Diagnosis of external ocular infections: microbiological processing and interpretation

Editor,—I read with interest the recently published article by Pinna et al.,1 and compliment the authors for bringing to light the important issue of external ocular infections associated with coagulase negative staphylococci (CoNS). Ocular microbiologists rarely pay attention to the speciation of this group of bacteria and various species involved in ocular infections are generally passed off as *Staphylococcus* species or CoNS without attention. This group of staphylococci needs special attention with respect to their role in pathogenicity. Generally, *S. epidermidis* and other CoNS along with corynebacteria and propionibacteria are normal commensals of the conjunctival sac and lids; therefore samples from the external ocular surface resulting in a light growth on primary solid culture medium like blood agar or from a thioglycolate broth, are more likely to be contaminated with skin contamination.2 In our laboratory and many others across the world, a bacterial isolate (more so a known commensal organism) from corneal scrapings or conjunctival/lid swab is considered significant if it is consistent with the clinical signs and fulfills any one of the following criteria: (1) results of direct smear of the sample are consistent with culture; (2) the same organism is grown in more than one medium; or (3) the same organism is grown from repeated specimens. However, Pinna et al.,3 in their article, have not indicated adherence to any such criteria while selecting isolates for their study, though they have actually isolated and tested them as “clinically significant”. Their methodology of including just two media (thioglycolate broth and Sabouraud’s dextrose agar) as primary culture media also does not conform to the recommended methods of microbiological investigation of streptococci, streptococci and, keratitis.4 Though the authors did not intend to determine the etiology of CoNS in external ocular infections, the methodology details provided by them can be misleading. Another concern raised by their article is the interpretation of bacterial susceptibility testing by agar disc diffusion. As stated by Dr Sharma, a bacterial isolate from corneal scrapings or conjunctival/swab is generally considered significant whenever there is (1) growth in one medium with consistent direct microscopic findings, or (2) growth of the same organism on two or more media, or (3) the same organism is grown from repeated specimens. However, when a bacterial isolate is consistent with the clinical signs, isolation of the organism even from a single medium can be considered significant. In our study, corneal scrapings for Gram stain were performed only on the patients with suppurative keratitis. In all cases the Gram stain showed the presence of gram-positive clusters of Gram positive cocci. Follow up cultures performed about 12 hours after the last dose of medication showed eradication of the infecting organism in all 45 patients. According to our and other authors’ experience (Leventer DB, presented at the AAO Annual Meeting, San Francisco, 1997), thioglycolate broth is an adequate, cost effective, primary culture medium for the detection of aerobic and anaerobic bacteria in external ocular infections, especially when the patients show clear signs and symptoms of infection. Antibiotic susceptibility tests were determined by agar disc diffusion (Kirby-Bauer method). The disc diffusion technique requires labelling of bacteria as resistant, sensitive, or intermediate. The authors have not clarified the way the “intermediate” group was dealt with, or was no such group noticed in any of the 55 isolates tested by them? Similarly, the reason for testing susceptibility to penicillin is far from clear since CoNS are known to be resistant to penicillin and penicillin is not commonly used to treat external ocular infections. Moreover, much valuable data could have been obtained by determining the minimum inhibitory concentration of the antibiotics against CoNS.

Replay

Editor,—We thank Dr Sharma for her interest in our article on the identification and antibiotic susceptibility testing of coagulase-negative staphylococci (CoNS) isolated in corneal/external infections. Apart from being a common component of the normal ocular flora, CoNS may occasionally be important ocular pathogens and cause chronic blepharitis, acute conjunctivitis, and suppurative keratitis. As stated by Dr Sharma, a bacterial isolate from corneal scrapings or conjunctival/swab is generally considered significant whenever there is (1) growth in one medium with consistent direct microscopic findings, or (2) growth of the same organism on two or more media, or (3) the same organism is grown from repeated specimens. However, when a bacterial isolate is consistent with the clinical signs, isolation of the organism even from a single medium can be considered significant. In our study, corneal scrapings for Gram stain were performed only on the patients with suppurative keratitis. In all cases the Gram stain showed the presence of gram-positive clusters of Gram positive cocci. Follow up cultures performed about 12 hours after the last dose of medication showed eradication of the infecting organism in all 45 patients. According to our and other authors’ experience (Leventer DB, presented at the AAO Annual Meeting, San Francisco, 1997), thioglycolate broth is an adequate, cost effective, primary culture medium for the detection of aerobic and anaerobic bacteria in external ocular infections, especially when the patients show clear signs and symptoms of infection. Antibiotic susceptibility tests were determined by agar disc diffusion (Kirby-Bauer method), a technique which labels bacteria as “resistant”, “intermediate”, or “sensitive”. Although we found helpful or “intermediates” isolates (Table 1), our main concern was to draw attention exclusively to the large number of “resistant” strains. Indeed, in Table 2 of the published article we reported the ratio of “resistant” isolates/total isolates. Dr Sharma’s criticism on this point is difficult to understand, since in a recent paper she and her co-workers included “resistant” and “intermediate” strains in a single group labelled as resistant, instead of maintaining the distinction between the two groups.

