



A Cross Sectional Descriptive Study Of Unusual chemical keratitis Following Exposure To Diafenthion 50 WP Insecticide In Farming Community In and Around Bidar District.

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Abstract

Background: Diafenthion is an insecticide commonly used in cotton cultivation. Occupational exposure to its fumes or vapours may cause ocular surface toxicity and chemical keratitis. This study describes the clinical features, visual impairment, management, and outcomes of unusual chemical keratitis following exposure to Diafenthion 50 WP insecticide among individuals from agricultural communities in and around Bidar district.

Methods: A cross-sectional descriptive study was conducted at Megur Eye Care Centre, Bidar, from September 16, 2023, to December 15, 2023. Fifteen patients involving 26 eyes with chemical keratitis following exposure to Diafenthion insecticide fumes or vapour were evaluated. Visual acuity and slit-lamp examination with fluorescein staining were performed. Patients were treated with antimicrobial-steroid eye drops in tapering doses, lubricating eye drops and gel, analgesics, and vitamin C. Bandage contact lenses were used in eyes with epithelial defects and severe punctate erosions. Follow-up examinations were performed on the fifth day and at 15 days.

Results: Twenty of the 26 eyes had punctate corneal erosions, while six eyes had epithelial defects. At initial presentation, four eyes had severe visual impairment ($<6/60$), 15 had moderate visual impairment ($6/12p$ to $6/60$), and seven had mild visual impairment ($\leq 6/12$). Patients commonly presented with severe ocular pain, burning, watering, redness, blurred vision, and photophobia. All patients demonstrated good visual acuity at the final follow-up.

Conclusion: Diafenthion exposure can cause an unusual form of chemical keratitis characterized predominantly by punctate corneal erosions and, in some cases, epithelial defects. Although the condition showed a favourable short-term visual outcome in this study, awareness regarding the ocular hazards of pesticide exposure and appropriate protective measures is important among agricultural workers, particularly during the cotton harvesting season. Collaboration with local agricultural authorities may help reduce accidental ocular exposure.

Keywords: Diafenthion; Chemical keratitis; Pesticide exposure; Ocular toxicity; Corneal epithelial defect; Punctate corneal erosions; Cotton farmers; Agricultural workers; Chemical eye injury; Bidar

Introduction

Karnataka and the districts that make up the state are primarily agricultural, as is the rest of India. People in southern India, notably in the state of Karnataka and border districts of Telangana are responsible for the moderate cotton production in India. Typically, seeds are sown between the months of March and May, while cotton is harvested between the months of August and October [1]. Before the start of the harvesting season, the cotton plants are treated with a variety of insecticides in order to protect them from weeds and pests.

Singenta Polo or Singenta Pegasus, which contain Diafenthuron, is the most particularly used insecticide or pesticide. Diafenthuron is a novel pesticide used to control insects and mites that are resistant to key chemical classes such as organophosphorus compounds and pyrethroids. This insecticide can cause mechanical eye damage, but hazardous exposure to its vapour (fumes) is more common. [2] Inadvertent exposure causes eye inflammation, which usually appears 6-8 hours after insecticide application. [3] As the most anterior structure of the eye, the cornea is vulnerable to a variety of risks. As a result, corneal damage can manifest in a variety of ways and clinical manifestations. [4] Because the cornea is the most important refracting surface of the eye, even tiny alterations in its contour produce considerable vision impairments. [5] The most typical symptoms of this pesticide exposure in patients include burning, watering, and pain, as well as redness, blurring of vision, and photophobia. [6] The purpose of this study is to monitor the spectrum of ocular toxicity, complications, and prevention of inadvertent eye exposure to Diafenthuron pesticide vapours, as well as to raise awareness among patients about the harmful effects of Diafenthuron in order to prevent recurrence.

Case Presentation:

