

Filamentary Keratopathy as a Chronic Problem in the Long-Term Care of Patients in a Vegetative State

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Purpose: To emphasize that filamentary keratopathy may occur in the long-term care of patients in a vegetative state.

Methods: Clinical observation of 2 young patients who had survived 16 and 8½ years, respectively, in a vegetative state after an acute traumatic brain accident. Interventions were analyzed against the background of the different speculations about the relationship between filamentary keratopathy and the vegetative state.

Results: Both patients' medical records registered 36 and 24 episodes of "a red eye," respectively, which in most cases were due to filamentary keratopathy. The episodes lasted 1–5½ months, despite lubrication, removal of filaments, and regular application of corticoid ointment. The longest remission occurred when the eyes were frequently opened, and no topical medications were applied. This experience supports the hypothesis that prolonged eyelid closure is more likely related to filamentary keratopathy in these patients, more so than a moistening disturbance.

Conclusions: Filamentary keratopathy can be a chronic problem in the long-term course of a patient in a vegetative state with remissions and exacerbations. These cases substantiate a relationship, although the precise mechanism is speculative. The incidence and effective treatment await further reports.

Key Words: filamentary keratopathy, vegetative state, long-term care, nursing home

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Patients in a vegetative state have not regained consciousness after surviving a comatose phase caused by an acute brain accident of traumatic or nontraumatic origin. They show no evidence of awareness of self or the environment, an inability to interact with others, and no evidence of sustained, reproducible, purposeful, or voluntary behavioral responses to visual, auditory, tactile, or noxious stimuli.¹ In contrast to coma

patients, however, they open their eyes and show a sleep-wake cycle; they are "awake, but not aware."²

As a result of the relative preservation of brainstem functions, most patients in a vegetative state retain good to normal reflexive regulation of vision and eye movements, and a few may even shed tears.¹ Sustained visual pursuit is lacking in most patients, and they do not fixate on visual targets, track moving objects with their eyes, or withdraw from threatening gestures.¹ For all patients in a vegetative state, recovery after 1 year is unlikely.³ Because they are totally dependent, they are usually referred to nursing homes and can survive a long time on artificial nutrition and hydration.

Filamentary keratopathy (FK) is a nonspecific clinical sign. Corneal epithelial filaments form as a result of a number of inflammatory or degenerative corneal conditions. A corneal filament consists of a tag of elongated epithelium that is firmly attached to the base but has broken away from the cornea. The epithelial filament is intertwined with mucus and degenerative cells. Filaments stain both with fluorescein and with rose Bengal. They often fall off with time but tend to reoccur.⁴

Because medical facts about the long-term care of patients in a vegetative state are scarce in the literature, we have studied the medical events of all patients in a Dutch nursing home who had spent over a year in a vegetative state after an acute brain accident. FK was a remarkable finding in 2 patients from the total caseload of 5 who met the criteria for vegetative state, as formulated by the Multi Society Task Force on Persistent Vegetative State.¹ The FK was diagnosed by 2 independent ophthalmologists in different hospitals. Both patients were examined by the first author (J.C.M.L.); the patient in case 1 was also examined by the second author (G.V.R.).

Because of the lack of literature on the relationship of FK to the long-term survival in a vegetative state, we present these 2 case reports.

CASE REPORTS

Case 1

This male patient has survived in a vegetative state since 1987, when he was involved in a motorbike accident at the age of 18. Five months after the brain accident, the ophthalmologist diagnosed FK of the right eye as a cause of a red eye. Lagophthalmos in the right eye was suspected, and artificial tears were applied. However, observation in the nursing home showed no lagophthalmos. A second visit 2 weeks later showed persistent FK with subepithelial ingrown blood vessels in the cornea. Fluorescein staining confirmed the diagnosis of FK, and a Schirmer tear test in both eyes was normal.

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Corticoid/antibiotic ointment was included in the therapy. As the keratitis was considered a moistening disturbance of the eye at the time, artificial tears were applied continually to prevent the recurrence of corneal problems. This therapy had only a temporary effect on the FK.

After this, the nursing home physician recorded 36 episodes of a "red eye": 6 times a conjunctivitis/blepharitis cured by antibiotic/corticoid therapy, 13 times a nonspecified "red eye," and 17 times FK. The problem usually began with signs of conjunctivitis (vessel dilatation and discharge), which did not improve after the application of corticoid/antibiotic ointment. Cultures showed no clinically significant results and mycosis was excluded. The episodes of keratopathy lasted 1–5½ months, in which FK was seen mainly in the right eye in the first 5 years, and more in the left eye in the following 10 years.

Five years after admission, during the fifth relapse of keratopathy, superficial infiltrates and pannus as well as superficial stromal vessels were observed in the right eye and FK in the left eye. After topical ofloxacin was prescribed, the infiltrates and filaments disappeared within a week, but there was no effect on the blood vessels in the cornea. The therapy with artificial tears was continued.

