

Orthopaedic Manifestations of Date Thorn Injury

Case series

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مظاهر إصابات العظام بأشواك النخيل مجموعة حالات

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الملخص: الإصابات بأشواك النخيل واسعة الانتشار في أقطار الشرق الأوسط حيث تكثر زراعة النخيل فيها. معظم الإصابات تحدث عند الفلاحين والأطفال. عندما تكتشف الإصابات وتعالج مبكراً لا يكون هناك اختلاطات. لكن الإصابات عند الأطفال يمكن أن تحدث دون العلم بها ويمكن ألا تجلب انتباه الأهل إليها مما يتسبب في حدوث اختلاطات متأخرة. وبما أن اليد هي الجزء الأكثر عرضة من باقي الجسم فإنها تكون الأكثر عرضة للإصابات. الأشواك المنطومة يمكن أن تعمل آفات تشبه التهاب العظم والنقي. كما أن القدم يمكن أن تصاب هي الأخرى عندما تكون عارية في المناطق المزروعة بالنخيل. ندرج هنا خمس حالات مصابة بأشواك النخيل بعد حصول اختلاطات متأخرة. عانى المرضى الثلاثة الذين لديهم إصابات في اليد من التهاب السمحاق. وكان أحدهم يشكو من شوكة في العظم أدت إلى التهاب العظم والنقي. كان لدى المريضين الآخرين آفات انحلال في العظام المشطية. وكان لدى أحدهما شوكة داخل العظم. كل الحالات شفيت تماماً دون اختلاطات في العظام.

مفتاح الكلمات: اليد. العظام المشطية. كيس العظم. التهاب العظم والنقي. التهاب السمحاق. ورم الجسم الغريب الجببي. تقرير حالة.

ABSTRACT Date palm thorn injuries are common in Middle Eastern countries where there are many date palm plantations. Most of the injuries happen to workers in the plantation or to children. Injuries, if detected, can be treated without subsequent complications, but in children the diagnosis can very easily be missed resulting in late complications. The hand, being the most exposed part of the body, is the most affected. Embedded thorns can produce lesions mimicking those of osteomyelitis. The foot is exposed to injuries in people who walk barefoot in the plantations. The author presents five cases of date thorn injury which presented with late complications. All three patients with hand injuries had periostitis, and one of them had an intraosseous thorn producing osteomyelitis. Two patients presented with osteolytic lesions of the metatarsals with intraosseous thorn in one patient. All cases recovered completely leaving behind no sequelae of the bony infection.

Key words: Hand; Metatarsal; Bone cyst; Osteomyelitis; Periostitis; Foreign body granuloma; Case Report; Oman.

ORGANIC FOREIGN BODY GRANULOMA, including date thorn, should be considered in the differentials of a lytic lesion with or without sclerotic lesions of the bone.^{1, 2} The foreign body reaction which results from thorn injury can mimic various bone, joint and soft tissue disorders.^{1, 2, 3, 4, 5, 6, 7, 8, 9} Date palm thorn injuries are common in the Sultanate of Oman with its extensive farming of date palms. The thorns, lying beneath the trees in places where children play, produce injuries to exposed parts, mostly in the hands, knees and foot. There are various

reports of date palm thorn injuries in the literature, with eight cases of metacarpal lesions reported so far.⁶ There are reports of thorn induced osteomyelitis of the metatarsals and cuboid,¹⁰ from areas where people walk barefoot.

METHODS

Data regarding all patients who presented to Ibri Regional Hospital with the following ICD (International Classification of Diseases) codes were reviewed for the last 4 years:

