

A case report of ocular injury by *Euphorbia* plant sap

大戟植物汁液令眼部受傷的個案報告

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Ocular injuries in the working place are usually related to exposure to industrial chemical substances e.g. acid and alkaline, radiation energy e.g. ultra-violet light or even direct trauma. Ocular injuries by saps of plants are uncommon but can result in serious ocular complications. We report a case of ocular injury of a gardener caused by the sap of a *Euphorbia* plant, *Euphorbia trigona*. The ocular complications and management of *Euphorbia* plant sap-associated eye injuries are reviewed. (*Hong Kong j.emerg.med.* 2009;16:267-270)

在工作地點的眼部受傷通常與暴露於工業化學物質（如酸鹼）或輻射能量（如紫外線）有關，或甚至直接的受傷。因植物汁液令眼部受傷並不常見，但可以引致嚴重的眼部併發症。我們報告一名園丁因大戟特里戈納植物的汁液引致眼部受傷的個案；並評論有關大戟植物汁液令眼部受傷的眼部併發症及處理。

Keywords: *Euphorbia*, eye injuries, occupational accidents, plants

關鍵詞：大戟、眼部受傷、職業意外、植物

Case

A 52-year-old man, with a history of recovery from nasopharyngeal carcinoma after chemotherapy and radiotherapy, presented to the accident and emergency department (AED) in September 2008 for intense right eye pain after ocular contact with the sap of a *Euphorbia* plant, *Euphorbia trigona*. He was the gardener of a school. He accidentally got the sap of the plant sprayed into his right eye while he was pruning the plant during his daily work in the school garden without any eye

protection. He presented to the AED one-and-a-half hours after the injury with persistent pain despite self-irrigation over his right eye with fresh water.

At the hospital, his injured eye was irrigated immediately at triage with normal saline under topical anaesthesia. The pH on his right eye cornea was 7 after irrigation. His right eye showed conjunctival congestion. His pupils were both 2 mm in size and reactive to light symmetrically. The visual acuity of both eyes were normal at 20/20. Slit-lamp examination after fluorescent stain showed no obvious corneal erosion. He was treated with chloramphenicol eye ointment and eye patch. He was then referred to the ophthalmology outpatient clinic for further care. Fluorometholone (0.1%) eye drop, levofloxacin (0.5%) eye drop and Solcoseryl (20%) eye gel were prescribed. He suffered from intense pain over his injured eye for two days. On subsequent follow-up one week later, his eye showed full recovery without serious sequelae like corneal scarring or visual impairment.

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Discussion

Euphorbia belongs to the family of Euphorbiaceae, which contains more than 2000 species in the world.¹ *Euphorbia* plants are commonly employed as ornamental plants in Hong Kong (HK). Moreover, it is also not difficult to find them in parks or gardens. There are about 100 species in HK.² Most of the *Euphorbia* plants cultivated in HK are not native species. Apart from *Euphorbia trigona*, examples of *Euphorbia* plants which are commonly seen in HK are *Euphorbia milii*, *Euphorbia tirucalli*, *Euphorbia antiquorum* and *Euphorbia lacteal*. The authors bought four *Euphorbia* plants from ornamental plant shops. Milk-like saps were found from the cut edges of the leaves or stems (Figure 1). The pH values of the saps were tested for each plant, and all of them were acidic with a pH of 5.

The family of the plants is named after Euphorbus, who was a physician in 18 AD and he discovered the therapeutic properties of *Euphorbia* plants.³ *Euphorbia* plants are used as raw material for rubber, castor oil and tapioca.⁴ The saps of *Euphorbia* plants are highly irritant due to the presence of polycyclic diterpene esters.⁵ Despite the irritant properties on skin,⁵ the saps are traditionally used as a remedy for warts, calluses and verrucas.⁶ Some occupations or hobbies which need to take care of *Euphorbia* plants are prone to develop

ocular inflammation caused by *Euphorbia* plant saps. It is also a well known occupational hazard in lumber workers in tropical regions, and people who work in area clearing and grass cutting operations.^{4,7} Ocular injuries by *Euphorbia* plant saps were frequently reported in Western literatures. Joshi et al reported the largest series of ocular injuries from the sap of *Euphorbia* plant involving 12 patients. The culprit is the milky sap from *Euphorbia tirucalli* from the army centre during area clearing. *Euphorbia tirucalli* is a garden plant species and contains an excessive amount of sap, found growing in the wild apart from where they are planted as hedges. The patients were not aware of the excessive amount of sap in the plant and did not wear proper eye protective equipments. They got ocular exposure from splashes of the plant sap while performing grass cutting work.⁷ Apart from direct splashing into the eyes, there are other mechanisms of ocular contact with the sap, i.e. rubbing the eyes with contaminated hands⁸ and intentional application of the sap for the treatment of eyelid wart.⁵

