Ocular toxicity by latex of *Calotropis procera* (Sodom apple)

**Samar K Basak, Arup Bhaumik, Ayan Mohanta, Prashant Singhal**

We report the spectrum of ocular toxicity following accidental inoculation of latex of *Calotropis procera* (Sodom apple) in 29 eyes between January 2003 and December 2006. All patients presented with sudden painless dimness of vision with photophobia. Twenty-five (86%) patients had initial visual acuity of less than 20/60. All eyes had conjunctival congestion and mild to severe corneal edema with Descemet’s folds. Three (10%) eyes had an epithelial defect, nine (31%) had iridocyclitis, and seven (24%) had associated secondary glaucoma. After treatment with topical corticosteroids, antiglaucoma agents, cycloplegics, hypertonic saline and tears supplements, 27 (93%) eyes recovered completely within 3-14 days. After three months, 17 (74%) out of 23 eyes showed a significant low endothelial cell count compared to the normal fellow eye ($P < 0.001$).

The latex of *Calotropis procera* causes significant ocular morbidity which may be preventable by simple health education. The long-term effect on corneal endothelium has to be studied further.

**Key words:** *Calotropis procera*, latex, ocular toxicity

**Indian J Ophthalmol:** 2009;57:232-234

**DOI:** 10.4103/0301-4738.49402

*Calotropis procera* is a member of the milkweed or *Asclepiadeae* family and it is the scientific name of Sodom apple or Madar shrub. In India, it is found mainly in Assam, West Bengal, Rajasthan, Punjab, particularly in the wastelands.[1] They are medium-branched and perennial shrubs or small trees that grow up to a height of 4-5 meters with milky latex throughout. It has white or pink flowers which bloom between February and June [Fig. 1a].[2] In Bengali, it is known as *Akanda* and in Hindi as *Ak*. Its flower or garland and the leaves are used to worship *Lord Shiva* during the festive season in the months of February and April every year in West Bengal [Fig. 1b]. Thus, it is not so uncommon to get ocular injuries caused by accidental contact or inoculation of the latex of *Calotropis procera* during plucking of the flower or leaf stalk during this season.

The first report on ocular injury by *Calotropis* was by Muthayya in 1949 from India.[3,4] Since then, there are only three isolated case reports in literature - one from Israel, one from Thailand and the last one from Saudi Arabia.[5-7] Otherwise, the literature is silent about this kind of accidental toxic ocular injury with a large number of patients. In this communication, we report the spectrum of ocular toxicity after accidental inoculation of the latex of *Calotropis procera* in a series of patients, with their management, and further report its long-term effect on corneal endothelium.

**Case Report**

A retrospective analysis of 29 patients who presented with accidental ocular contact or injury with the latex of *Calotropis procera*, in our cornea department between January 2003 and December 2006, was performed. Apart from the demographic profile, a more detailed history was obtained from each patient to determine the mode of injury. Ocular examinations like best corrected visual acuity (BCVA) on presentation, slit-lamp findings, conjunctival injection, extent of corneal involvement including fluorescein staining and intraocular pressure by non-contact tonometer (NCT) [CT-80, Topcon Inc, Tokyo, Japan] were carried out for each patient.

Though most of the patients had given the history of washing their face and eyes with water, further thorough wash was given to all of them by Ringer’s lactate solution for those who had presented within 24 h. They were treated with tapering doses of topical antibiotic, steroids, cycloplegics, 5% hypertonic saline and oral vitamin C. Additionally, the patients with secondary glaucoma were treated with topical antiglaucoma medication and the eyes with epithelial defect with tear substitutes. All patients were followed up at a regular interval depending upon the severity of injury, and studied for all the parameters. After completion of treatment, specular microscopy (SP-2000P, Topcon Inc, Tokyo, Japan) was performed for the affected and fellow normal eye. The patients were asked to follow up after three to six months for routine check up and a repeat specular microscopy. The patients were taught about the toxicity of latex of *Calotropis* plant and the importance of washing hands after handling its flower or leaves.

There was a strong male preponderance (83%), with only five female patients. Sixteen (55%) patients were flower vendors by profession and 21 (72%) patients had presented within 24 h of the injury. Right eye was affected in 25 (86%) cases [Table 1]. All eyes showed mild conjunctival congestion and mild to moderate ciliary congestion. All eyes had mild to severe corneal edema with Descemet’s folds [Fig. 2a,2b], nine (31%) had mild to moderate degree of iridocyclitis, and seven (24%) had secondary glaucoma. The range in intraocular pressure rise in these eyes as recorded by NCT was between 8.0-11.5 mm of Hg as compared to the fellow normal eye. In 27 (93%) eyes, the mean period of complete resolution was 6.69 ± 2.70 days (range: 3-14 days) and the treatment was discontinued one week after the recovery. One case with large abrasion required bandage contact lens and complete resolution occurred after four weeks. The post-treatment BCVA returned to 20/20 in 26 (90%) cases with normal appearance of the cornea in all cases. In 17 (74%) out of 23 eyes, specular microscopy revealed a mean low cell count of 18.63 ± 9.91% after a period of three to six months in comparison to the normal fellow eye ($P < 0.001$) [Fig. 3a,3b].

