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*Can J Ophthalmol* 2012;47:e22–e23
0008-4182/11/$-see front matter 
dx.doi.org/10.1016/j.jcjo.2012.03.020

## Bloody tears from lacrimal sac rhinosporidiosis

Lacrimal sac rhinosporidiosis is an uncommon infection and to our knowledge has not been reported in Canada. *Rhinosporidium seeberi* is a fungus-like parasite with an evolutionary origin near the animal-fungal divergence that causes chronic infection of the mucous membranes of the upper respiratory tract.[1] It is endemic in India and Southeast Asia, but rarely a cause of disease outside of this region.[2]

A healthy 35-year-old female presented with acute onset unilateral bloody tears. There was no history of trauma, recent travel, or other constitutional symptoms. She resided in Bangladesh before immigration to Canada 14 years earlier. Examination revealed copious bloody, mucopurulent discharge from the left upper and lower puncta, with spurting during manual lacrimal sac compression. There was tenderness in the medial canthal region and mild swelling, but no erythema or warmth. Ocular, orbital, and nasal speculum examinations were otherwise normal. The patient began a course of oral cephalexin and the bloody tears resolved at 1 week, but the discomfort persisted. The improvement could have been related to clearance of bacterial superinfection. The lacrimal system was patent to irrigation. A computed tomography scan (Fig. 1) showed a left lacrimal sac mass, without bone destruction. The mass showed central gadolinium enhancement with magnetic resonance imaging, with loculated fluid peripheral to the mass, and dilatation of the upper part of the left nasolacrimal duct. An open excisional biopsy was performed. Frozen sections showed fungal elements and no evidence of neoplasm; therefore a left external dacryocystorhinostomy was performed. Permanent sections revealed features pathognomonic for *R. seeberi* infection (Fig. 2). Innumerable cystic structures, many filled with amorphous material surrounded by a thick, sometimes birefringent, capsule were seen. Occasional cysts contained spores, with the majority of cysts either impinging on the overlying mucosa or present in the immediate submucosa. The postoperative course was unremarkable. Infectious disease consultation deemed systemic dapsone treatment unnecessary. The patient has been followed for more than 5 years without recurrence.

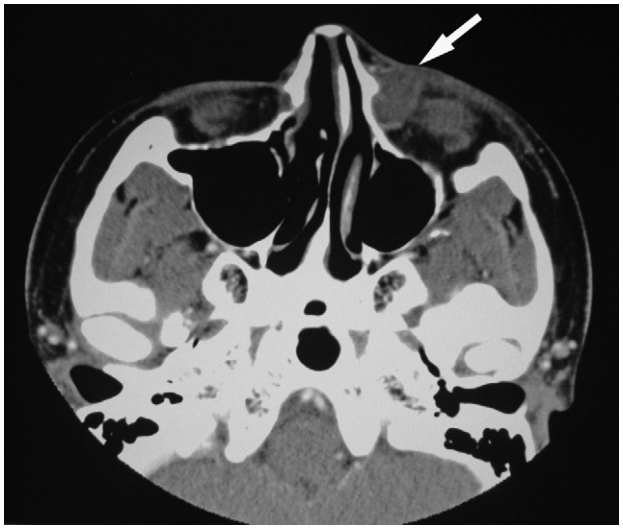

**Fig. 1—Axial computed tomographic scan with contrast showing a heterogeneous mass in the area of the left lacrimal sac, with enhancement of the rim and no bone invasion.**

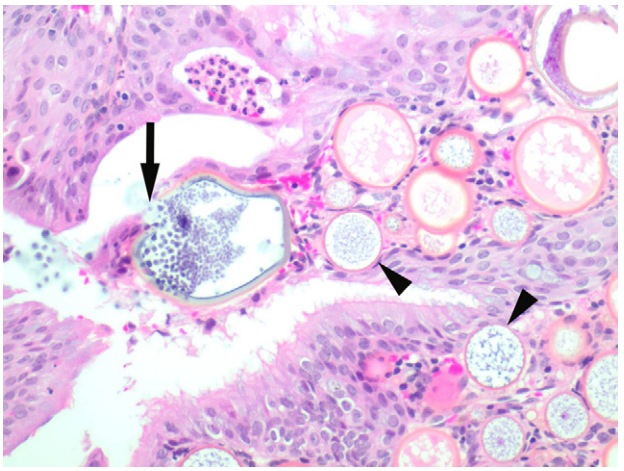

**Fig. 2—Multiple thick-walled trophocytes (arrowheads) and a ruptured sporangium releasing its numerous endospores at the mucosal surface (arrow) confirming the diagnosis of *Rhinosporidium seeberi* (hematoxylin phloxine saffron, original magnification ×150).**

