

Euphorbia grandicornis Sap Keratouveitis: A Case Report

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Key Words

Corneal toxicity · *Euphorbia* · Keratouveitis

Abstract

Purpose: To describe a case of keratouveitis caused by *Euphorbia grandicornis* sap, that resolved with topical steroids. **Methods:** We report a case presentation of a patient with keratouveitis. **Results:** A 70-year-old woman suffered from accidental ocular contact with *E. grandicornis* sap in her left eye. Two hours after the contact, she attended the clinic due to conjunctival hyperemia and pain. Best-corrected visual acuity (BCVA) was 20/25. The toxic conjunctivitis was treated with topical lubricant and steroid. After 24 h, she presented blurred vision. BCVA was 20/80. Toxic keratouveitis was diagnosed. Topical treatment with 1% cyclopentolate t.i.d., 5% sodium chloride, 1.14% dexamethasone phosphate each hour, and 4% sodium hyaluronate each hour was continued. Complete resolution was obtained 1 week later. *Euphorbia* sap content analysis was performed using dissolvent extraction spectrophotometry. Its contents included flavonoids, alkaloids, phenols and sesquiterpene lactones. **Conclusion:** Corneal exposure to *E. grandicornis* sap is a cause of nonvisually threatening keratouveitis when adequately treated with corticosteroids.

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Introduction

The genus *Euphorbia* belongs to a group of plants characterized by tall thick stems, resembling cacti, with a highly corrosive, milky sap [1]. Ocular inflammation due to *Euphorbia* sap is usually self-limited, though potentially blinding if left untreated [2, 3]. Euphorbiaceae keratitis is characterized by initial punctate keratopathy and progression to larger epitheliopathy, with excellent final visual outcome [4]. *Euphorbia* sap keratouveitis has been associated with exposure to the sap of several *Euphorbia* species, including *lactea*, *royleana*, *lathy-*

ris, *trigona*, *tirucalli*, *peplus*, *cyparissias*, and *helioscopia* but not *Euphorbia grandicornis* [2–4]. We present the clinical evolution of *E. grandicornis* (Goebel ex N.E.Br.) sap keratouveitis and its chemical components.

Case Presentation

A 70-year-old female patient, with a history of hip replacement surgery, Barret's esophagus, skin cancer, and treated systemic hypertension, suffered from accidental ocular contact with *E. grandicornis* sap (fig. 1). She washed her left eye (OS) with water and, after 2 h, she attended the clinic due to OS conjunctival hyperemia and pain.

Her OS was profusely irrigated with saline solution, after which ophthalmology exploration showed a best-corrected visual acuity (BCVA) of 20/15 (+2.75 D) in her right eye (OD) and 20/25 (+2.75 D) in her OS. Intraocular pressure (IOP) was 11 mm Hg for both eyes and biomicroscopy was normal in her OD. OS had conjunctival hyperemia, chemosis, a transparent cornea with intact epithelium, and a quiet anterior chamber. Fundoscopy was normal for both eyes. Toxic conjunctivitis was then treated with topical 4% sodium hyaluronate each hour and 1.14% dexamethasone (sodium phosphate) 6 times a day. After 24 h, BCVA decreased to 20/80 in the OS, IOP was 11 mm Hg, the conjunctiva remained chemotic, and ciliary flush was present. The cornea of her OS had diffuse punctuate keratitis (fluorescein staining), subepithelial and stromal edema and Descemet folds, while the anterior chamber revealed +++ cells (fig. 2). Fundoscopy was normal. Anterior keratouveitis was then treated with topical 1% cyclopentolate t.i.d., 5% sodium chloride t.i.d., 1.14% dexamethasone phosphate each hour, and 4% sodium hyaluronate each hour. Additionally, 0.5% chloramphenicol was added as prophylactic antibiotic.

Three days after the initial insult, the BCVA in her OS was 20/60, IOP was 11 mm Hg, chemosis had improved, subepithelial and stromal edema as well as Descemet folds persisted, and anterior chamber inflammation improved to + cells.

Forty-eight hours later, she became asymptomatic, BCVA in her OS was 20/25, IOP was 13 mm Hg, slight hyperemia was observed, chemosis had resolved, cornea was transparent and the anterior chamber showed faint inflammation, with pharmacological mydriasis. Sodium chloride treatment was withdrawn. A week later, BCVA in her OS was 20/20, IOP was 11 mm Hg and biomicroscopy showed no inflammation signs.

E. grandicornis sap content analysis was performed using dissolvent extraction spectrophotometry (Laboratorio de Bioquímica, Departamento de Ciencias Biológicas, Instituto Politécnico Nacional, Mexico). *Euphorbia* sap had a pH of 6.0, and its contents included flavonoids, alkaloids, phenols, and sesquiterpene lactones.

Discussion

The genus *Euphorbia* englobes more than 2,000 species distributed all around the world, mainly in temperate and subtropical regions. Some are characterized by thick, succulent branches and thorns; differed from cacti by their flowers and milky sap rich in irritant dipertene esters and carcinogens [1]. *E. grandicornis* belongs to the Euphorbiaceae family and it is commonly known as 'cows' horn'. The succulent Euphorbiae occur in India, Arabia, through Africa and Malagasy to the Cape [1]. One of the chief taxonomic features of Euphorbias is the quaint, complex floral arrangement called cyathium, which means 'cup', and this is

the unit of the inflorescence [1]. A pinprick on the *Euphorbia* stem produces a trickle of white, milky latex, often poisonous.