Susceptibility to penicillin was tested because our microbiologists are involved in a study on resistance to β-lactams in CoNS isolated from different sites (blood, eye, etc). As part of this survey, penicillin resistant isolates were also tested for resistance to methicillin (data not shown). The Kirby-Bauer method is generally recommended for routine antibiotic susceptibility testing of bacteria.5 On the other hand, this method was also used extensively by Sharma and co-workers in their paper.6 Determining the minimal inhibitory concentration may provide more useful information, especially while testing clinically relevant antibiotics such as vancomycin, teicoplanin, and methicillin.

Table 1 Antibiotic susceptibility testing of coagulase negative staphylococci

<table>
<thead>
<tr>
<th>Species</th>
<th>Penicillin</th>
<th>Gentamicin</th>
<th>Tetracycline</th>
<th>Erythromycin</th>
<th>Ciprofloxacin</th>
<th>Teicoplanin</th>
</tr>
</thead>
<tbody>
<tr>
<td>S epidermidis</td>
<td>0/42*</td>
<td>5/42</td>
<td>1/36†</td>
<td>0/42</td>
<td>1/42</td>
<td>0/42</td>
</tr>
<tr>
<td>S hominis</td>
<td>0/4</td>
<td>0/4</td>
<td>0/4</td>
<td>0/4</td>
<td>0/4</td>
<td>0/4</td>
</tr>
<tr>
<td>S capitis</td>
<td>0/3</td>
<td>0/3</td>
<td>0/3</td>
<td>0/3</td>
<td>0/3</td>
<td>0/3</td>
</tr>
<tr>
<td>S simulans</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
</tr>
<tr>
<td>S equorum</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
</tr>
<tr>
<td>S lugdunensis</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
<td>0/1</td>
</tr>
<tr>
<td>Total</td>
<td>0/55</td>
<td>6/55</td>
<td>1/49†</td>
<td>0/55</td>
<td>1/55</td>
<td>0/55</td>
</tr>
</tbody>
</table>

*Numbers indicate intermediate isolates/total isolates.
†Susceptibility to tetracycline was not performed in six isolates.

2 Andrew J, Grando D. Laboratory diagnosis of eye infection. In: Lee N, ed. Clinical microbiology update programme (No 33). UNSW, Australia: NSW branch of ASM and the School of Microbiology and Immunology, 1992.
6 Laser pointers can cause permanent retinal injury if used inappropriately.
purchased by children. A new version of the traditional, and dangerous children’s game of “chicken” had developed in relation to these new “toys”, the game of “chicken” being won by the child who could stare directly into the laser beam for the longest period. We concluded, “this makes laser pointers potentially dangerous in the hands of children.” Fortunately, trading standards agencies throughout the UK have moved to ban sale of these laser pens and a number of legal cases are pending with regard to their sale. There have also been successful prosecutions brought against individuals who have deliberately used these laser pen devices to cause temporary dazzle and visual disturbance, without permanent retinal damage.

We therefore were particularly interested in the recent RJFJ perspective by Professor John Marshall.1 In an otherwise erudite and comprehensive review we were very surprised to read his conclusions, “laser pointers, pens, or key rings if used appropriately are not an eye hazard, and even if used inappropriately will not cause permanent eye damage.” [Our italics] It has long been a physician’s maxim that always and never can rarely be applied to human biology, even if perceived risks are low. Indeed, all the majority of laser pens examined by us at the time had an output of less than 5 mW, it seemed reasonable to conclude in our article that there was the potential for laser damage if these items were used inappropriately.

