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Case Report OMICS International

Corneal Toxicity after Self-Application of *Calotropis procera* (Ushaar) Latex: Case Report and Analysis of the Active Components

Huda Al Ghadeer*, Ahmad Al Gethami and Hamad Al Sulaiman

Department of Emergency Medicine, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

***Corresponding author:** Huda Al-Ghadeer, Department of Emergency Medicine, King Khaled Eye Specialist Hospital, PO Box 7191, Riyadh 11462, Kingdom of Saudi Arabia, Tel: +966 1 4821234 ext 3777; Fax: +966 1 4821234 ext 3727; E-mail: hghadeer@kkesh.med.sa

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Abstract

Calotropis procera (ushaar) produces a copious amount of latex, which has both inflammatory and anti-inflammatory pharmacological properties. Local application produces an intense inflammatory response and causes significant ocular morbidity. We report corneal toxicity following self-application of latex from *C. procera* in a 74-year-old man. He reported painless decreased vision in the affected eye with diffuse corneal edema, and specular microscopy revealed a reduced endothelial cell count. After he was treated with topical corticosteroids, his visual acuity improved from HM to 20/80. The composition of the active compounds in the latex was analyzed. When topically administered, the latex may cause severe ocular injuries and a loss of endothelial cells over a period of time. Public education, early recognition of such injuries, and timely intervention may prevent permanent ocular damage.

Keywords: *Calotropis procera*, Ushaar latex, Keratitis, Corneal toxicity, Herbal medicine

Introduction

Herbal medicine and the use of plant and herb extracts are not uncommon in Saudi Arabia. Occupying four fifths of the Arabian Peninsula, Saudi Arabia has a wide number of flora, including trees and herbs [1]. In the rural areas of Saudi Arabia, folk medicine is still actively practiced, and topical folk remedies are commonly used in the central and southern parts of the country [2].

Calotropis procera (ushaar), a xerophytic shrub of the family Asclepiadaceae, is widely distributed in the tropics of Asia, Africa, and northwest South America [3]. It is medium branched and grows to a height of 4-5 meters. The shrub has white or pink flowers (Figures 1A and 1B) and produces latex throughout [4].

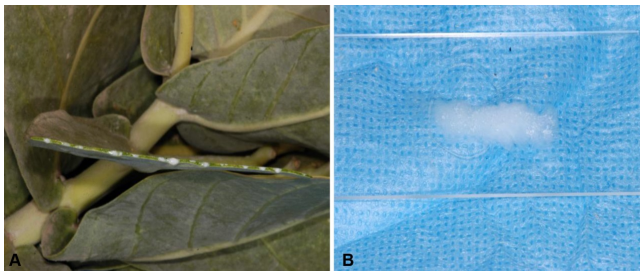

Figure 1: (A) *Calotropis procera* (ushaar). (B) Milky latex from the cut leaf of a *C. procera* plant.

The milky white endogenous latex exhibits a variety of effects in various animal models [5]. On oral administration, it produces potent anti-inflammatory and analgesic effects, as well as weak anti-pyretic effects, whereas on local administration, it induces an intense inflammatory response in animal models [3,6]. These antagonistic biological activities (inflammatory and anti-inflammatory) depend on the extraction medium and the route of administration of the latex in experimental animals [3].

Ocular injury caused by this plant can be mechanical, but more commonly results from toxic exposure to the latex. Accidental exposure has been reported to cause inflammation of the skin and eyes [7,8].

We report the management of a case of self-application of *C. procera* latex that resulted in corneal toxicity, as well as the analysis of the active compounds in the substance.

Case Report

A 74 year old man presented to the Emergency Department at King Khaled Eye Specialist Hospital 3 days after self-application of latex from *C. procera* in his left eye. He reported a painless decrease in vision. There was no history of previous trauma, surgery, or other ophthalmic disorder. Apart from hypertension, the patient had no medical illness.

