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A new use of K-Y jelly as a gonioscopy fluid

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SUMMARY Methylcellulose drops varying in strength between 0·3% and 2·0% and isotonic saline are the fluids currently used for gonioscopy and posterior segment examination of the eye with diagnostic contact lenses. The author reports the use of K-Y jelly for such examinations in over 80 patients after having it used on his own eyes without any immediate or delayed ill effects. No observable difference was found between saline drops, methylcellulose drops of 0·3% and 2·0%, and K-Y jelly as regards the visibility of the anterior and posterior segments of the eyes. The more viscous fluids of 2% methylcellulose and K-Y jelly were more convenient to use, as they rarely allowed interposition of air bubbles between the cornea and the contact lens. K-Y jelly was well tolerated by all subjects.

An ideal fluid for use with the various diagnostic contact lenses for gonioscopy and posterior segment examination of the eye at the slit-lamp should be innocuous, non-irritant, transparent, non-greasy, isotonic, water miscible or soluble, viscous, readily available, and inexpensive. It should also be harmless to the contact lenses and other equipment with which it comes into contact, and should be available as a sterile fluid that is stable and durable.

Judged by these criteria each of the currently used fluids—isotonic saline, and methylcellulose 0·3%–2·0%—has some drawbacks. This study was therefore prompted by a need to obtain an alternative fluid satisfying these criteria. Having observed the use of K-Y jelly for laryngeal intubation for general anaesthesia, even for infants, and having known its use as a lubricant for the delicate and sensitive mucosae during gynaecological and surgical examinations, including cystoscopies, the author considered the jelly to be worth trying as a gonioscopy fluid.

Material and methods

K-Y jelly in squeezable tubes containing 42 g of the fluid was used on all subjects. The content of the tube is stated to be sterile until the seal is punctured. Before using it as a gonioscopy fluid its suitability on the grounds of its physical properties first, and then its physiological properties, was determined as follows.

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Establishment of transparency. One 'drop' each of normal saline, methylcellulose 0·3% Methocel 2% (methylcellulose), and K-Y jelly was placed over a printed glossy paper to ascertain and compare by visual judgment the transparency of these fluids.

Comparison of viscosity. The concavity of a dry gonioscopic contact lens was fully filled with each of these fluids in turn. The contact lens was then inverted to assess the viscosity by comparing the ease of spillage of the fluids.

Assessment of physiological properties. Having found K-Y jelly to be suitable on grounds of transparency and viscosity, before using the jelly for ocular examination I placed a 'drop' of the jelly from a freshly opened tube on my tongue and buccal mucosa and also on my nasal mucosa. No irritation or unacceptable immediate or delayed effect was experienced. I therefore had the jelly instilled in the lower conjunctival cul de sac of my eyes. Having experienced no ill effects, I subjected myself to a gonioscopic examination by a colleague. He reported normal visibility. Since then I have used K-Y jelly on over 80 patients for gonioscopy, Goldmann triple mirror funduscopy, and for corneal coating during xenon arc photocoagulation.

The chemical constituents of K-Y jelly were ascertained from the manufacturer (Johnson and Johnson). They would not divulge the exact quantities. This is a common practice adopted by most manufacturers. K-Y jelly is marketed in two packs—a large tube of 42 g which was used for this study, and a 5 g sachet. These each contain a different

preservative, but the same basic constituents: glycerol *BP*, propylene glycol *BP*, hydroxyethyl cellulose, hydrogen phosphate buffer, and water. The tube contains Paraben preservative, and the sachet contains chlorhexidine gluconate as a bacteriostat. The manufacturers have never recommended K-Y jelly for ocular use, and at present will not accept responsibility for it.

Cost comparisons of the various gonioscopic fluids were obtained from our hospital pharmacist.

Results

Assessed by visual judgment, no difference could be detected in the transparency of the various fluids. Each fluid—including K-Y jelly—had adequate transparency to allow reading the print on the glossy paper on which it was placed. Further, in the clinical situation no one fluid had a detectably superior or different transparency.

The comparison of viscosity by inverting a fluid-filled gonioscopic contact lens demonstrated the run-away characteristics of normal saline, and 0·3% hypromellose drops. The syrup-like fluid of 2% methylcellulose took longer to drip, and K-Y jelly remained steadfast in the cup of the inverted contact lens. This test, and the comparison of the appearance of the fluids, confirmed the jelly to be the most viscous.