A recent article by Luttrull and Hallisy2 is therefore of significant importance to any ophthalmologist dealing with clinical cases relating to laser pen exposure. In this reported case, a 34 year old Hispanic mail clerk was reviewed 2 days after deliberately staring into the beam of a class 3A (USA) laser pointer, held 8–10 inches from the eye, for 30–60 seconds. The laser device in question had a maximum power rating of 5 mW at a wavelength of 670 nm. Although the subject maintained 20/20 vision with a normal Amsler chart, he exhibited a focal disturbance of the retinal pigment epithelium in the left nasal macula despite the absence of his central scotoma. The right eye of this 34 year old was entirely healthy on intravenous fluorescein angiography, but the left eye demonstrated a window-type defect and hyperfluorescence in the area of the pigment disturbance within the macula. The authors concluded, “laser-pointing devices can cause macular injury when used inappropriately. Conformance with consumer safety recommendations should minimize potential hazards.”

Although we agree the risks of lasting injury from laser pointing devices are remote,1 it cannot categorically be stated that there is no risk.3 While transient exposure is unlikely to cause permanent ocular damage, this case demonstrates that the authors’ initial warnings about the theoretical risk of injuries from staring into these devices were warranted.4 The ophthalmic clinician should therefore be aware of the potential for retinal injury from gross misuse of laser pointers and these “toys” must be kept out of the hands of children and those who might use them inappropriately.


Reply

EORTOR—In writing this article1 I addressed five issues. Firstly, to counteract media “hype” on the “blinding potential” of laser pointers by explaining the biophysical principles involved in beam tissue interactions and, as a consequence, the potential danger of such devices as retinal hazards. Secondly, I wished to address a degree of confusion generated by a misleadingly titled, well-circulated, but non-peer-reviewed article. Thirdly, I wished to give guidance to casualty and medical personnel first confronted with individuals who had experienced exposure to laser pointers. Fourthly, I thought it helpful to explain the differences in fundamental problem implicit in housing the world’s major producers and major market and the European Union.5 Finally, I wanted to highlight the fact that, although the derived safety criteria and system classifications varied between countries and practices, all the classifications were dependent on a common database.

McGhee et al confused the issue of classification and potential risk in their periodical communications and potential risk in their periodical current letter. A laser pointer that goes from a 3A classification in the United States does not suddenly become more hazardous by traveling across the Atlantic. Although it moves into a 3B category within the European Union, it is still the same laser and still has the same risk profile as it had in the United States as a 3A system.

Almost all of the UK database for retinal damage that is incorporated in the various codes of practice was derived through collaboration between my laboratory and the then Institute of Aviation Medicine, Farnborough, Hampshire. The same risk profile as it had in the United States does not suddenly become more hazardous by traveling across the Atlantic. Although it moves into a 3B category within the European Union, it is still the same laser and still has the same risk profile as it had in the United States as a 3A system.

In their final paragraph, McGhee et al agree that the risks of permanent retinal injury remain remote, but they state that “there can never be zero risk.” In all safety criteria documents the aim is to reduce risk to an insignificant level. I reiterate that current US safety standards satisfy these criteria. I also reiterate that, notwithstanding the report of Luttrull and Hallisy, to date there is no evidence of irreversible retinal damage sustained from viewing laser pointers.

JOHN MARSHALL
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NOTICES

External eye infections

The latest issue of Community Eye Health (no 30) discusses external infections of the eye. Included are papers on conjunctivitis, corneal ulcer, and transmission and control of infection. For further information please contact Community Eye Health, International Centre for Eye Health, Instituto de Oftalmología, 11–43 Bath Street, London EC1V 9EL. (Tel: (+44) 171 608 6909/6910/6923; fax: (+44) 171 250 3207; email: eyeresource@ucl.ac.uk). Annual subscription £25. Free to workers in developing countries.
Residents’ Foreign Exchange Programme
Any resident interested in spending a period of up to one month in departments of ophthalmology in the Netherlands, Finland, Ireland, Germany, Denmark, France, Austria, or Portugal should apply to: Mr Robert Acheson, Secretary of the Foreign Exchange Committee, European Board of Ophthalmology, Institute of Ophthalmology, University College Dublin, 60 Eccles Street, Dublin 7, Ireland.

