Herpes simplex virus infection in the neonate is a well-recognized, extremely serious problem with a high morbidity and mortality. The disease may be localized or generalized. The former type frequently involves the brain, skin, mouth, or eyes. If the central nervous system is the site of the infection, there is about a 33% mortality and a very high rate of morbidity.

The latter type has at least a 90% mortality. The liver, brain, adrenals, lungs, and gastrointestinal tract are often involved. About 10% of these cases have ocular lesions. Any of the ocular tissues may be included in the herpetic infection. Conjunctivitis, keratitis, chorioretinitis, and cataracts have all been reported.

The first case of chorioretinitis from this organism to appear in the literature was in an article by Florman and Mindlin in 1952. Since then, of 160 cases of neonatal herpes reported, 14 have demonstrated chorioretinitis. In 1972, Nahmias and Hagler stated that severe uveitis had not been described and speculated that the difficulty in slit-lamp examination in the newborn was probably the reason. However, in 1965, Young, Knox, and Dodge described steamy corneas, pale irides, yellow-brown deposits on the lens, vitreous haze, elevated optic nerve heads, retinal hemorrhages, perivascular sheathing and patches of yellow inflammatory areas of the choroid in a 55-day-old infant with herpes simplex virus infection.

Hagler et al., in 1969, described two neonates with herpetic infection. Skin vesicles, unilateral keratitis, and bilateral chorioretinitis were present in each case. Examination of the eyes in the first infant on the 26th day by indirect ophthalmoscopy revealed a sharply circumscribed band of pigmentation extending 360° around the equator. The media was clear and the vessels were attenuated. The left eye had a perivascular scar of two disc diameters in size and a large equatorial scar covering three clock hours. No evidence of active uveitis was found but a mature cataract developed in the right eye months later. Examination of the second infant on the 49th day demonstrated iris atrophy with anterior synechiae and bilateral fulminating chorioretinitis. A ring of greyish yellow exudate was seen at the equator. Vitreous reaction was marked and prevented a clear view of the disc.

CASE REPORT

A 3,100 gm infant was admitted to Washoe Medical Center at the 19th day of age for evaluation of seizure activity of two days duration. The child had been well prior to admission. Initially, the seizures had been left-sided but had gradually become more generalized. Temperature on admission was 102.8°F.

Pregnancy had been uncomplicated until three to four days prior to delivery, when the mother developed leaking of the membranes. She had been noted to have cervicitis during pregnancy but Pap smears and cultures were negative for herpes simplex virus. The birth weight of the infant was six lbs, three and three quarter ozs. Delivery was uncomplicated and physical examination was entirely negative. Eye examination, the day following admission, was normal throughout. A CAT scan of the brain was negative. The course was protracted and downhill with increasing seizure activity progressing to opisthotonos. The baby was irritable and developed...
a high pitched cry. The fontanel was full and the liver was palpable at the right costal margin. CAT scan of the brain one week later showed selective inflammation of the grey matter. Two weeks after admission, the EEG showed depression of normal voltage. The next day, a culture of cerebral spinal fluid which had been previously taken was reported positive for herpes simplex virus, Type II. In spite of intensive therapy, apnea, bradycardia, and loss of suck reflex occurred. Examination of the eyes on the 28th day, with the pupils dilated, revealed inflammatory deposits on the anterior lens with annular posterior synechial formation. An intense vitreous reaction gave a yellowish reflex through the pupil (Fig. 1).

This vitritis prevented adequate evaluation of the optic nerve and vessels. There were yellowish, greasy, homogenous appearing plaques in the area of the posterior poles of about two disc diameters by one disc diameter in size (Fig. 2). Identically appearing lesions had coalesced at the equator to form a 360° ring with one or two interruptions. It is interesting to note that this conformation at the equator closely resembled the description given by Hagler. No conjunctivitis or corneal involvement was noted at the examination. Photographs and drawings of retinal scarring and photographs of neonatal infections have appeared in the literature, but to the best of our knowledge, no photographs of acute intraocular process have previously been published.

DISCUSSION

Herpes simplex virus is recognized in two forms: Type I, or nongenital, is most commonly associated with lesions of the eye, face, mouth, and skin above the waist; Type II involves the genitalia and skin below the waist. Over 80% of positive cultures from neonatal infections have been of Type II. The incidence of neonatal herpes simplex infection varies from one in 3500 to one in 30,000. The mode of transmission to the neonate may either be by the ascending route from the mother, if the membranes rupture prior to the delivery or via the genital tract during delivery. The risk of neonatal infection in association with maternal infection occurring after 32 weeks is 10%. When the virus is present at delivery, the risk is 40% if Caesarean section is not performed within four hours of rupture of the membranes.

Herpetic retinitis has been previously linked to two possible etiologies. An immune response was first suggested by Cogan in 1964, following the study of the pathology of a case which demonstrated the limitation of the disease process to the retina without involvement of adjacent structures. Martenet et al., experimentally using two groups of rabbits, found that those previously immunized prior to inoculation of HSV virus did not develop retinitis in the second eye following inoculation into the anterior chamber of the first, while the nonimmunized animals all developed retinitis in the second eye. Cibis, in a case at autopsy, found no inclusion bodies in the necrotic retina but did find them in the skin and brain and was unable to find the virus in the eye by electron microscopy, culture of the aqueous humor or fluorescent antibody staining. Oh recently reported that experimental rabbits with normal eyes receiving systemic immuni-
zation with HSV provided complete protection against the production of primary uveitis but in an experimental group who had had a previous bout of experimentally induced nonherpetic uveitis, the same protection was not obtained. The second group developed an immune mediated uveal inflammation.

The second possible etiology is by viral extension. Kimura\(^1\) has experimentally recovered HSV from the uninoculated fellow eye of an experimental animal following injection of the virus into the first eye. Bahrami,\(^2\) reporting a case of a premature with skin lesions and encephalitis, who later developed chorioretinitis, found primary optic atrophy and presumed this to be due to direct involvement of the nerve. Johnson and Wisotzkey,\(^3\) in a study of autopsy material in an adult, found intranuclear viral particles in the retina and optic nerve of the patient. The eye involvement followed a severe encephalitis, therefore they concluded that the virus was directly transmitted via the neural tissue from the brain to the optic nerves.

Very recently, Cibis, Flynn, and Davis\(^4\) reported the clinical pathology of a case in which viral particles, consistent with those of herpes virus, were found in the brain and in the inner-nuclear and ganglion nerve fiber layers of the retina in an 18-month-old infant who succumbed to herpetic encephalitis. These authors presumed a hematogenous of the virus to the retina in this case.

Unfortunately, autopsy permission was not obtained in our case and we are unable to contribute to the knowledge of the route of dissemination.

SUMMARY

Neonatal infection with herpes simplex virus is, in recent years, a more frequently recognized complication of maternal genital herpes infection. Chorioretinitis has been described in approximately 16 cases. A case report is presented in which clinical photographs of the intraocular lesions are presented.

REFERENCES