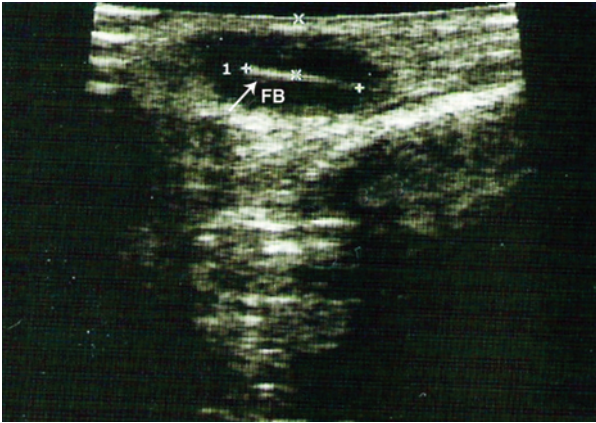


Figure 1: *Ultrasound scan. FB 11 mm lying 5 mm deep to skin, granuloma measuring 24 x 7.6 mm around the thorn*

1. W45: Foreign body or object entering through the skin
2. L92.3: Foreign body granuloma of skin and subcutaneous tissue
3. M60.2: Foreign body granuloma of soft tissue not elsewhere classified.
4. M65: Synovitis and tenosynovitis



Figure 2: *X-ray of foot showing osteomyelitis of 2nd metatarsal*



Figure 3: *CT scan of the right foot showing lytic lesion (arrow)*

There were 253 cases during this four year period with injuries related to foreign body intrusion in the body, of which 137 (54%) were related to injuries by date thorns. Eighty-two cases involved the upper extremity, mostly the hand and fingers. Fifty-five cases were in the lower extremity, mostly involving the toes and foot. Eighteen cases of foreign body granuloma involving the hand and 9 cases of granulomas of the foot were excised in the operating room. The rest of the cases were managed as outpatients. X-rays were done in all cases of granulomas to rule out skeletal lesions due to date thorns. Most of the cases also underwent an ultrasound scan to localize the foreign body.

There were two cases of skeletal lesions in the foot, one in a 12 year old boy. He presented with pain and swelling of the left foot of one year duration. His X-rays showed a lytic lesion of the shaft of the second metatarsal with cortical thickening. The swelling was non-tender and there were no signs of inflammation. The patient underwent curettage of the lesion under general anaesthesia and was found during surgery to have an intraosseous thorn.

A lady presented with a swollen right foot, recur-

Table 1: Characteristics of the date thorn injuries in the five cases

No	Age in years /sex	Clinical details	Radiology	Lesion	Management	Histo-pathology
1	6/M	Fall in garden; Pain and swelling of left hand	Periosteal reaction 3 rd metacarpal, lytic lesion base of metacarpal.	2.5 x 1.5 cm mobile non tender swelling dorsum of hand	Curettage of the cavity, excision of granuloma	Dense infiltrate of inflammatory cells, mainly neutrophils and macrophages, no foreign body giant cells
2	11/M	Injury with date thorn in garden	Periosteal reaction over the shaft of 4 th metacarpal	Soft tissue swelling dorsum of right hand	Excision of granuloma, two date thorn pieces removed at surgery	Inflammatory cell infiltration with foreign body giant cells
3	16/M	No definite history of trauma	Periosteal reaction dorsum of proximal phalanx midfinger	Swollen dorsum of right middle finger	Offending date thorn with granuloma removed	Inflammatory cell reaction, with pieces of foreign bodies
4	12/M	No definite history of trauma; swelling in dorsum of left foot of 1 year duration	Osteolytic lesion over the shaft of 2 nd metatarsal, with sclerotic margins	Bony swelling over the dorsum of left foot, over the 2 nd metatarsal	Lesion curetted through a window, granuloma curetted, thorn removed	Inflammatory cell reaction
5	23/F	Swelling in right foot of 2 years duration	Osteolytic lesion base of 4 th metatarsal. Confirmed with CT scan	Tender swelling dorsum of right foot over base of 4 th and 5 th metatarsal	Thorn removed from interdigital space of 4 th and 5 th toes. Base of 4 th metatarsal curetted	Fibrocollagenous and fibroadipose tissue with inflammatory granulation tissue, with pieces of thorn

ring for the past two years. She did not recollect any antecedent injury. Her X-rays of the foot were doubtful of a lytic lesion of the metatarsal and hence a computed tomography (CT) scan of the foot was done. This showed an osteolytic lesion over the base of the fourth metatarsal. The lesion was curetted and the offending thorn piece was removed from the intermetatarsal space. She eventually recovered fully.

