

# Eye injuries caused by date palm thorns and leaves

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## Abstract:

**PURPOSE:** To describe the clinical presentation, management, and outcome of hospitalized patients having date palm tree eye injuries.

**METHODS:** This is a retrospective study of consecutive patients who were admitted to Al-Ain hospital following date palm tree eye injuries between 2012 and 2017. Patients' demography, symptoms and signs at presentation, surgical intervention, visual acuity (VA) before and after treatment, hospital stay, and causes for VA limitation were studied.

**RESULTS:** Sixteen patients were studied. Their median (range) age was 38.5 (7–58) years, all were males. Majority (87.5%) were from the Indian subcontinent and had their injuries at farms. Eye pain (94 %) was the most common presenting symptom while keratitis (62.5%) and corneal perforation (43.8%) were the most common physical findings. Vision showed a statistical trend for improvement after treatment ( $P = 0.1$ , Wilcoxon signed rank test). Five patients (31%) were blind in the injured eye.

**CONCLUSION:** Palm date tree eye injuries which mainly occur at farms are a significant cause for visual loss at United Arab Emirates (UAE). Use of eyes protective goggles combined with legislative eye safety regulations will reduce palm tree eye injuries.

## Keywords:

Corneal ulcer, date palm, eye injuries, penetrating injury, thorn

## INTRODUCTION

United Arab Emirates (UAE) is the fourth largest country for dates crop worldwide and contributes to about 14% of the world dates production.<sup>[1]</sup> It is estimated that date palm tree in UAE is 40 million of which 8.5 million are in Al-Ain region.<sup>[2]</sup>

Date palm tree (*Phoenix dactylifera*) can reach a height of 21-25 meters.<sup>[3,4]</sup> Its feather-shaped leaves fan out from the top with about 150 leaflets.<sup>[3,4]</sup> Leaflet can be up to 30 centimeters long with sharp and taper tip<sup>[4]</sup> and thorns arises from the petiole of the leaves [Figure 1a].

Agricultural labor is a high risk occupation.<sup>[5]</sup> Eye problems are the second most common health problem in farmworkers. Workers harvesting the field crops are at risk for eye injuries especially with reported low rates of safety glasses usage

and limited access to eye wash stations.<sup>[6,7]</sup> Eye injury risk might be high with date palm tree, where in addition to field crop hand harvesting, it requires manual pollinizing, chopping of thorns to reach spathes and bunches, and periodic pruning and striping of excess and dried leaves. Climbing the tree is usually done in a traditional way where a rope is passed behind the trunk of the tree and used to support the farmer to reach the top [Figure 1b].

Agricultural eye injuries have been studied with various crops such as citrus,<sup>[8]</sup> olive<sup>[9]</sup> and cocca.<sup>[10]</sup> Nevertheless, date palm tree eye injuries have not been studied in detail except for few case reports.<sup>[11-14]</sup> We aim to study the clinical presentation, management and clinical outcome of hospitalized date palm tree eye injuries.

## METHODS

This study was approved by Al-Ain Hospital Research Ethics Committee (AAHEC-09-17-071). Al-Ain Hospital is the

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main health center for eye treatment of major injuries in Al-Ain City. We studied all patients who were hospitalized to Al-Ain Hospital for corneal ulcers or eye injuries caused by date palm thorn or leaves during the period of January 2012 to March 2017. A special protocol was developed for data extraction. The studied variables were age, gender, nationality, place of injury, time to hospital presentation, eye scraping microbiology cultures, medications, surgical intervention, hospital stay and visual acuity at presentation and follow up.

Corneal wounds were all central and were closed with 10.00 nylon sutures. At the end of surgery, subconjunctival injection of gentamycin was given in addition to dexamethasone in case there was any traumatic cataract. This was followed by topical gentamycin and moxifloxacin for 7-10 days. Traumatic cataracts were removed on a later stage.

Statistical analysis included simple descriptive data analysis. Data were expressed as median (range) or number (%) as appropriate. Wilcoxon signed rank test was used to compare the continues data of two related groups. Data analysis was done using PASW Statistics version 25, SPSS Inc, Chicago, Illinois, USA.

## RESULTS

Sixteen patients were studied. They had a median (range) age of 38.5 (7-58) years, all were males (100%). Table 1 shows the demography of the patients. Majority (68%) were from the Indian subcontinent. Eight injuries (50%) occurred at work place, five (31.3%) at home, while three (18.8%) occurred at other places. Seven out of ten (70%) of those that occurred at work place were at farms. Nine eyes were on the right side (56%) while seven were on the left (44%).

Majority of patients presented to the hospital within 6 hours of injury (44 %) [Figure 2]. Pain (94 %), redness (50%) and sensation of a foreign body (50%) were the most common presenting eye symptoms. Keratitis (62.5%) was the most common physical finding followed by corneal perforation

(43.8%) [Table 2]. One patient had computed tomography scan which showed the penetrating wound tract [Figure 3].

Corneal perforation was repaired in 7 patients (43.8%) of whom two had retained intrastromal foreign bodies that were removed during corneal wound closures. One patient had vitreous hemorrhage and one had vitreous prolapse into anterior chamber [Figure 4].