Ocular toxicities caused by *Euphorbia* plants comprise of a spectrum of severity ranging from burning pain, lacrimation, photophobia, conjunctivitis, keratitis, uveitis, cornea ulceration, corneal oedema, sloughing off of the central corneal epithelium to even blindness.^{6,9,10}



Figure 1. *Euphorbia* and its plant sap (arrows); from left to right: *Euphorbia milii*, *Euphorbia antiquorum*, *Euphorbia trigona*, *Euphorbia lacteal*.

Experiments on ocular exposure to *Euphorbia* plants saps as conducted by Geidel¹¹ on guinea pigs and Crowder and Sexton¹² on dogs demonstrated severe keratoconjunctivitis, corneal oedema, and haemorrhages of the conjunctiva. The histological findings of the eyes showed vascularisation of the peripheral stroma and infiltration of the anterior segment with polymorphonuclear leukocytes. The accumulation of oedema fluid in the corneal stroma resulted in the appearance of corneal opacity. The epithelium of the cornea might slough off eventually. These findings appeared after 24–36 hours and resolved in one to three weeks after the endothelium had recovered and the epithelium had regenerated.¹² These findings were similar to those reported in human cases.

The degree of ocular inflammation is related to the amount of exposure and possibly the species of *Euphorbia* plant. Petty spurge (*E. peplus*) sap causes a typical *Euphorbia* keratopathy with a fibrinous anterior uveitis.^{13–15} Caper spurge (*E. lathyris*) sap gives a similar clinical picture as *E. peplus*, though the uveitis appears milder and there is no fibrin.^{11,16,17} The pencil tree (*E. tirucalli*)^{6,12,18} and candelabra cactus (*E. lactea*)^{6,12} also cause keratopathy, with a variable degree of uveitis. *E. characias* and its subspecies *wulfenii* cause only mild keratopathy without uveitis.⁹ *E. trigona* results in conjunctival injury alone based on our case, the first reported case according to our literature search. The different clinical presentations may be related to the different chemical substances present in the saps of different *Euphorbia* species.¹⁹ Besides the species of plant, the severity of ocular inflammation certainly is also related to the concentration of the sap and the duration of contact.⁷

The hallmark of ocular injuries by the saps of *Euphorbia* plants is intense pain immediately upon exposure. Early recognition of the symptoms and appropriate treatment is the cornerstone of the management of ocular injuries by *Euphorbia* plant saps. Copious irrigation by tap water at scene should be started as soon as possible in order to reduce the concentration of the sap over the eyes and the duration of exposure. Immediate medical consultation is advisable. If possible, sample of the plants should be taken for identification. Emergency

physicians should be aware of the potentially serious ocular complications from *Euphorbia* plant saps and detailed assessments, namely slit-lamp examination for corneal defect, should be performed. Topical antibiotic and steroid can reduce the risk of bacterial infection and corneal oedema. Topical cycloplegics for pain relieve should also be considered. Early follow-up by the ophthalmologist should be arranged for detailed evaluation. Apart from direct ocular toxicity from the *Euphorbia* plant sap, secondary bacterial infection also plays a very important role on visual loss and complications.⁹ Corneal ulcer with scarring or even perforation can result from delayed management.⁶ The symptoms may worsen several hours to days after the exposure.^{6,7} The patients should be warned of the possibility of worsening of vision before an improvement after days and it is important to have frequent follow-up for reassessment.

In general, serious complications, i.e. significant visual impairment, are rare if early consultation and treatment are made. Patients should be reassured about the benign clinical course of the injury provided good compliance with medications and follow-up are adhered.

Conclusion

Ocular injuries by *Euphorbia* plant saps can result in serious ocular complications. People who work with *Euphorbia* plants should be reminded about this potential occupational hazard. Preventive measures, such as wearing proper eye protection equipments and avoiding direct contact of the eyes with contaminated hands, should be stressed.

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