Comment

Arteritic CRAO requires urgent treatment with corticosteroid.[1] Non-arteritic CRAO occlusions are usually caused by emboli of various compositions from the carotid arteries or the heart. Thirty per cent of patients have valvular disease.[4] CRAO is usually associated with a poor visual outcome[1] as the first eye of our patient demonstrates. Experimental studies in the rhesus monkey found irreversible retinal damage at 105 min.[5] CRAO is, however, rarely complete and useful vision can be restored if treatment is begun even several hours after onset.

Described treatments aim at reducing the intraocular pressure, thus reducing resistance to inflow from the central retinal artery. This increases the pressure differential across the central retinal artery and increases the perfusion pressure of the eye. It is alleged that an increase in retinal blood flow may move the embolus or increase blood flow past the obstruction.

Treatment regimes show variable rates of improvement; patients present at various times after occlusion and the occlusions may be partial or complete. Vision of 20/100 or better has been reported in 35% of patients.[3] Lowering of intraocular pressure is usually the mainstay of treatment to increase ocular perfusion and this may be repeated.[4]

The patient in our report had an improvement in visual acuity with repeated paracentesis but the visual acuity decreased again. There was a family history of glaucoma and his presenting pressure was high. A surgical filtering procedure was therefore performed and has for 2 years maintained his visual acuity. We therefore suggest that acute trabeculectomy may well have a use in such a patient where there is improvement in vision with paracentesis which deteriorates after time with increasing intraocular pressure. Maintaining a low intraocular pressure should help continue perfusion.

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P.A. Harvey ✉
S. Winder
J.F. Talbot
Department of Ophthalmology
Royal Hallamshire Hospital
Glossop Road
Sheffield S10 2JF, UK

Sir,

The use of a vaccine in recurrent corneal graft infection

The benefits to ophthalmology of vaccination have already become apparent. It has been shown that a herpes simplex vaccine seems able to reduce the number and duration of relapses of herpes simplex virus 1-related keratitis and keratouveitis.[1] A vaccine against *Haemophilus influenzae* has resulted in this organism no longer being a significant pathogen in periorbital or orbital cellulitis in vaccinated populations.[2–4]

Microbial infection of a corneal graft can have devastating effects on the eye. There is a poor prognosis for graft survival and the regraft rate can be as high as 53%.[5] The percentage of grafts that remain clear after infective keratitis can be as low as 23%.[5]

Streptococcus pneumoniae is a significant pathogen in microbial keratitis associated with penetrating keratoplasty.[5] Here we describe a novel approach to management of recurrent pneumococcal microbial keratitis in a corneal graft.

Case report

A 78-year-old woman underwent a combined left penetrating keratoplasty and extracapsular cataract extraction on 20 September 1994. The indication was bilateral cataracts combined with Fuchs' endothelial dystrophy. The post-operative period was uncomplicated. On 21 November 1996, she presented with a painful left eye. She was noted to have a left corneal ulcer at 2 o'clock at the graft–host junction. Immediate Gram stain revealed the presence of Gram-positive cocci and culture confirmed the diagnosis of pneumococcal ulcer. Because of a concurrent chest infection, a sputum sample was taken and this grew *Streptococcus pneumoniae* as well as *Haemophilus influenzae*. The chest infection responded to oral antibiotics and the corneal ulcer responded to removal of involved sutures and intensive therapy with penicillin drops. The ulcer had healed totally by 27 December 1996.

In January 1997 she developed a chest infection and presented again to the eye department on 21 February 1997 with pain and redness of her left eye. She was noted to have a corneal abscess at 7 o'clock in the area of the graft–host junction. Gram stain once again revealed the presence of Gram-positive cocci, which were confirmed as *Streptococcus pneumoniae* by later culture. She was started on hourly penicillin and ciprofloxacin topically and the involved sutures were removed. The cornea healed on this regime and she was discharged on 3 March 1997.

It was considered that this patient was at high risk of developing further pneumococcal corneal ulcers in the grafted eye, and it was thought that her recurrent lung infections were due in part to *Streptococcus pneumoniae*. The chest infections may have been a primary source leading to secondary infection of the grafted cornea. We decided it was appropriate to consider vaccination of this patient with pneumococcal vaccine. Because of the

history of *Haemophilus influenzae* infection, we thought it best to vaccinate her against this bacterium at the same time. On 18 March 1997 the patient was given one dose each of the Pneumovax II vaccine (pneumococcal vaccine – Pasteur Mérieux) and the Hib Titre vaccine (*Haemophilus influenzae* type B vaccine – Wyeth). Her vision in that eye was 6/18 at the time. She was seen again on 26 March 1997 because of a painful eye. The vision had gone down to count fingers and there was noted to be stromal and epithelial oedema of the graft. The anterior chamber was quiet and there was no epithelial defect. A diagnosis was made of acute left corneal graft rejection and the frequency of the topical steroids was increased. Atropine drops and benzylpenicillin drops were also started. The patient was admitted to the ward for management of the graft rejection. This episode had resolved by 30 March 1997 and the intensive drops were tapered. She remained with thinned areas of cornea at the site of the previous ulcers. At last review in November 1998 no new ocular problems were found and the vision remains at 6/18 with refraction.

Comment

Infectious keratitis after penetrating keratoplasty can be devastating to the survival of the graft and its visual outcome. The incidence of bacterial keratitis has been reported to be as high as 11.9%.[6] Most studies show a poor prognosis for graft clarity after keratitis.[5,7,8] In most reports, Gram-positive cocci are isolated as the most frequent causative agent, particularly *Streptococcus pneumoniae*.[5,6,9,10]

A polyvalent pneumococcal vaccine is recommended for immunisation of persons over the age of 2 years with any of the following conditions: homozygous sickle cell disease, asplenia or severe dysfunction of the spleen, chronic renal disease or nephrotic syndrome, coeliac disease, immunodeficiency or immunosuppression due to disease or treatment (including HIV infection), chronic heart disease, chronic lung disease, chronic liver disease including cirrhosis, diabetes mellitus.[11] The vaccine is effective in a single dose if the types of pneumonia in the community are reflected in the polysaccharides contained in the vaccine.[11] The vaccine contains polysaccharide from each of 23 capsular types of pneumococcus.

Side effects to the vaccine include discomfort at the site of injection, mild fever and malaise. Anaphylactic reactions can occur.[11] Rare side effects have been described including relapses in patients with idiopathic thrombocytopenic purpura,[12] transient decrease in serum immunoglobulin and serum complement[13] and glomerulonephritis.[14] Contraindications to the vaccine include acute illness, pregnancy and breastfeeding.[11]

In this case, we report the successful use of a pneumococcal vaccine in a patient who had recurrent pneumococcal keratitis in a grafted eye. This patient had an episode of rejection after immunisation. It is possible this was as a result of antibodies produced after vaccination reacting against pneumococcal antigen in the graft. It has now been over 2 years since the patient had her vaccination and there has been no recurrence of the infection or any further evidence of allograft rejection. Vaccination should be considered in a patient who has had a pneumococcal keratitis. To prevent keratitis, there is a need to implement appropriate preventive measures as well as to monitor the graft closely after the operation; however, we think that, because of the risks associated with infections of a graft, pneumococcal vaccine could be considered as part of the pre-operative management of patients who are to have penetrating keratoplasty.

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R.R. Seemongal-Dass ✉
C.H. Hutchinson
Department of Ophthalmology
Royal Halifax Infirmary
Free School Lane
Halifax
West Yorkshire HX1 2YP, UK
Tel: +44 (0)1797 066 8383
e-mail: robindass@hotmail.com