Lacrimal canalicular obstruction following chickenpox

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SUMMARY Three cases of unilateral epiphora following an attack of chickenpox were studied. Each patient was a child who was in good health prior to the onset of the attack. During the illness each had ocular symptoms suggesting local infection from the virus. A dacryocystogram revealed obstruction of the common canaliculus in each case caused by a fibrotic scar. All cases responded to appropriate surgical management.

Lacrimal canaliculus obstruction is a known complication of virus infection.¹ Although several different viral diseases have been implicated in this way, chickenpox has been mentioned only sparingly in the medical literature as having such a complication. Three cases were recently observed and provided the opportunity to examine this more closely. The results are reported here.

Materials and methods

During the past year 3 cases of common canaliculus obstruction following an attack of chickenpox presented at the Lacrimal Clinic of Moorfields Eye Hospital, City Road, London. All were children who were in good health and asymptomatic before the onset of the illness.

In addition to the general ocular examination a dacryocystogram (DCG) was performed on each patient to identify and localise the obstruction. All patients have undergone surgery. Either a dacryocystorhinostomy (DCR)² with resection of the obstruction from within the sac or a Barrie Jones type of canaliculodacryocystorhinostomy (CDCR)³ was performed. In all patients the system was left intubated with polyethylene tubing (no. 10 Portex) for 3 months. A tissue specimen from one of the cases was sectioned for histological study and examined for evidence of the virus.

CASE REPORTS

Patient 1. A 10-year-old boy presented with a 14-month history of epiphora in his right eye following immediately after an attack of chickenpox. During

the illness vesicles were present on the eyelids, and the eyes were 'red and irritable' with crusting on the lashes and considerable tearing. The general ocular examination was normal, but an obstruction was

Fig. 1 Dacryocystogram of patient 1 showing obstruction at the medial end of the right common canaliculus.

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Fig. 2 Dacryocystogram of patient 2 showing partial obstruction of the common canaliculus at its medial end in the right eye.

found at the medial end of the right common canaliculus on the DCG (Fig. 1). At surgical operation a plaque of fibrous tissue was found to be occluding the internal opening of the common canaliculus, and this was excised from within the sac. After a conventional DCR had been completed the canaliculi were left temporarily intubated with soft polyethylene tubing for 3 months. After removal of the tubes the patient has remained symptom free.

Patient 2. A 10-year-old boy presented with an 18-month history of epiphora of the right eye that was first noted immediately following an attack of chickenpox. The eyes were 'red and irritable' during the illness, but no vesicles were noted near them. The ocular examination was unremarkable except for partial obstruction at the medial end of the right common canaliculus seen on the DCG (Fig. 2). At surgery the internal canicular opening was found to be stenosed by a fibrous scar which was excised from within the sac. A DCR was completed and the canaliculi temporarily intubated with the poly-

ethylene tubing for 3 months. The symptoms disappeared afterwards. There were no complications.

Patient 3. An 11-year-old girl presented with a 2-year history of epiphora of her right eye that began immediately after an attack of chickenpox. The eyes were described as being 'red and irritable' during the

Fig. 3 Dacryocystogram of patient 3 showing obstruction of the right common canaliculus at its medial end.

illness, with vesicles on the eyelids and on the bulbar conjunctiva. The general eye examination was normal, but an obstruction of the medial end of the common canaliculus was seen on the DCG (Fig. 3). Because of the experience in the previous 2 cases the common canaliculus was dissected and exposed prior to opening the tear sac. A fibrotic scar, which was found again to involve the internal opening of the common canaliculus, was resected. A CDCR was then completed by anastomosing the divided common canaliculus to the nasal mucosa, the lacrimal sac being used as a bridge. The system was left intubated with the soft polyethylene tubing for 3 months. There were no complications.

The excised tissue from patient 3 was sent for histology and virus identification studies. It was found to be composed of fibrous scar tissue but was otherwise unremarkable. No giant cells or intracellular inclusion bodies were found. Indirect immunofluorescent staining tests with human antisera were negative for virus, including the varicella-zoster (V-Z) virus. Antibodies in the patient's blood for V-Z virus indicated past infection.

Results

There were no unusual systemic symptoms during the chickenpox attack in any of these patients. The eyes in all 3 cases, however, were 'red and irritable,' and in 2 of the 3 cases the parents recalled that vesicles were present on the eyelids or on the conjunctiva. Apart from the epiphora beginning immediately after the attack there were no other complications. The health of each of the patients has returned to normal.

The features common to these 3 patients were: an ocular inflammation complicating an attack of chickenpox, unilateral epiphora, and an obstruction of the lacrimal drainage apparatus which was located at the level of the common canaliculus. Although the x-ray appearances suggested a mucosal type of obstruction, which is usually a characteristic of chronic sac disease, surgical exploration showed this not to be present; a localised, dense fibrous scar involving the common canalicular opening was found in all cases.⁴

Discussion

The circumstances in these 3 cases enable us to conclude that the common canaliculus obstruction was the result of the chickenpox attack. That other viruses are known to act in a similar way supports this.

