

LETTER TO THE EDITOR

Disinfection of Tonometer Prisms and Examination Contact Lenses in Ophthalmic Departments

Sir,

Applanation tonometry carries a risk of cross infection. Important possible pathogens include Human Immunodeficiency virus (HIV), Herpes and Adenoviruses. Various methods have been employed for the disinfection of tonometer prisms and examination contact lenses. In order to evaluate current practice in this country we have surveyed ophthalmic outpatient departments in England.

Departments were identified from the Directory of Hospitals. A questionnaire was sent to the nurse in charge of each department requesting details of procedures used for disinfection of tonometer prisms and examination contact lenses.

Of 305 departments surveyed replies were obtained from 269 (88.2%). Of those departments responding 107 (39.8%) disinfected tonometer prisms (Table I) and 44 (16.4%) examination contact lenses (Table II) in a manner approved by the College of Ophthalmologists.^{1,2} A variety of non-approved methods were in use, (Tables III and IV).

The Goldman applanation tonometer is widely used in ophthalmology. By contacting the eye the Methylmetha-

crylate prism is a potential source of cross infection. Various authors have evaluated contamination and methods of disinfecting tonometer prisms.³⁻⁹ With the advent of Human Immunodeficiency Virus (HIV) Infection and its associated high mortality, prevention of cross infection assumes great importance. To this end the then Faculty of Ophthalmologists outlined in a letter¹ to consultants the threat posed by HIV infection. Whilst there is no evidence of any transmission of HIV by procedures carried out by ophthalmologists nor by any secretion other than semen, the theoretical possibility of cross infection exists as active virus may be present in tears¹⁰ and conjunctival epithelial cells.¹¹ In addition to recommending usual cleanliness the Faculty endorsed the policy of the American Academy of Ophthalmologists with respect to disinfection of tonometer prisms and examination contact lenses.²

As it is likely that cross infection occurs more frequently via the fingers of health workers than via contaminated instruments,^{12,13} hands should be washed between patients. Gloves should be worn where convenient and are advisable where a break or inflammation of the skin is present. Instruments, including tonometer prisms and contact lenses should be wiped clean then disinfected by soaking for five to ten minutes in any of the following solutions: 3% Hydrogen Peroxide (fresh), any

Table I Approved soaking solutions used in disinfection of tonometer prisms

	Departments
Source of free chloride	84
Hydrogen Peroxide	21
Glutaraldehyde	2
	—
	107

Table II Approved soaking solutions used in disinfection of examination contact lenses

	Departments
Source of free chloride	30
Hydrogen Peroxide	13
Glutaraldehyde	1
	—
	44

Table III Non-approved soaking solutions used in disinfecting tonometer prisms

Chlorhexidene	58
Phenylmercuric compounds	8
	—
	66

Table IV Non-approved methods used in disinfecting examination contact lenses

<i>a) soaking solutions</i>	
Chlorhexidine	2
Phenylmercuric compounds	1
Saline	1
	—
	4
	—
<i>b) rinsing solutions</i>	
Water	67
Saline	4
Source of free chloride	3
Chlorhexidine	2
other	4
	—
	80
	—
<i>c) wipes</i>	
Alcohol	22
Dry	22
Chlorhexidine	13
Source of free chloride	3
Hydrogen Peroxide	2
Other	3
	—
	65

source of 5,000 ppm free chloride, 70% ethyl or isopropyl alcohol, or 2% glutaraldehyde. Instruments should then be rinsed to remove the soaking solution and dried. It has since been reported that 70% isopropyl alcohol damages tonometer prisms.¹⁴ This protocol and selection of soaking solutions should effectively inactivate HIV and other pathogens of ophthalmic importance such as herpes and adenoviruses.^{5,15-17} Traditional disinfectants, phenylmercuric compounds and aqueous chlorhexidine are not virucidal.¹⁹ Isopropyl alcohol whilst being effective against HIV is not virucidal for adenovirus.¹⁹ The efficacy of alcohol in killing HIV has been questioned recently by Hanson,²⁰ although this work has yet to be confirmed.