Euphorbia sap ocular inflammation includes conjunctivitis, keratitis, and keratouveitis without posterior segment involvement. Initial symptoms include lacrimation, pain, and photophobia with worsening symptoms and visual acuity several hours after initial sap contact, as in this case [3]. Severe keratouveitis has been associated with exposure to the sap of several *Euphorbia* species, including *lactea*, *royleana*, *lathyris*, *trigona*, *tirucalli*, *peplus*, *cy-parissias*, and *helioscopia* but not *E. grandicornis* [2–4]. Symptoms begin immediately after contact with the sap; patients refer burning pain, photophobia and lacrimation that worsen despite treatment; central corneal epithelial defect develops 24 h later and takes several days to heal [3, 4]. Ocular inflammation seems to be associated with the amount and time of sap exposure as well as the species; it is becoming apparent that some species are more toxic than others [3]. This patient did not develop a corneal epithelial defect, as happened after exposure to other *Euphorbia* sap species [2–4]. It has been reported that ingenol 3,20-dibenzoate, a diterpenoid diester, a major component of sap from *Euphorbia esula* extract, has antileukemic activity. The corneal epithelial defects, requiring several days to heal in other reported cases, may be explained by the antineoplastic effects of the sap, which may hinder corneal epithelial replication [3]. Our patient did not have corneal epithelial defect, maybe because this compound was not present in *E. grandicornis* sap. This patient's clinical evolution resolved after 1 week, with complete recovery of visual acuity, as has been previously reported in other cases of *Euphorbia* sap keratouveitis [3].

Studies show that the corneal endothelium has a pH tolerance between 6.8 and 8.2. We reported a pH of 6 for *Euphorbia* sap, and its alkalinity would explain its increased corneal permeability through nonionic diffusion [5]. *E. grandicornis* sap toxicity can also be attributed to its flavonoids, alkaloids, phenols, and sesquiterpene lactones. Phenols, alkaloids and sesquiterpene lactones are liposoluble and thus, due to their hydroxyl groups, can easily cross epithelial cellular membranes and penetrate the entire cornea into the anterior chamber. Although *E. grandicornis* sap constituents have not been previously reported, flavonoids belonging to other species are antioxidants which can modify eicosanoids synthesis, block the Na/K/ATPase pump, show promise as a treatment for dry eye, and have anti-HBV activity in animal studies [6, 7].

E. grandicornis sap corneal exposure is a cause of nonvisually threatening keratouveitis when adequately treated with corticosteroids.

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Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

None of the authors has any conflicts of interest to disclose. No author has financial or proprietary interest in any material or method mentioned.

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Fig. 1. *E. grandicornis* belonging to the patient, with strong spines resembling the shape of cows' horns. It is used for ornamental purposes.

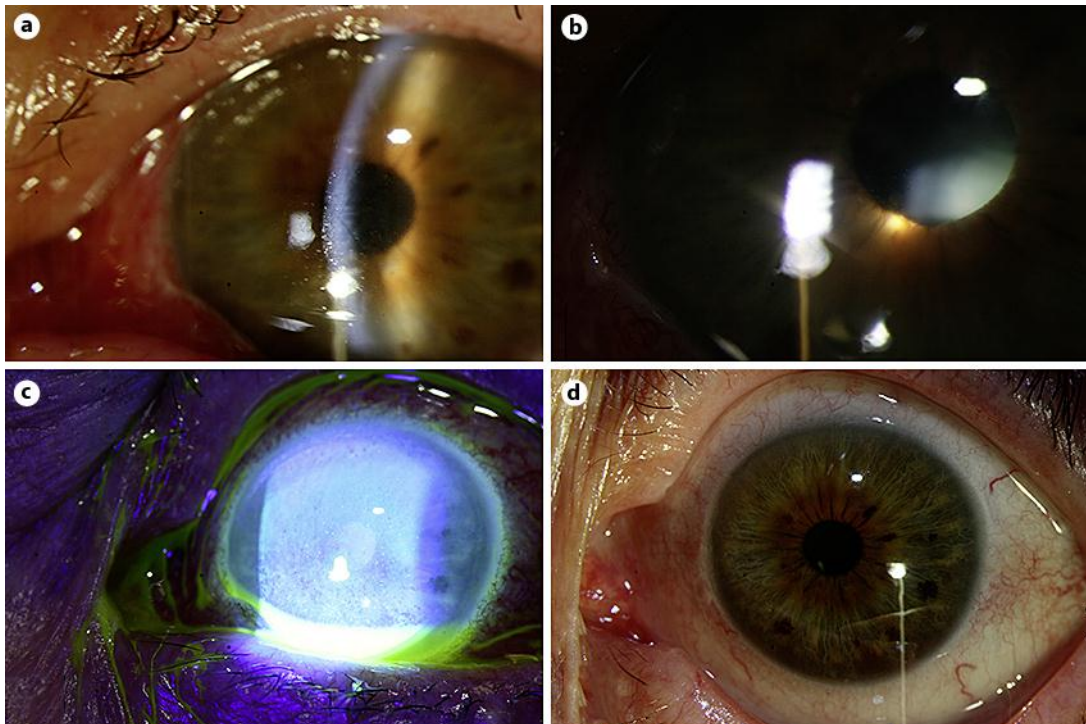


Fig. 2. Slit-lamp photograph of the OS. **a** Clinical aspect after 24 h of exposure to *Euphorbia* sap. **b** Anterior chamber inflammation. **c** Corneal fluorescein staining. **d** Clinical aspect 1 week later.