16th Congress of the International Society for Geographical and Epidemiological Ophthalmology (ISGEO)
The 16th Congress of the ISGEO will be held at the Institut D’Ophthalmologie Tropicale De L’Afrique (IOTA) in Bamako, Mali on 21–22 February 2000. Further details: Dr Paul Courtright, ISGEO Secretary, BC Centre for Epidemiologic & International Ophthalmology, University of British Columbia, St Paul’s Hospital, 1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada (email: pcourtright@stpaulshosp.bc.ca; website: www.interchange.ubc.ca/bcco/isgeo).

Office of Continuing Medical Education
The Baylor College of Medicine, Cullen Eye Institute, Department of Ophthalmology is presenting a course entitled “The Cullen course 2000—clinical advances in ophthalmology for the practising ophthalmologist” at the Houstonian Hotel and Conference Center, 111 North Post Oak Road, Houston, Texas from 3–5 March 2000. Further details: Carol J Soroka, Conference Coordinator, Office of Continuing Medical Education, Baylor College of Medicine, One Baylor Plaza-S104, Houston, TX 77030, USA. (Tel: 713 798-5600.)

Leonhard Klein Foundation
The Leonhard Klein Foundation in the Donors’ Association for the Promotion of Sciences and Humanities in Germany is to bestow the Leonhard Klein Award 2000 of DM 30,000 for innovative work in the development and application of microsurgical instruments and microsurgical operating techniques. Deadline for applications is 31 March 2000. Further details: Stifterverband fur die Deutsche Wissenschaft e V, Herrn Peter Beck, Postfach 16 44 60, D-45224 Essen, Germany.

American Institute of Ultrasound in Medicine
The American Institute of Ultrasound in Medicine will hold the 44th annual convention in San Francisco, California on 2–5 April 2000. Further details: AIUM Professional Development Department, 14750 Sweitzer Lane, Suite 100, Laurel, MD 20707-5906 (tel: 800-638-5535; fax: 301-498-4100; email: cont_edu@aium.org; website: www.aium.org).

XXII Tuebingen Detachment Course
The XXII Tuebingen Detachment Course, retinal and vitreous surgery, will be held in the congress centre Incheba, Bratislava, Slovak Republic 6–7 April 2000 preceding the congress on retinal detachment of the Slovak Ophthalmological Society 8–9 April 2000. Further details: Professor Peter Strmen 81369 Bratislava, Mickelevizicova 13 (tel/fax: 00421-7-52964641; email: strmen@faneba.sk).

VIIth Mediterranean Ophthalmological Society
The combined meeting of the VIIth Mediterranean Ophthalmological Society and the VIIth Michaelson Symposium on Ocular Circulation and Neovascularisation will be held in Jerusalem on 21–26 May 2000. Further details: Secretariat, c/o Unitours Israel Ltd, PO Box 3190, 61031 Tel Aviv, Israel (tel: +972-3-5200999; fax: +972-3-5230909; email: meetings@unitours.co.il). The VIIth Michaelson medal and award will be delivered on 24 May 2000 in Jerusalem. The medal and award (IS$ 1,000 million prize) are sponsored by the Israel Academy of Sciences and Humanities and by the Hadassah Hebrew University Hospital and Medical School of Jerusalem, Israel. Nominations are sought from the ophthalmic community at large. Suggestions and reasons for choice and CV highlights should be sent to Professor David BenEzra, Secretary for the International Nominating Committee, Pediatric Ophthalmology Unit, Hadassah Hebrew University Hospital, PO Box 12000, Jerusalem 91120, Israel.