The jelly produced no immediate or delayed ocular irritation or intolerance, nor did it produce any visual complications. Even after instillation in my unanaesthetised eyes there was no hyperaemia. The jelly did not leave any sticky feeling or residue on the cornea after about a minute or so. Five minutes after gonioscopy with K-Y jelly the subjective vision was as before, and no difficulty was encountered in conducting retinoscopy and ophthalmoscopy. Application of the jelly to the cornea of an eye kept open with a speculum for xenon arc photocoagulation ensured clarity of the cornea for longer periods than with hypromellose drops. No difference was observed in the quality or quantity of retinal reaction to the photocoagulation. The jelly could be easily washed off the contact lens with tap water, without leaving any residue or greasy film.

Comparisons of costs showed K-Y jelly to be the cheapest at 42 p for a 42 g tube. Normal saline in 10 ml bottles costs 60 p. Normal saline minims cost £2·70 per 20 units. Methylcellulose drops of 0·3%, 0·5% and 2% uniformly cost £3·50 per 10 ml bottle. As an approximate estimation one tube of K-Y jelly should allow nearly 400 gonioscopic examinations, while a 10 ml bottle of drops, with the minimum effective amount of 2 drops, should allow nearly 80 examinations. Saline minims are sterile and therefore each minim can be freshly opened for a gonioscopy. The 10 ml bottles of saline and methylcellulose drops as well as the K-Y jelly are sterile in their containers until the seal is opened. The tube of K-Y jelly once opened will have to be stored the longest to be used up.

Discussion

The forces that hold a diagnostic contact lens in situ during the clinical examination are surface tension and perhaps partial vacuum if an incompletely filled cup of the gonioscopic lens is gently pushed on to the cornea to dispel air. In clinical practice the more viscous the fluid the more convenient it is found to be. When the viscous fluids are used, a light-weight contact lens such as the Goldmann fundus lens weighing 2 g and a gonioscopy lens weighing 4·2 g, can be left unheld for some time even with the patient sitting at the slit-lamp. This is useful when teaching or when different clinicians need to see the patient at one sitting. In this respect K-Y jelly was found to be the most efficient. Some of the practical difficulties encountered with gonioscopy fluid and measures for avoiding these difficulties have been the subject of correspondence recently.[1,2]

Federman *et al.*[3] have described the use of sodium hyaluronate 1% to maintain clarity of the cornea during vitreoretinal surgical procedures. Justifiable as it may be during surgical procedures, the use of sodium hyaluronate for outpatient gonioscopy cannot be justified because of its exorbitant cost. Conversely, the innocuousness of K-Y jelly for 'intraocular' use needs to be established before it can be used during vitreoretinal operations (as some fluid is likely to seep from under the contact lens into the surgical wound), and for coating of intraocular implants during cataract surgery to minimise corneal endothelial damage. My personal experience after insertion of the jelly into my conjunctival fornix was of great comfort. It may therefore be possible for K-Y jelly to be used for dry eyes, especially nocte. The only patient with advanced cicatricial ocular pemphigus on whom I have used K-Y jelly for ocular lubrication reported significant improvement in comfort over that obtained from hypromellose drops. However, clinical trials need to be undertaken before advocating this therapy.

COST AND ACCEPTABILITY

The main consideration of any therapeutic or diagnostic agent should be its effectiveness, but cost and acceptability must also be taken into consideration. K-Y jelly certainly is the cheapest gonioscope fluid available. It was not unacceptable to the patients. However, its packaging in a large tube could be unacceptable to the clinician on aesthetic and handling grounds, especially as once opened the tube

is likely to be stored for some time, thus losing its sterility. Perhaps packaging in smaller tubes similar to those used for eye ointments is likely to be more acceptable—though it may make it more expensive, thus losing its considerable advantage of cheapness. I feel justified in using a 'bulk buy' product that is convenient, effective, cheap, and not proved unsafe.

CONCLUSION

K-Y jelly is an effective, convenient, and the cheapest fluid that can safely be used for diagnostic contact lens examinations, and perhaps also for laser trabeculotomies and photocoagulation with the appropriate contact lens. Extensive study is necessary to establish its innocuousness before contemplating its *intraocular* use as an alternative or adjunct to sodium hyaluronate.

References

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