Summary code for ocular herpes simplex

JOHN MCKINNON*, JAMES McGILL†, AND BARRIE R. JONES
From the Department of Clinical Ophthalmology, Institute of Ophthalmology, Moorfields Eye Hospital, London

Herpes simplex virus is a major cause of serious eye disease. Despite advances in antiviral therapy many patients experience exacerbations of the disease with progressive deterioration in their condition requiring frequent and long-continued ophthalmic attention. The resulting morbidity and loss of work constitutes a major social and economic disruption.

The character of herpetic disease may change in different directions in different patients over a period of time. Many patterns of disease are possible; but at present there is no way of predicting which patients presenting with dendritic ulceration are at particular risk of developing disciform keratitis, recurrent ulceration, corneal abscess formation, or herpetic uveitis.

The sequential pattern of herpetic disease is important in assessment of the individual patient and in determining correct management at each point: it probably also has prognostic and epidemiological significance and may be related to the type of herpes virus or even to strain differences in the agent.

The complexity and diversity of possible sequences and combinations of events have hitherto made it difficult to comprehend the entire historical pattern of each patient's case, and exceedingly difficult to communicate a grasp of each case to other clinicians, or to analyse large-scale data for the existence of sequential patterns.

To overcome these difficulties in assessment and obstacles to communication we have devised a simple coding of the main morphological variants of herpetic disease, its treatment and complications. This code makes it easy to maintain a progressive summary of each case and greatly facilitates the rapid evaluation of essential data, at each decision-making point during management. Furthermore, it offers considerable facility in recording, analysing, and communicating the complex historical data to others.

*Present address: c/o Public Hospital, Nelson, New Zealand
†Southampton Eye Hospital, Wilton Avenue, Southampton SO9 4XW
Address for reprints: Professor Barrie R. Jones, Institute of Ophthalmology, Moorfields Eye Hospital, City Road, London EC1V 2PD

Code and definitions

A. HERPETIC LESIONS OF VARIOUS MORPHOLOGY

1. Skin
   LV — typical herpetic lid vesicles
   SV — typical herpetic skin vesicles occurring beyond the lids.

2. Conjunctiva
   HC — herpetic conjunctivitis
   An acute follicular conjunctivitis with regional lymphadenopathy. Frequently with SV (skin vesicles) or LV (lid vesicles) and sometimes a superficial punctate keratitis.

3. Superficial cornea
   HPK — herpetic punctate keratitis
   Fine granular epithelial spots which coalesce to form irregularly-shaped lesions which stain with fluorescein. Frequently with subepithelial infiltration
   AU — amoeboid ulcer
   This is an irregularly lobulated extensive but frequently shallow ulcer with a minimum width of 2 mm. The edges are irregular and sharply defined, and the surrounding epithelium is opaque. The base of the ulcer is yellowish-grey and the stroma shows varying degrees of infiltration and oedema. There is always an associated uveitis, often with a hypopyon. The edges of the ulcer stain with rose Bengal, and the base with fluorescein
   AUS — amoeboid ulcer treated with steroids in the past week
   DU — dendritic ulcer
   This is a characteristic zig-zag, linear, or complicated arborescent ulcer typically less than 1 mm broad, with an irregular sharply
defined edge and bead-like nodes at the end of the branches. The epithelium at the edge of the ulcer is typically opaque and swollen, and there is a varying amount of stromal haze and uveitis. The edge of the ulcer stains with rose Bengal, while the ulcer itself stains with fluorescein dye.

DUS — dendritic ulcer treated with steroids in the past week

DURC — dendritic ulcer, recrudescent
A recrudescence ulcer is one that reappears at the site of a previous ulcer within 14 days of healing

DURR — dendritic ulcer, recurrent
A recurrent ulcer is one that appears more than 14 days after healing of a previous ulcer

MAU — herpetic marginal ulcer
A round, oval, or irregular ulcer near the limbus, the edges of which resemble those of dendritic or amoeboid ulcers. It is normally associated with considerable stromal infiltrate and conjunctival hyperaemia which does not resemble in history or appearance a 'straphylomococal marginal ulcer' and which responds to antiviral agents.