It is of interest and concern that of responding Out Patient Departments in England only 16% soak their tonometer prisms and 20% their examination contact lenses in a recommended virucidal solution.

Michael W. Austin FRCS Ed FCOphth

David I Clark FRCS Ed FCOphth

Carol A. Moreton DO

Department of Ophthalmology

Walton Hospital

Liverpool

REFERENCES

1. British Ophthalmologists & AIDS The Faculty of Ophthalmologists. Newsletter, October 1985.
2. Recommendations for preventing possible transmission of HTLV III/LAV from tears. *Morbidity and Mortality Weekly Report* 1985, **34**: 533-4.
3. Craven ER, Butler SL, McCulley JP, Luby JP: Applanation tonometer tip sterilization for adenovirus type B. *Ophthalmology* 1987, **94**: 1538-40.
4. Ventura LM and Dix RD: Viability of Herpes simplex virus type 1 on the applanation tonometer. *Am J Ophthalmol* 1987, **103**: 48-52.
5. Clarke SKR, Dean-Hart JC, Barnard DL: The disinfection of instruments and hands during outbreaks of epidemic keratoconjunctivitis. *Trans Ophthalmol Soc UK* 1972, **92**: 613-8.
6. Corboy JM and Borchardt KA: Mechanical sterilization of the applanation tonometer. *Am J Ophthalmol* 1971, **71**: 889-93.
7. Thomsen VF and Norn MS: Disinfection of Goldmann's applanation tonometer prism by means of ultraviolet light. *Acta Ophthalmol* 1969, **47**: 1207-18.
8. Norn MS and Thomsen VF: Contamination of the applanation tonometer prism. *Acta Ophthalmol* 1968, **46**: 712-20.
9. Mitsui Y, Hanna L, Hanabusa J *et al*: Association of adenovirus type 8 with epidemic keratoconjunctivitis. *Arch Ophthalmol* 1959, **61**: 891-9.
10. Fujikawa LS, Salahuddin SZ, Palestine AG, Masur H, Nussenblatt RB, Gallo R: Isolation of the Human T-lymphotropic virus type III from the tears of a patient with the acquired immunodeficiency syndrome. *Lancet* 1985, **2**: 529-30.
11. Fujikawa LS, Salahuddin SZ, Ablashi D, Palestine AG, Masur H, Nussenblatt RB, Gallo RC: Human T Cell Leukaemia/Lymphotropic virus type III in the conjunctival epithelium of a patient with AIDS. *Am J Ophthalmol* 1985, **100**: 507-9.
12. Dawson CR, Hanna L, Wood TR, Despain R: Adenovirus type 8 Keratoconjunctivitis in the United States. *Am J Ophthalmol* 1990, **69**: 473-80.
13. Dawson CR and Darell R: Infection due to adenovirus type 8 in the United States I. An outbreak of epidemic keratoconjunctivitis originating in a physician's office. *New Eng J Med* 1963, **268**: 1031-7.
14. Key CB and Whitman J: Alcohol soaking damages applanation tonometer heads. *Arch Ophthalmol* 1986, **104**: 800.
15. Klein M and Deforest A: Principles of viral inactivation in: Block S.S. (ed), Disinfection, sterilization and preservation. 3rd ed. Philadelphia. Lea & Febiger 1983: 422-34.
16. Spire B, Barre-Sinoussi F, Montagnier L, Chermann JC: Inactivation of Lymphadenopathy associated virus by chemical disinfection. *Lancet* 1984, **2**: 899-901.
17. Martin LS, McDougal JS, Loskoski SL: Disinfection and inactivation of Human T-Lymphotropic virus type III. *J Infect Dis* 1985, **152**: 400-3.
18. Russell AD, Hugo WB, Ayliffe GAJ: Principles and practice of disinfection, preservation and sterilization. Oxford Blackwell Scientific Publications 1982; 125.
19. Naginton J, Sutethall, GM, Whips P: Tonometer disinfection and viruses. *Br J Ophthalmol* 1983, **67**: 674-6.
20. Hanson PJV, Gor D, Jeffries DJ, Collins JV: Chemical inactivation of HIV *Br Med J* 1989, **298**: 862-4.