lubrication to the cornea. So it provides a protective layer on the cornea and thus inhibits lacerations or ulceration. As the topical anesthesia can cause ulceration or decrease in blink response, so the gel has additional advantage against such problems. The discomfort faced by the patients is less with the gel.

The less discomfort following contact lens application with the gel may be explained as the gel having thick viscosity.

Another explanation may be that gel is preservative free,

and it turns into pure water and oxygen upon contact with the eye⁴.

The gel forms weaker bond with the contact lens. So the contact lens could be easily removed from the corneal surface at the end of the procedure. This bond was stronger when 2.5% methylcellulose was used as coupling agent, so the lens removal after the procedure was difficult, causing pain and discomfort.

CONCLUSION

The gel, (Hydroxymethylcellulose 0.3%) is characteristically, long acting dry eye lubricant and is effective, convenient, relatively affordable and safer coupling agent for diagnostic gonioscopy and therapeutic YAG laser iridotomy capsulotomy, grid laser, focal and pan retinal photocoagulation.

At the same time the gel is less bubble forming, easy to use for diagnostic examination and for laser photocoagulation with the appropriate contact lens.

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