**Discussion**

The latex of *Calotropis procera* contains several alkaloids (such as *Calothixin, Calotoxin, Calclini, Gigantin*) which are caustic and considered poisonous in nature.[5,8] Previous reports showed that accidental contact of *Calotropis* latex into the eye caused violent kerato-conjunctivitis with associated corneal edema and gross dimness of vision but without any pain.[5,7,8] But they did not report...
In this series, all patients presented with sudden dimness of vision with photophobia due to corneal edema with Descemet's folds. Again as with other reports, pain was surprisingly absent any uveitis or secondary glaucoma in any case. However, confocal microscopy of a recently reported case showed permanent endothelial cell damage which was evident after three weeks.\(^7\)

In this series, all patients presented with sudden dimness of vision with photophobia due to corneal edema with Descemet's folds. Again as with other reports, pain was surprisingly absent.
Table 1: Patients’ profile (n = 29) with presenting clinical features

| Patients’ profile and clinical features | No. of patients (%) |
|----------------------------------------|---------------------|
| Age (year)                             | 24-71 (Mean: 41.3 ± 9.3) |
| Gender (Male: Female)                  | 24: 5               |
| Right eye: Left eye                    | 25: 4               |
| Occupation:                            |                     |
| Flower vendor:                         | 16 (55.2%)          |
| Brahmin Pundit:                        | 7 (24.1%)           |
| Household person:                      | 6 (20.7%)           |
| Time of presentation:                  |                     |
| Within 24 h                            | 21 (72.4%)          |
| 24 - 48 h                              | 7 (24.1%)           |
| After 48 h                             | 1 (03.5%)           |
| Chief complaints:                      |                     |
| Sudden dimness of vision               | 29 (100%)           |
| Photophobia                            | 29 (100%)           |
| Visual acuity on presentation:         |                     |
| <20/200                                | 8 (27.6%)           |
| 20/200 to <20/60                       | 17 (58.6%)          |
| 20/60 to 20/40                         | 4 (13.8%)           |
| Corneal edema with Descemet’s folds    | 29 (100%)           |
| Epithelial defect                      | 3 (10.3%)           |
| Iridocyclitis                          | 9 (31.0%)           |
| Secondary glaucoma                     | 7 (24.1%)           |

In all the cases. This kind of painless course is probably due to the anesthetic properties of Calotropis latex. Seventeen out of 24 eyes showed significant low endothelial cell count after three months follow-up compared to the fellow normal eye. These findings suggest that unlike other chemical burns, Calotropis latex is paradoxically relatively non-toxic to the corneal epithelium, but highly toxic to the corneal endothelium. That is why there was corneal edema with varying degree of Descemet’s folds. The management in most cases is as simple as treating a mild chemical burn.

In conclusion, the latex of Calotropis procera causes immediate severe corneal damage with painless sudden dimness of vision. It may also cause reduction in endothelial cell count over a period of time. Every year during the months of February and April, a few people suffer from this kind of chemical injury during the festive season. Simple health education like washing of hands, avoiding contact or rubbing of eyes while plucking of Calotropis flower is important to prevent this kind of injury.

References

1. Available from: http://en.wikipedia.org/wiki/calotropis_procera. [last accessed on 2007 Jul 11].
2. Available from: http://www.himalayahealthcare.com/herbfinder/h_calotropis.htm. [last accessed on 2007 Jul 11].
3. Muthayya RE. Madar keratitis. Proc Indian Ophthalmic Soc 1949;10:44-7.
4. Duke-Elder S. System of ophthalmology. Injuries, Part II. Vol 14, London: Henry Kimpton; 1978. p. 1186.
5. Biedner B, Rothko L, Witztum A. Calotropis procera (Sodom apple) latex keratoconjunctivitis. Isr J Med Sci 1977;13:914-6.
6. Laukanjanarat W, Tovanich M. Corneal edema due to Calotropis procera. Thai J Ophthalmol 1997;11:87-90.
7. Al-Mezaine HS, Al-Rajhi AA, Al-Assiri A, Wagoner MD. Calotropis procera (Ushaar) keratitis. Am J Ophthalmol 2005;139:199-202.
8. Kuriachen PM, Dave Y. Structural, developmental and histochemical studies in the collectors of Calotropis procera (Asclepiadaceae). J Phytological Res 1989;2:7-14.
9. Devasari T. Toxic effects of Calotropis procera. Indian J Pharmacol 1965;27:272-5.