The nursing home physician and 2 ophthalmologists informed the parents and discussed the therapeutic options at the time. The family rejected occlusion of the eye and the proposal to apply a permanent wear soft lens as bandage.

Seven years after admission and after consulting a cornea specialist, the ophthalmologist removed the filaments under local anesthesia. Later on, the nursing home physician repeated this procedure. In some years, FK was a main medical and nursing problem.

In 2002, after 15 years in a vegetative state, a vague nebulae cornea with pannus and superficial stroma vessels was observed in the right eye, and ingrown blood vessels without filaments in the left eye. Because the problem could not be solved permanently in a wet eye and the patient's eyes seemed to be more often closed than open, we changed our hypothesis, which was based on a moistening disturbance as well as the therapy. Our current hypothesis is that FK could be caused by insufficient opening of the eye, resulting in a lack of refreshment of the tear film. Therefore, the lubricants were withdrawn, and the family and nursing staff were advised to open the eye frequently. After this intervention, the FK has not reoccurred in 25 months, the longest remission in this survival of more than 16 years in a vegetative state.

Case 2

This patient, who was involved in a traffic accident at the age of 15, survived in a vegetative state from 1991 until 2000. During this survival, he had been well fed by tube feeding and had shown tears. Before admission to the nursing home, an ophthalmologist had diagnosed FK as a cause of an opaque left cornea, which was treated with corticoid/antibiotic ointment.

At the time of admission, dexamethasone/neomycin was applied in his left eye because of a relapse of FK with superficial blood vessels ingrown in the left cornea. From 1993 until 2000, 24 episodes of a "red eye" OS were registered in the medical record, most times caused by FK. In certain periods, the cornea was opaque. In every episode of conjunctivitis and keratopathy, antibiotic/corticoid ointment was applied, which usually proved temporarily successful in reducing the inflammation and filaments within 2–4 weeks and in 1 instance, within 6½ weeks. Between these episodes, daily observations showed no red eyes, and artificial tears were applied in both eyes.

From 1995 onward, the nursing home physician regularly removed the filaments mechanically from the cornea under local anesthesia. Once a culture was made because the turbid filaments looked like pus; this turned out to be sterile. The patient died in January 2000.

DISCUSSION

In these young patients with long-term survival in a vegetative state, FK turned out to be a chronic problem with remissions and exacerbations. In 1927, FK was described in some cases of chronic arthritis.⁵ Since then, many conditions have been associated with filaments, including dry eyes, prolonged occlusion or ptosis, ocular surgery, recurrent corneal erosions, infections, and diabetes mellitus.^{6–9}

In a review article, some authors stated that the absence of normal lid movements predisposes the cornea to chronic filament formation in the long-term course of hospitalization due to brain injuries.¹⁰ Brainstem injuries can be associated with FK, but only 2 previous case reports are available about coma in the first years.^{6,11} It is difficult to compare these reports with our cases of a long-term vegetative state because the vegetative state was not defined and the cause was not described in them. Moreover, in contrast to coma, in patients in a vegetative state, the function of the brainstem is completely or partially preserved; the main problem is absence of function in the cerebral cortex.^{1,2}

In our cases and in the literature, there is no evidence that absence of tears is a cause of FK in patients in a vegetative state. At first, we assumed that the eye would be too dry as a result of infrequent blinking. For that reason, artificial tears were supplied on a regular basis. This, however, did not prevent recurrence of the problem, and neither did additional debridement of the filaments, as suggested by several authors.^{4,12}

One case study that we found describes the treatment of FK with a soft contact bandage lens in a patient who was comatose for 10 months.⁶ However, in that case, the vegetative state was not described and there was no long-term follow-up. After an initial positive effect, the lenses frequently came out, and the patient died 4 months later. The parents in case 1 rejected this therapy.

Because the problem could not be solved permanently in a wet eye, we based our last intervention on the literature on the relationship of FK to ptosis, prolonged patching, or eyelid closure.^{8,13} Moreover, on the basis of heteroanamnesic information, we came to the conclusion that our patients' eyes were probably far more often closed than open, even outside the FK episodes. On the basis of the theoretical assumption that FK could be caused by a lack of refreshment of the tear film, we terminated the treatment with artificial tears and began to open the patient's eyes frequently. Until now, the FK has not recurred.

As medical facts about the long-term course of the vegetative state are scarce, it may be assumed that general practitioners and nursing home physicians do not recognize FK as such. Moreover, a red eye can easily be attributed to only conjunctivitis, which frequently occurs in these patients, as seen in these 2 cases. It is not unlikely that the different problems such as blepharitis, conjunctivitis, and FK are all part of the same process.

In conclusion, this finding of FK in 2 patients in a vegetative state highlights a chronic problem in the long-term care of these patients. We recommend consulting an ophthalmologist in every case of a chronic red eye in vegetative state patients. Reports of such cases and effective therapy may help us gain more insight into the problem.

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