5th International Vitrectoreal Meeting-IIV 2000
The 5th International Vitrectoreal Meeting—IIV 2000 will be held in Parma, Italy, on 26–27 May 2000. The main topics will include “Hypotony and glaucoma in vitreoreal surgery”, “Internal limiting membrane surgery”, “Macula oedema”, “Open globe injuries”, and “News in retinal pigment epithelium”. Further details: C Cantu, MA De Giovanni, or S Tedesco, Scientific Secretary, Institute of Ophthalmology, University of Parma, Via Gramsci 14, 43100 Parma, Italy (tel: ++39 0521 292106; fax: ++39 0521 2922588; email: muzzi@ipruniv.unicc.unipr.it).

International Strabismological Association
The International Strabismological Association (ISA) has established fellowships for training in strabismus and paediatric ophthalmology, supported by ISUS 10,000 each. Further details: Secretary/Treasurer ISA, Derek T Sprunger, MD, Indiana University School of Medicine, 702 Rotary Circle, Indianapolis, Indiana 46202-5175, USA. The last day of application is 15 June 2000 (tel: (317) 274-1214; fax: (317) 274-1111).

XXIV Nordic Congress of Ophthalmology
The XXIV Nordic Congress of Ophthalmology will be held in Reykjavik, Iceland, 18–21 June 2000. This meeting celebrates the 100 year anniversary of the Nordic Ophthalmology Conference. Further details: Iceland Incentives Inc, Hamrarborg 1–3, Is- Kópavogur, Iceland (tel: +354 554 1400; fax: +354 554 1472; email: incentivist@inmy.is).

13th Annual Meeting of German Ophthalmic Surgeons
The 13th annual meeting of German Ophthalmic Surgeons will be held on 15–18 June 2000 at the Meistersingerhalle, Nuremberg, Germany. Further details: MCN Medizinische Congress-organisation Nuremberg AG, Zerzabelhofstrasse 29, D-90478 Nuremberg, Germany (tel: +49-911-3931621; fax: +49-911-3931620; email: doerflinger@mcn-nuernberg.de).

Joachim Kuhlmann Fellowship for Ophthalmologists 2000
The Joachim Kuhlmann AIDS Foundation, Essen, Germany, is sponsoring two fellowships per year for ophthalmologists at a well known institute, who want to train in CMV retinitis and other HIV related ophthalmological diseases. The fellowships are valued at ISUS$5000 each. Deadline for application is 31 July. Detailed applications, including CV and publication list, should be sent to the Joachim Kuhlmann AIDS Foundation, Bismarckstrasse 55, 45128 Essen, Germany (tel: 0201 87910-87; fax: 0201 87910-99; email: jsktstiftung@t-online.de).

DR-2000, International Forum on Diabetic Retinopathy
The International Forum on Diabetic Retinopathy will take place on 7–9 September 2000 at the Palazzo Reale, Naples, Italy. Further details: Francesco Bandello, Congress Secretary, MIR Congress, Via Servito Tullio, 4, 20123 Milano, Italy (tel: 39 02 430371; fax: 39 02 48008471; email: dr2000@mgir.it).

13th Afro-Asian Congress of Ophthalmology
The 12th Afro-Asian Congress of Ophthalmology (Official Congress for the Afro-Asian Council of Ophthalmology) will be held on 11–15 November 2000 in Guangzhou (Can ton), China. The theme is “Advances of ophthalmology and the 21st century”. Further details: Professor Lezhong Wu, Zhongshan Eye Center, SUMS, New Building, Room 919, 54 Xianlie Nan Road, Guangzhou 510060, PR China (tel: +86-20-8760 2402; fax: +86-20-8777 3370; email: lwuicsc@gzsums.edu.cn).

Singapore National Eye Centre 10th Anniversary International Congress
The Singapore National Eye Centre 10th Anniversary International Congress will be held in conjunction with 3rd World Eye Surgeons Society International Meeting on 2–4 December 2000 at the Shangri-La Hotel, Singapore. Further details: The Organising Secretariat, 11th Third Hospital Avenue, Singapore 168751 (tel: (65) 2277255; fax: (65) 2277290; internet: www.snee.com.sg).

The Hong Kong Ophthalmological Symposium 00
The Hong Kong Ophthalmological Symposium 00 will be held 4–5 December 2000, in Hong Kong, China. Further information: Miss Vicki Wong, Room 802, 8/F Hong Kong Academy of Medicine, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong (tel: (852) 2761 9128; fax: (852) 2715 0089; email: colk@netvigator.com).