Ophthalmic examination revealed best corrected visual acuity of 20/40 in the right eye (OD) and hand motion (HM) vision in the left eye (OS). Intraocular pressure using applination tonometry was within normal range in both eyes. Examination of the OD was unremarkable except for a mild cataract. Slit-lamp examination of the left eye revealed quiet conjunctiva, no corneal epithelial defect, diffuse corneal edema with significant Descemet's folds and small pigmented keratic precipitates (Figures 2A and 2B), nuclear sclerosis of the lens, and a hazy view of the fundus. B scan ultrasonography of the left eye showed no pathology of the posterior pole. Specular microscope SP-3000 P showed 2224 endothelial cells/mm^2 in the right eye and 593 cells/mm^2 in the left eye, with abnormal morphology.

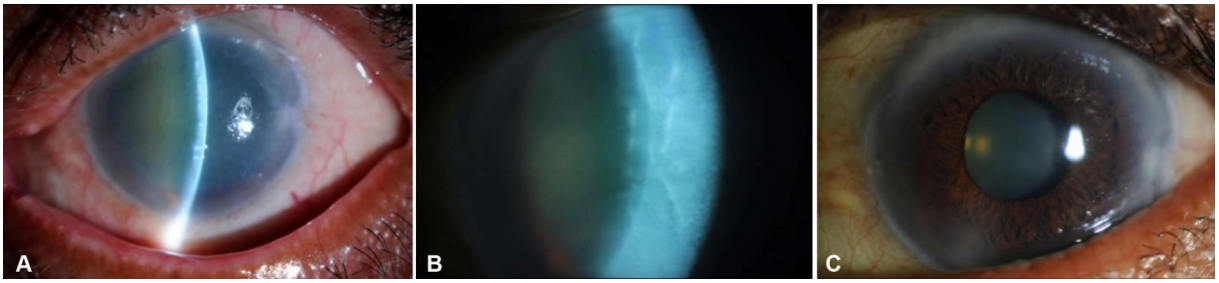

Figure 2: (A) Slit-lamp biomicroscopy of the left eye; (B) Diffuse corneal edema with Descemet's folds; (C) Complete disappearance of corneal edema after treatment.

The patient was started on topical prednisolone acetate 1% four times a day for the first week, after which it was tapered. In addition, topical cyclopentolate 1% drops three times a day were prescribed for the first 2 weeks. In the first follow-up at 1 week after presentation, his best corrected visual acuity in the left eye improved to 20/300. Slit-lamp examination showed a reduction in corneal edema and an increase in clarity with fewer Descemet's folds. In the second follow-up at 2 weeks after presentation, his best corrected visual acuity improved to 20/200. Slit-lamp examination showed a clear cornea with no residual edema (Figure 2C). One month later, his best corrected visual acuity was 20/80 in the left eye. The latex was sent for analysis and revealed the elements shown in Table 1. The result of Phytochemical screening of petroleum ether and methanol leaf extracts of *Calortropis Procera* revealed the presence of glycosides, protein, triterpenoids, steroids, flavonoids. The presence of these components in this species is an indication that it may have some medicinal potential. The latex of the *Calotropis procera* were tested and was found completely varying in pH values. It has an acidic nature with pH of 4.2 at room temp of 25 degree centigrade. The amount of Magnesia was found highest amount in latex. The level of Chromium was completely absent (Table 2).

Phytochemical Screening of *Calotropis Procera*	**Petroleum Ether Extract**	**Methanol Extract**
Alkaloids	-	-
Carbohydrates	-	+
Reducing Sugar's	-	-
Flavonoids	-	+
Glycoside	+	+
Tannin and Phenolic	-	+
Saponin	-	-
Protein and Amino Acid	+	+
Fats and Oils	-	-
Triterpenoids and Steroids	+	+

Table 1: Analysis of *Calotropis procera* (ushaar) using phytochemical screening.