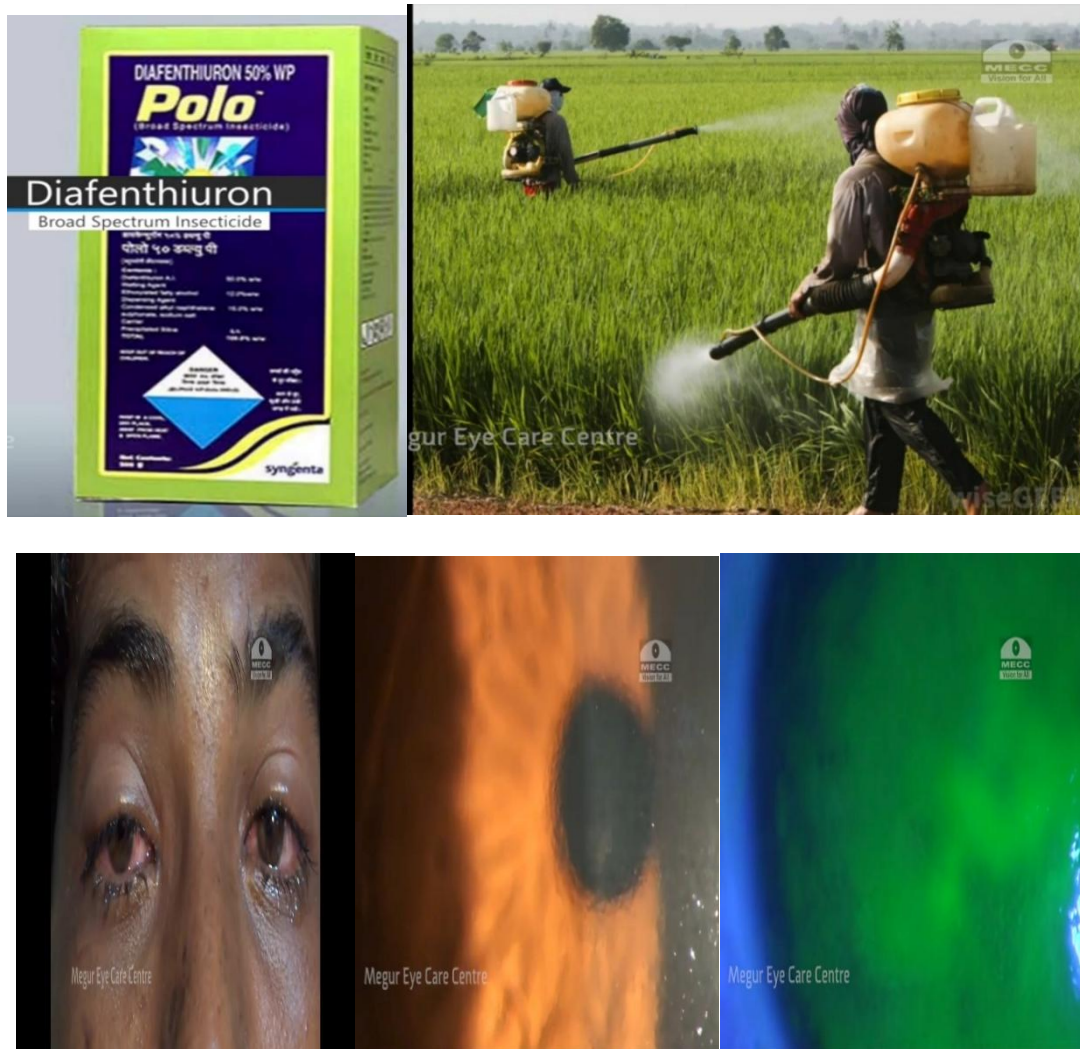
A cross-sectional descriptive study was conducted at Megur Eye Care Centre Bidar for a month between September 16, 2022 and October 15, 2022, with 26 eyes of 15 patients (11 with both eyes involved and 4 with one eye involvement) with chemical keratitis following exposure to a peculiar insecticide that is typically used to sprinkle on cotton plants during harvesting season.

Twenty of the 26 eyes exhibited punctate corneal erosions, and six had epithelial defects.

Among the 26 eyes, 4 had severe vision impairment of less than 6/60 on initial presentation, 15 had moderate visual impairment of 6/12p to 6/60, and 07 had mild visual impairment of less than or equal to 6/12.

Patients typically present with severe pain and burning sensation in eyes exposed to insecticide fumes or vapour to such an extent that patients are unable to open their eyes. Clinical examination is carried out only after instilling paracaine eye drops for patient cooperation for slit lamp examination and stained with fluorescein stain following visual acuity assessment. All patients received antimicrobial steroid eyedrops [7] in a tapering dose, lubricating eye drops and gel, analgesic pills, and vitamin C tablets until the erosions resolved, patients with epithelial defect (06 eyes) and severe punctate erosions (02 eyes) receiving bandage contact lenses. All patients were summoned on the fifth day after their initial appointment for a follow-up examination and a decision on bandage contact lens removal based on corneal symptoms, and then again after 15 days for a final follow-up assessment.

All of the patients exhibited good visual acuity on the final follow-up evaluation.



Discussion:

The cases that were reported here have symptoms that are similar to those of photophthamia; however, after conducting a thorough history review and physical examination, we were able to determine that the patients were suffering from an unusual form of chemical keratitis associated with a specific insecticide (Daifenthiuron). In addition, the patients were given antibiotic and steroid eye drops in gradually decreasing doses, as well as lubricating eye drops and gels, painkiller tablets, and vitamin C tablets and in few bandage contact lenses until the condition resolved.

Conclusion:

This peculiar kind of keratitis is more common in the agricultural villages located in and around the Bidar area, particularly among those farmers who regularly apply daifenthiuron pesticide, and it is most noticeable at the time of year when cotton plants are being harvested (August to October). Therefore, despite the fact that there are no long-term difficulties linked with it, it is extremely important to educate

the individuals who are at risk and to advise them to take the safety precaution by attempting to draw the attention of the local agricultural authority.

References

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