Three young people children presented with lesions in the small bones of the hands; all boys aged 6, 11 and 16 years respectively.

The boy aged 6 years was initially treated for an injury, and was immobilised in a slab for a short while. Later on, he presented with pain and swelling of the hand. Radiographs after few weeks showed periosteal reaction of the third metacarpal with a lytic lesion over the base of the metacarpal on the left side. The lesion

healed after curettage of the lesion and removal of the offending thorn.

Another boy presented with a swollen right hand after an injury with date thorn. The boy recollected the injury from a date thorn in the garden a month prior to his presentation. There was periosteal reaction over the entire shaft of the fourth metacarpal. The lesion healed after removal of the offending thorn and removal of the granulation tissue. Another boy had no definite history of trauma, but presented with painful swelling over the right middle finger. There was periosteal reaction over the dorsum of the proximal phalanx of the middle finger. The lesion was successfully treated by curettage.

DISCUSSION

Date thorn is a modified leaf that ends in a spine of the palm tree, *Phoenix anarensis*, which is widely cultivated in the Middle-East countries.² Penetrating injuries of the extremities by date thorn are common in Middle Eastern countries.² Children are exposed to thorn injuries because of their contact with date palms in gardens or plantations. There may not be any visible signs of injury. If detected, attempts at removal may leave part of the sharp tip of the thorn inside the body. The initial symptoms are usually mild and disappear in a few days, but some patients present late with granuloma or bony pathology.⁹ A diagnosis of a date thorn foreign body is considered when there is a history of trauma and a periosteal reaction or lytic lesion is seen in the radiographs. A date thorn embedded near a bone can produce a pathological reaction resulting in periostitis or osteomyelitis. A retained thorn can present as synovitis, arthritis, rheumatism, granuloma or osteomyelitis.^{3, 9, 11, 12, 13, 14, 15}

Gerle named the pathology “thorn-induced pseudotumor of bone.” Maylahn called them thorn-induced “tumors of bone.”^{3, 7, 13} In most of the cases, the thorn is removed by the patients causing little morbidity. If retained in the tissue it can cause an inflammatory reaction leading to development of foreign body granulomas. A thorn stab produces an acute local inflammatory reaction in the tissues¹⁶ even if no part of the thorn remains in the body. Antibiotics are indicated only if the culture turns positive for a particular organism. Durr et al⁶ reported a case of intraosseous thorn in the diaphysis of the fifth metatarsal in a fifty-six year old lady. Organic plant material when present in or near a bone can produce lesions in bone that are lytic or sclerotic or a combination of both.^{6, 17} There is usually a delay in seeking medical help or there is a delay in diagnosis with the mean time of presentation in various reports of around four months.^{6, 9, 16} Granuloma is due to incomplete removal of the date thorn by the patient retaining the sharp tip inside the soft tissue, of which the patient is unaware. Most of the thorn related injuries occur in the hand, it being the most exposed body part. So far only eight metacarpal lesions and three phalangeal lesions have been reported.^{1, 4, 6, 7, 18}

The thorn, once entered, produces a granuloma by foreign body reaction, resulting in periosteal reaction or osteolysis. Once inside the joint, the thorn can cause synovitis due to a chemical reaction.¹⁴ Most