Corneal scraping for cultures and smears was performed for 10 patients. Five of them showed positive results; one showed *Neoscytalidium Dimidiatum* fungus, one revealed *Streptococcus viridans* and *Streptococcus hominis*, one revealed *Staphylococcus warneri*, *Aspergillus tereus*, and *Fusarium* species. Ten patients received gentamycin eye drops, 13 received moxifloxacin, 4 received Natamycin for 7-30 days. Patients with a corneal perforated wound were routinely given subconjunctival gentamycin. Dexamethasone was added in cases of traumatic cataracts. Also all patients received cycloplegics. Nevertheless, file documentation for this was missing for 5 patients (one patient with corneal ulcer, 2 corneal lacerations, one lid laceration, and one with intra-corneal FB).

The median (range) hospital stay of patients was 3.5 (0-22) days. The patients were followed up for a median (range) of

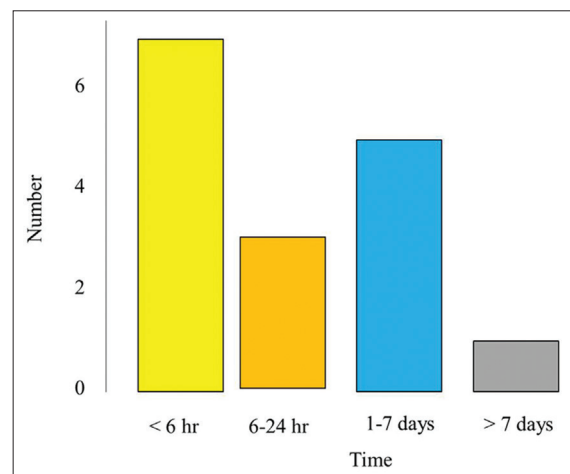
**Table 1: Demography of 16 patients who were admitted to Al-Ain Hospital with date palm tree injury during the period of January 2012 to March 2017**

Variable	Value
Age median (range) years	38.5 (7-58)
Gender	
Male	16 (100)
Nationality	
Bangladeshi	7 (43.8)
Pakistani	4 (25)
Emirati	2 (12.5)
Others	3 (18.8)

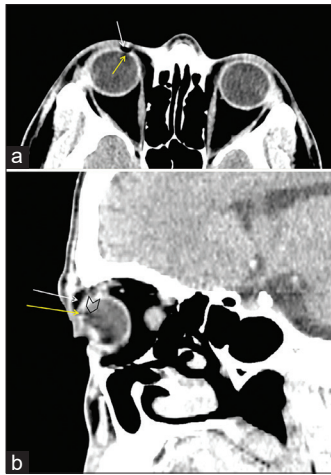
Data are presented as median (range) or number (%) as appropriate.



**Figure 1:** Date palm tree thorns (a). A laborer climbing the date palm tree with a rope passed behind the trunk of the tree and his back (b)



**Figure 2:** Time between injury and hospital presentation of 16 patients who had date palm tree eye injuries and required hospitalization in Al-Ain Hospital during the period of 2012–2017



**Figure 3:** Coronal (a) and sagittal (b) computed tomography (CT) scan with intravenous contrast of the right orbit of a 35-year old male farmer who sustained a right eye injury caused by a date palm tree thorn. It shows subcutaneous emphysema (white arrow), defect of the sclera (yellow arrow), and the tract of the penetrating injury (arrow head)

1 (0-4) months and were seen for a median (range) 2 (0-7) visits. There was a strong trend for improvement in the visual acuity at follow up ( $P = 0.1$ , Wilcoxon signed rank test,  $n = 12$ , Figure 3). The visual acuity in the injured eye was 20/200 or worse in five patients. The main cause of vision limitation was the corneal involvement (81%) [Table 3].

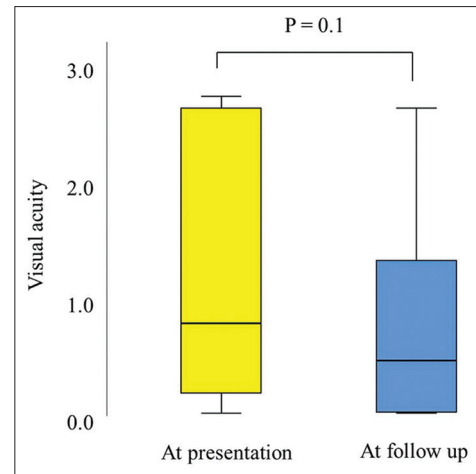
### DISCUSSION

Our study has shown that date palm tree eye injuries are a significant cause for visual loss. This has affected males with a median age of around 40 years.

Keratitis was the most common clinical finding in our patients. In a retrospective study for corneal ulcers, Oladigbolu *et al.*<sup>[15]</sup> reported that trauma with vegetable matter caused 31% of the ulcers. The second most common finding in our study was corneal perforation. There are two case reports of traumatic globe rupture with intraocular foreign body related to date palm tree thorns.<sup>[11,13]</sup> Local reactions to date palm puncture may occur in various tissues including joints and bones.<sup>[16,17]</sup> Organic matter, surface contaminants, or toxins including phenolic alkaloids were suggested to cause a chronic inflammatory reaction.<sup>[16,18,19]</sup> We could not find such description in the reported eye injuries. Nevertheless, we assume that the mechanism of reaction is similar.