Ocular rhinosporidiosis accounts for 15% of *R. seeberi* infections, with conjunctival involvement in the majority of cases.[2] Lacrimal sac involvement is rare.[3] Although

rarely encountered in Western countries historically, rhinosporidiosis has become more frequent with immigrants from endemic areas acquiring the infection in their native countries.[4] There is no evidence that rhinosporidiosis is transmissible between humans.[2] Most cases are sporadic, with transmission presumed to be from exposure of traumatized epithelium to water contaminated with *R. seeberi*.[2] Only two other cases of ocular rhinosporidiosis, both involving conjunctiva, have been reported previously in Canada.[4] These cases, along with an additional report of nasal rhinosporidiosis occurring in a dog from Ontario,[5] support the possibility of the organism existing locally in our temperate climate.

Reported features of lacrimal sac rhinosporidiosis include painless, soft, fluctuant swelling of the lacrimal sac with partial nasolacrimal duct obstruction, and epistaxis, although our patient did have tenderness that is atypical. The dilated lacrimal sac often contains polypoidal growths or diverticula.[3] Excisional biopsy is the treatment of choice, with recurrences possible from incomplete excision or seeding of endospores into adjacent tissue during removal.

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*Can J Ophthalmol* 2012;47:e23–e24
0008-4182/11/$-see front matter 
dx.doi.org/10.1016/j.jcjo.2012.03.019

## Epidermal growth factor receptor exists in the early stage of proliferative vitreoretinopathy

Some studies have localized the coreceptor epidermal growth factor receptor (EGFR) for the epidermal growth factor (EGF) and the transforming growth factor alpha (TGF$\alpha$) in a proliferative vitreoretinopathy (PVR) membrane and have reported that EGFR might be expressed only in certain as yet undefined stages of PVR.[1] Therefore, our experiments aim to investigate precisely in which stage of PVR EGFR exists.

All PVR cases were grade C2 or worse, according to the classification recommended by the Retina Society Terminology Committee. The 43 epiretinal membranes (ERMs) of PVR were divided into 3 groups arbitrarily, according to the time since ERM onset[2]: the early-stage membranes ($<$ 2 months); the intermediate-stage membranes (2 $\sim$ 6 months); and the late-stage membranes ($>$ 6 months).

The expression of EGFR protein and EGFR mRNA was detected by immunohistochemical staining and in situ hybridization (ISH), respectively. The staining was performed according to the manufacturer's protocol (Boster, Wuhan, China). The samples were incubated with the polyclonal rabbit anti-human EGFR antibody (Boster) or hybridization solution containing cardiox-labeled EGFR multiphase oligonucleotide probes (5′-AAAGT TTGCC AAGGC ACGAG TAACA GGCTC—3′; 5′-CAGCT TTGGT GCCAC CTGCG TGAAG AAGTG—3′; 5′-AACAC CCTGG TCTGG AAGTA TGCAG ATGCC—3′;) (Boster). The reaction to the product was finally visualized with diaminobenzidine tetrachloride substrate (Boster). Negative controls and positive controls were set. We used a microscope to observe 5 high-power fields (×400) of each sample and calculated the rate of positive staining cells.

Immunohistochemical study showed a strong positive for EGFR protein staining in 17 (17/43) membranes in the early stage of PVR (Fig. 1); 2 (2/14, 14/43) membranes in

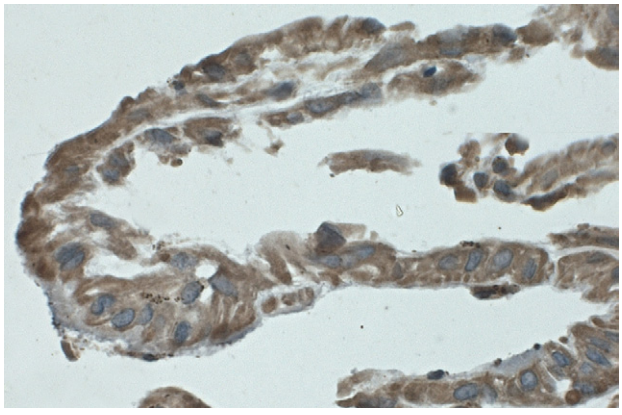

**Fig. 1—EGFR protein expressed strong positive staining in the early stage of membranes of proliferative vitreoretinopathy (PVR). EGFR protein expressed positive staining in the cytoplasm of cells of epiretinal membranes (ERMs) and positive cells appear brown (SABC ×400). (EGFR, epidermal growth factor receptor; ERMS, epiretinal membranes; PVR, proliferative vitreoretinopathy; SABS,.**