children do not identify the initial injury, making the diagnosis difficult. The periosteal reaction may mimic osteomyelitis, trauma or Ewing’s sarcoma.^{7, 13} If the thorn remains in the subperiosteal region this can cause a subperiosteal reaction and periosteal elevation.⁸ Subsequent to this the cortical bone is devitalized resulting in a sequestrum.⁸ A periosteal reaction should also be differentiated from the periosteal reaction of stress fractures, as the lesions of thorn-induced skeletal changes are seen mostly in the paediatric age group. Because palm thorns are not radio-opaque, X-rays are negative for the foreign body until and unless bony lesions develop. Thorns can be seen in the tissues as echogenic structures surrounded by inflammatory hypoechoid tissue during an ultrasound scan. High performance ultrasonography is useful for preoperative assessment of the granuloma and for localizing the foreign body.¹⁸ As plain radiographs and even an ultrasound may not show the foreign body, a magnetic resonance imaging (MRI) scan may have to be done.¹² There are reports⁸ where even an MRI has failed to show the foreign body. Date thorn granuloma is usually not suppurative, unless contaminated with organic material from the farm.^{9, 11, 17} Bacterial growth in date thorn injury is rare.^{3, 12, 19} Many organisms have been identified in the tissues, though bacterial growth is infrequently reported from date thorn lesions.¹⁹ Authors suggest that *Pantlea agglomerans* should be considered in aseptic arthritis of the joints after date thorn injuries. This organism is considered less aggressive and can cause protracted local inflammation.¹⁶

Date thorn palm may contain some toxic substance, probably an alkaloid substance, which causes osteolytic reactions in the bone.^{3, 9, 12, 17, 20} Kelly, in 1966,²⁰ was the earliest to prove that the theory, as reported by various authors, of alkaloids in the thorn was wrong as removal of the thorn cures the inflammation. The small bit of retained thorn may not contain enough alkaloids to initiate an inflammatory response. Contrary to this, in synovitis the symptoms usually persist after removal of thorn even after partial synovectomy, and total synovectomy is needed for complete resolution.⁵ The speculation of alkaloids causing the granuloma is not scientifically proven yet. No microorganisms are usually grown from the tissue, and the infection that occurs is secondary.⁴ Yousefzadeh, in 1978, reported a case of sclerotic and lytic lesions in the fifth metacarpal due to thorn-induced granuloma in an eight year old boy. The interval between the entry of foreign



Figure 4: *Date thorn infection of 3rd metacarpal. Single arrow: lytic lesion base of metacarpal; double arrow: periosteal reaction*

body and the appearance of bony changes in the radiographs, in the study by Yousefzadeh, ranged from three weeks to two years.^{15, 20}

Maylahn,⁷ as early as 1952, suggested that thorn induced granuloma should be considered in the differentials of bone neoplasms. As early as 1936, Maylahn came across a date thorn injury of the fibula resulting in a granuloma and radiological features of Ewing's sarcoma.⁷

The lesion in the fourth metacarpal of a child was diagnosed by Barry¹ as due to tuberculous infection. A similar case was treated by Dhillon et al¹⁷ with antituberculous drugs until a wooden splinter was extruded. Tuberculosis was considered in the differential diagnosis by various authors.^{1, 3, 17, 20}

CONCLUSION

Date thorn granuloma should be kept in mind while treating extremity bone and joint infections in children in the Middle East countries. The diagnosis is easy when there is history of injury with a date thorn. The granuloma should be excised and the bone must

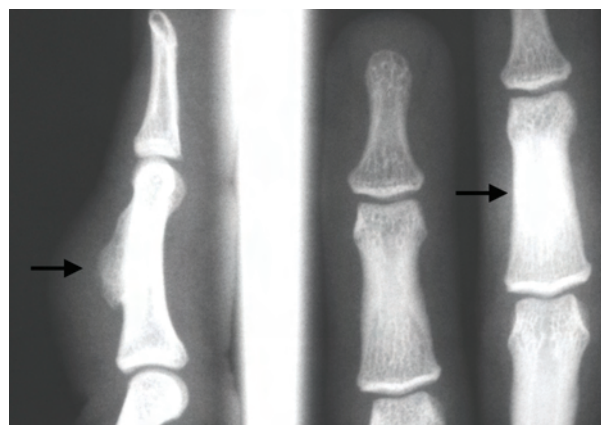


Figure 5: *Periosteal reaction of the middle phalanx of right middle finger*

be debrided after removal of the thorn. Appropriate antibiotics must be started after intraoperative culture. Date thorn granuloma should be suspected if there are osteolytic or sclerotic lesions in the extremities of children from areas where date palms are grown extensively.

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