Elements	**Latex (mg/KG)**
Al	200
Ca	340
CD	120
Co	80
Cr	ND*
Cu	0
Fe	50

Mg	39400
Mn	17
Ni	50
Pb	0
Zn	23
K (%)	ND*
N (%)	ND*
P (%)	ND*
ND*: Not Detected	

Table 2: Analysis of *Calotropis procera* (ushaar) using chromatography.

Discussion

The irritant and pro-inflammatory properties of the milky white latex of *C. procera* has been well established [3]. Exposure to the latex irritates the mucous membrane and produces contact dermatitis and intense inflammation when injected locally in animal models [8,9]. The latex is known to contain several alkaloids (e.g., calotropin, catotoxin, calcilin, gigantin) that are considered poisonous [3]. Spectrum analysis revealed the main elements of the latex, as shown in Table 1.

Shivkar et al. in their study of a rat paw model, found that injection of dried latex produces an intense inflammatory response involving edema formation and cellular infiltration [8]. They showed that this response was caused by the presence of histamine in the latex itself, as well as the release of mast cell histamine by the latex. They also reported that latex induced prostaglandin synthesis through the induction of cyclooxygenase-2 [9]. Both histamine and prostaglandins are key mediators in an inflammatory response.

In accordance with these findings, we believe that stromal keratitis is caused by inflammation induced by exposure to latex because of its strong pro-inflammatory property. The resolution of keratitis with local corticosteroid use supports such a mechanism. Another possible mechanism is a reduced endothelial count due to the direct toxic effect of the latex, as suggested by Al-Mezaine et al. [6].

Our patient developed transient corneal edema with permanent loss of endothelial cells as a result of the penetration of the latex into the corneal endothelium. The painless clinical course of our patient could be attributed to the analgesic property of the latex [10]. We conclude that *C. procera* latex causes immediate severe corneal damage with painless sudden dimness of vision. It may also reduce the endothelial cell count over a period of time.

Causes of visual impairment are numerous, but many are preventable through public education and provision of modern health care. Simple health education such as hand washing, protective eyewear and avoiding rubbing of the eyes while plucking the Calotropis flower is important to prevent this kind of serious injury. Ophthalmologists should be aware of the acute side effects of some of these folk remedies.

References

1. Youssef R (2013) Medicinal and non-medicinal uses of some plants found in the middle region of Saudi Arabia. J Med Plant Res 7: 2501-2517.
2. Al-Ghadeer HA (2010) Acute ocular complications from self-administered topical kermes. Middle East Afr J Ophthalmol 17: 382-384.
3. Pandey N, Chandrakar AK, Garg ML, Patel SS (2009) Calotropis procera -induced keratitis. Indian J Ophthalmol 57: 58-60.
4. Basak SK, Bhaumik A, Mohanta A, Singhal P (2009) Ocular toxicity by latex of Calotropis procera (Sodom apple). Indian J Ophthalmol 57: 232-234.
5. Shenoy R, Bialasiewicz A, Khandekar R, Al Barwani B, Al Belushi H (2009) Traditional medicine in oman: its role in ophthalmology. Middle East Afr J Ophthalmol 16: 92-96.
6. Al-Mezaine HS, Al-Amry MA, Al-Assiri A, Fadel TS, Tabbara KF, et al. (2008) Corneal endothelial cytotoxicity of the Calotropis procera (ushaar) plant. Cornea 27: 504-506.
7. Tomar VP, Agarwal PK, Agarwal BL (1970) Toxic iridocyclitis caused by calotropis. J All India Ophthalmol Soc 18: 15-16.
8. Shivkar YM, Kumar VL (2003) Histamine mediates the pro-inflammatory effect of latex of Calotropis procera in rats. Mediators Inflamm 12: 299-302.
9. Kumar VL, Shivkar YM (2004) Involvement of prostaglandins in inflammation induced by latex of Calotropis procera. Mediators Inflamm 13: 151-155.
10. Basu A, Chaudhuri AK (1991) Preliminary studies on the antiinflammatory and analgesic activities of Calotropis procera root extract. J Ethnopharmacol 31: 319-324.