MHU — metaherpetic ulcer
An indolent round or oval ulcer with smooth sloping borders that do not stain with rose Bengal, occurring in a hypoaesthetic cornea overlying an area of stromal disease. There is a past history of herpetic disease. Virus cultures are typically negative

LU — linear ulcer
A non-arborescent straight or curved ulcer staining brightly with rose Bengal.

HSK — herpetic stromal keratitis
A generalized or irregular non-disc-shaped deep keratitis almost always following herpetic ulceration. It is usually eccentrically sited in the cornea but may be very extensive. Deep stromal vascularization frequently develops

HSKU — herpetic stromal kerato-uveitis
Herpetic stromal keratitis with more than 1+ cells and 1+ flare in the anterior chamber

HCA — herpetic corneal abscess
Dense opaque white or yellowish infiltrate after herpetic stromal keratitis or disciform keratitis

HU — herpetic uveitis
Anterior uveitis, often severe, occurring in an eye with a history of past herpetic disease but currently no active keratitis

HSC — herpetic episcleritis or scleritis
Scleral or episcleral inflammation occurring in sectional or generalized pattern in association with or following known, and active, herpetic kerato-uveitis.

5. Associated conditions

IOP — intraocular pressure above 30 mmHg during an episode of herpetic disease

DE — dry eye
Diminution of aqueous tear production, frequently associated with drug toxicity (McGill, Williams, McKinnon, Holt-Wilson, and Jones, 1974)

CAT — cataract
Secondary cataract after episodes of herpetic kerato-uveitis

AMB — amblyopia
Amblyopia after herpetic corneal disease in childhood

FK — filamentary keratopathy
Epithelial filaments after herpetic corneal disease

PDT — presumed drug toxicity
Presumed side-effects (for example, cataract) not otherwise categorized

MIS — miscellaneous
Any ocular sign not otherwise categorized which is thought to be due to herpetic infection (for example, iris atrophy).
### B. MANAGEMENT

1. **Drug treatment**

   - **S** — steroid
   - Treated with topical steroids

   - **IDU** — treated with Idoxuridine (IDU)

   - **IDUT** — IDU toxicity
   
   An eye treated with IDU, usually for at least 10 days (but the period can be shorter if treatment is very intensive or if IDU treatment has been used on previous occasions), which demonstrates one or more of the following (McGill and others, 1974; Patterson and Jones, 1967):
   
   - **lid** — ptosis
   - **lid margin** — keratinization
   - **rounded edge**
   - **Meibomian orifice occlusion**
   - **punctum** — narrowing or occlusion
   - **limbus** — follicles or oedema
   - **conjunctiva** — punctate epithelial disease, characteristically in the interpalpebral fissure, staining with rose Bengal
   - **cornea** — punctate epithelial keratopathy
   - **flaking opaque epithelium, staining with rose Bengal**
   - **microysts, some staining with fluorescein**
   - **sub-epithelial opacification and vascularization (changes aggregate in a curved or linear fashion with whorl-shaped patterns of epithelial keratopathy)**

   **indolent corneal ulcer** — developing usually from a linear pattern of punctate keratopathy. It may thus somewhat resemble a dendritic ulcer and may progress to resemble a metaherpetic ulcer.

   There is marked associated punctate epithelial keratopathy.

   - **IDUR** — IDU resistance
   
   An ulcer adequately treated with IDU which:
   
   1. is getting worse after 4 days, or
   2. shows no sign of IDU toxicity
   3. has no significant underlying active infiltrate

   - **IDUH** — IDU hypersensitivity
   
   Contact dermatitis of the lids after IDU application to the eye

   - **F3T** — treated with trifluorothymidine

   - **F3TT** — F3T toxicity
   
   An eye treated with F3T which demonstrates one or more of the following (McGill and others, 1974):
   
   - **punctum** — narrowing conjunctiva — punctate epithelial disease, characteristically in the interpalpebral fissure staining with rose Bengal
   - **cornea** — punctate epithelial keratopathy
   - **epithelial microysts**
   - **epithelial oedema**

   (Other toxic signs may be recognized as clinical experience with F3T grows. The time required for toxicity to develop is not yet defined)

   - **F3TR** — F3T resistance
   
   An ulcer adequately treated with F3T which:
   
   1. is getting worse after 4 days, or
   2. shows no sign of F3T toxicity
   3. has no significant underlying active infiltrate