In its systemic manifestations chickenpox may involve almost any organ of the body,⁵ though ocular involvement is rare. Griffin and Searle reported only a 4% incidence of lesions in the eye.⁶ These were

limited to isolated vesicular eruptions of the eyelid margin and to the conjunctiva and corneoscleral limbus. A report by Edwards⁷ separated ocular involvement into 4 categories: the eyelids, the cornea and conjunctiva, intraocular complications, and neurological complications. However, there was no mention of any effects on the lacrimal system. Werb commented in passing on 'secondary infections' involving the punctum and canaliculus from chickenpox but gave no further information about them.⁸

Attempts to identify the presence of V-Z virus in the fibrous scar excised from patient 3 gave negative results, but this does not exclude a cause-effect relationship. McSorley *et al.*⁹ examined new lesions during the active, infectious phase of chickenpox but found only a few which reacted 'weakly positive' to immunofluorescent testing, while the majority gave a negative reaction as had occurred in our case.

There is no doubt that identification of virus provides strong evidence of the connection between the infection and scar formation. Bouzas has shown that this relationship can still be deduced from the particular circumstances of the case.¹⁰ It was seen in the present cases that:

- (1) there was no epiphora prior to the onset of the infection with its ocular involvement;
- (2) the tearing was noted immediately after the illness had resolved;
- (3) formation of fibrous scar tissue is a characteristic result of inflammation in mucous membranes caused by viruses.

This result has been previously recognised, and a review of cases from the Lacrimal Clinic at Moorfields Eye Hospital showed that virus diseases were the most common cause of lacrimal canaliculus obstruction.¹¹

The ocular symptoms indicate that during the active phase of the illness the infection also involves the eyes themselves. The causative agent for chickenpox, the varicella-zoster (V-Z) virus, is an encapsulated DNA virus.¹² It acts on host tissue by entering the nucleus of the cell and after replicating causes the cell to rupture and release the newly created particles. These new virus particles can then infect other cells, perpetuating the cycle.¹³

This virus is very susceptible to DNA inhibitors such as the ophthalmic antiviral agents idoxuridine, cytosine arabinoside, and adenine arabinoside.¹² In the event of ocular involvement during an attack of chickenpox, local treatment with these antivirals may prevent lacrimal complications and their associated morbidity.

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References

- 1 Duke-Elder S, MacFaul PA. The ocular adnexa. *System of Ophthalmology*. London: Kimpton, 1974; **13**: 696.
- 2 Welham RAN. Surgery of the lacrimal apparatus. In: Miller S, ed. *Operative Surgery of the Eye*. London: Butterworths, 1976: 116–8.
- 3 Jones BR. The surgical cure of obstruction in the common lacrimal canaliculus. *Trans Ophthalmol Soc UK* 1960; **80**: 343–53.
- 4 Keast-Butler J, Lloyd GAS, Welham RAN. Analysis of intubation macrodacryocystography with surgical correlations. *Trans Ophthalmol Soc UK* 1973; **93**: 593–5.
- 5 Downie AW. Chickenpox and zoster. *Br Med Bull* 1959; **15**: 197–200.
- 6 Griffin WP, Searle CWA. Ocular manifestations of varicella. *Lancet* 1953; **ii**: 168–9.
- 7 Edwards TS. Ophthalmic complications from varicella. *J Pediatr Ophthalmol* 1965; **2**: 37–40.
- 8 Werb A. The surgery of canaliculus obstruction. In: Rycroft PV, ed. *Corneo-Plastic Surgery*. Proceedings from the Second International Corneo-Plastic Conference, London, 1967. Oxford: Pergamon Press, 1969: 87–99.
- 9 McSorley J, Shapiro L, Brownstein MH, Hsu KC. Herpes simplex and varicella-zoster: comparative histopathology of 77 cases. *Int J Dermatol* 1974; **13**: 69–75.
- 10 Bouzas A. Canalicular inflammation in ophthalmic cases of herpes zoster and herpes simplex. *Am J Ophthalmol* 1965; **60**: 713–6.
- 11 Coster DJ, Welham RAN. Herpetic canalicular obstruction. *Br J Ophthalmol* 1979; **60**: 259–62.
- 12 Mandell GL, Douglas RG, Bennett JE. *Principles and Practice of Infectious Disease*. New York: Wiley, 1979: 1295.
- 13 Rothschild H, Allison F, Howe C, Chapman CF. *Human Diseases Caused by Viruses*. New York: Oxford University Press, 1978: 54.