Although majority of our patients presented to the hospital within 6 hours of injury, some had delayed presentation. Poverty, lack of transportation, and language barriers<sup>[20-24]</sup> may delay health care seeking. A study from USA showed that most workers returned to their home country to continue medical treatment because of these barriers.<sup>[23]</sup>

There was a strong trend for improvement of visual acuity at follow up in our study which might be due to prompt medical management. Nevertheless, five patients (31%) had a vision of 20/200 or worse in the injured eye at the last follow up. In



**Figure 4:** The initial and final visual acuity of 16 patients who had date palm tree eye injuries and required hospitalization during the period of 2012-2017. There was a strong trend for improvement of visual acuity at follow up ( $P = 0.1$ , Wilcoxon signed rank test)

**Table 2: Presenting symptoms and signs of 16 patients who were admitted to Al-Ain Hospital with date palm tree injury during the period of January 2012 to March 2017**

Symptoms and signs	Number	%
<b>Symptoms</b>		
Pain	15	93.8
Redness	8	50
Foreign body sensation	8	50
Decreased vision	5	31.3
Eye swelling	2	12.5
<b>Signs</b>		
Keratitis	10	62.5
Corneal perforation	7	43.8
Stromal infiltrate	6	37.5
Epithelial defect	3	18.8
Cataract	3	18.8
Intra-corneal foreign body	2	12.5
Anterior chamber inflammation	2	12.5
Hyphema	1	6.3
Hypopyon	1	6.3
Canaliculus injury	1	6.3

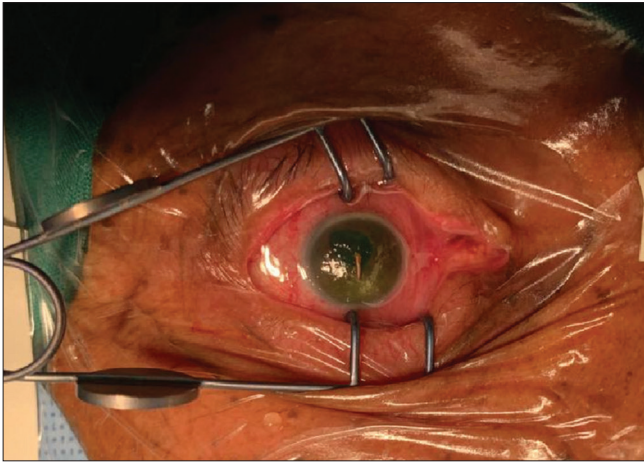
**Table 3: Causes for vision acuity limitation of 16 patients who were admitted to Al-Ain Hospital with date palm tree injury during the period of January 2012 to March 2017**

Cause	Number	%
Cornea	13	81.3
Lens	2	12.5
Vitreous	1	6.3

a retrospective study of corneal ulcers in a tertiary hospital, 18% had severe visual impairment.<sup>[15]</sup>

Compared with other industries, farmers have a higher risk for eye injuries.<sup>[25]</sup> Farmers of the date palm tree maybe at high risk for eye injuries because they deal with palm tree including climbing the tree to collect the male pollen in a middle of





**Figure 5:** A 65-year-old man sustained a right eye injury caused by a date palm tree thorn which is embedded in the central region of the cornea (Courtesy of Dr. Saeed Akhter Chohan, FRCS, Fujairah Hospital, Fujairah, United Arab Emirates)

thorny leaves, harvesting, chopping thorns and striping of old leaves [Figure 5]. Furthermore, they use sharp tools putting them at a higher risk for corneal abrasions and perforations. A major contributor to eye injury have been reported to be a low compliance for personal protective eyewear.<sup>[25-28]</sup> The U.S. Occupational Safety and Health Administration estimates that 90% of eye injuries could be prevented by proper use of eyewears.<sup>[29]</sup>

Majority of the labor force in UAE are primarily from the Indian subcontinent. Language and cultural barriers may hinder the use of personal protective eyewear. Farm-related eye injuries should be addressed through culturally appropriate educational programs. Also farmworkers' access to and usage of personal protective equipment should be promoted.

Our study included those with severe date palm thorns and leaves eye injuries and this represents the tip of an iceberg as we did not study those with less severe injuries. The Department of Municipalities and Transport (DMT) enforce the occupational safety of the agricultural workers in Al-Ain City. We have now a collaborative project with DMT in which we are running a direct observational study in workplaces to identify risk factors of eye injuries to give future practical preventive solutions for this problem.

## CONCLUSION

Our study has shown that date palm tree eye injuries are a significant cause for visual loss in our setting. Usage of personal protective eyewears may reduce date palm tree-related eye injuries. Future studies looking at farming eye hazards, level of awareness and utilization of safety measures and reasons for non-compliance may be useful for designing preventive interventional strategies. We hope that the findings of this study will contribute to eye safety for individuals dealing with date palm trees.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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