   - **F3TH** — F3T hypersensitivity
   
   Contact dermatitis of the lids after F3T application to the eye

   - **AA** — treated with adenine arabinoside

   - **AAT** — Ara-A toxicity
   
   An eye treated with Ara-A which demonstrates one or more of the following:
   
   - **conjunctiva** — punctate epithelial disease, characteristically in the interpalpebral fissure, staining with rose Bengal
cornea — punctate epithelial keratopathy
(Other toxic signs may be recognized as clinical experience with Ara-A grows. The time required for toxicity to develop is not yet defined)

AAR — Ara-A resistance
An ulcer adequately treated with Ara-A which:
1. is getting worse after 4 days, or is static after 7 days, or is changing shape but not healing by 10 days
2. shows no sign of Ara-A toxicity
3. has no significant underlying active infiltrate

AAH — Ara-A hypersensitivity
Contact dermatitis of the lids after Ara-A application to the eye. (We have not recognized hypersensitivity to Ara-A to date.)

2. Physical treatment

DB — debridement
Simple removal of the ulcerated epithelium

CA — carbolization
Removal of the ulcerated epithelium followed by application of phenol

ID — iodization
Removal of the ulcerated epithelium followed by application of iodine

CY — cryotherapy
Application of a cryoprobe to the ulcer and surrounding area.

3. Surgery

CF — conjunctival flap

TA — tarsorrhaphy

PKP — penetrating keratoplasty

LKP — lamellar keratoplasty

AR — allograft reaction

4. Contact lens

SCL — ‘soft’ (hydrophilic) contact lens

HCL — haptic contact lens

C. CLINICAL STUDIES

1. RES — research
Patients entered into clinical drug trials or other research projects (Designated RES₁, RES₂, etc.)

Method of use of the code

Patients with herpetic ocular disease are classified according to the code and this coded summary is recorded on the cover of their case notes.

The codes relating to each significant episode of disease or treatment are recorded on a separate line opposite the date of start and finish of treatment.

For example, Fig. 1 designates a patient with three significant episodes. An initial dendritic ulcer was treated with Idoxuridine. During the course of this illness kerato-uveitis developed and the patient was treated with steroids. After a further bout of kerato-uveitis a penetrating keratoplasty was performed. A dendritic ulcer developed during treatment with steroids and IDU toxicity necessitated a change of therapy to $F_{3}T$, with the ulcer finally resolving.

Each patient’s codes are recorded on punch cards. Fig. 2 shows a punch card for the above patient. Punch cards are updated from line to line, thus the codes for the first two episodes of disease have been transferred as indicated on the right-hand column of Fig. 1.

On the reverse side of each punch card code data are recorded in the same manner as Fig. 1. Thus all code information relevant to a patient is recorded in one place. Retrieval of data is simplified and the system allows for future elucidation of associated features or patterns.

Discussion

A continuing problem for ophthalmologists treating herpetic eye disease is the difficulty in relating

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<td>PKP/DUS/IDUT/$F_3T$</td>
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**FIG. 1 Herpes simplex code**
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**FIG. 2** Two sides of punch card recording clinical features, complications, treatment, and prognosis of herpes simplex eye disease.
significant events in the patient's past to his current problems. This difficulty is compounded when several clinicians are caring for the same patient.

Since the introduction of our coding system in a busy clinic for virus diseases, all clinicians concerned have been impressed by the way in which it facilitates clinical assessment of cases. A glance at the patient's code summary allows one to grasp important features of his past history and present situation, even if the patient is unfamiliar to the ophthalmologist.

We have the impression that a patient's history influences the way in which a new episode of disease presents, progresses, and responds to treatment. Use of this code and the punch card or computerized cross-reference system should help to elucidate possible patterns in evolution of disease, correlations in response to therapy, or otherwise unnoticed possible adverse effects of therapy.

Summary
A code for herpetic eye disease is presented. This simplifies the management of individual patients, and the up-to-date code summary of each case is easily maintained thus facilitating assessment of interrelating factors. It is suggested that the pattern of herpetic eye disease may have prognostic and epidemiological significance. This system has simplified retrieval of such data.

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References

Patterson, A., and Jones, B. R. (1967) Ibid., 87, 59