Case report

Retained foreign body masquerading as chronic osteomyelitis: A series of 3 cases and literature review

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1. Introduction/review of literature

Chronic osteomyelitis (OM) is a common entity seen in clinical practice of any orthopaedic surgeon. It is characterized clinically by a discharging sinus or wound. Radiological features may include periosteum elevation, osteosclerosis, involucrum and/or sequestrum formation.^{1,2} Incidence of chronic OM as a sequelae to acute OM is fast decreasing because of early and timely intervention and good antibiotic treatment. However, cases of post traumatic chronic OM is on rise with increasing incidence of trauma.³ Also, cases have been reported where occult foreign bodies inside bone or in relation to bone results in chronic OM and a discharging sinus.⁴ However, not all discharging sinuses are because of Chronic OM.^{5–24}

2. Material and methods

We present a series of three pediatric cases of actively discharging sinuses/wounds that were diagnosed as chronic OM and treated by long course of antibiotics and regular dressings at various tertiary level centers for several months. They were also being given general supportive therapy in the form of

multivitamins or immunity boosting ayurvedic medication. They turned to our hospital as there was continuing discharge with no signs of healing. A simple careful analysis of plain radiograph revealed absence of one or more characteristic radiological features of chronic osteomyelitis long after the onset of symptoms which raised the suspicion of some other differential.

Our centre is in developing stage, without facility for musculoskeletal USG, CT Scan or MRI. The patients, too, were from very humble background and could not afford costly imaging modalities. Hence, no further imaging could be carried out.

Routine hematological investigations were done. Culture and sensitivity of the discharge was also done. A decision was made to surgically explore and curette out the sinus/wound. After proper informed consent, surgery was carried out under anaesthesia and tourniquet control.

3. Case reports

The cases are summarized in Table 1. It is notable that in all the three cases, history given by parents did not conform to the per-operative findings. Plain radiography was carried out in all cases. Haematological investigations in all cases showed only slightly elevated total leucocyte count, erythrocyte sedimentation rate and C- reactive protein levels. Differential count was normal. None of the patients were diabetic or on any drugs (including steroids) for any comorbid condition.

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Table 1

Observations in 3 cases.

S.No.	Age/ Sex	History	Duration	Location	Examination Findings	Plain Radiograph	Per Operative Findings	Current Status
Case 1	2 yr/F	Wound by religious thread tied tightly around the wrist followed by infection	1 year	Just Proximal to Wrist	Multiple Circumferential Discharging Sinuses, Flickering movement of fingers, sensations intact, Radial & Ulnar Pulses absent	Constriction Sign	Small sized rubber band lying beneath the tendons in association with bone, all tendons incarcerated in fibrosis	Finger movements regained, Sinuses healed, no discharge now
Case 2	5 yr/M	Injury by fall of Water Pump on Leg	10 months	Posteromedial aspect of U/3 Leg	Discharging wound with granulation tissue	Normal	Water Pump Plastic Piston Cap deep beneath the Gastrosoleus in close proximity to tibia	Wound has healed, no discharge
Case 3	7 yr/M	Unknown Injury while playing	14 months	Dorsum of Forefoot	Discharging Sinus	Normal	Long stout thorn in close proximity to 5 th Metatarsal	Wound has healed, no discharge

3.1. Case 1

In the first case with sinuses in right forearm, two proximal based cutaneo-fascial flaps were raised – one on dorsum of forearm and another on ventral aspect and careful dissection done layer by layer. Since, the wound was circumferential, care had to be taken not to disrupt the vascularity of the surviving hand and the surgical flaps raised (Fig. 1). Intense fibrosis was found both on dorsal aspect and ventral aspect, and the flexor and extensor tendons were incarcerated in fibrosis. The tendons were freed. Beneath the fibrosis and the tendons in close proximity of the bone was lying an intact rubber band (Fig. 2). Dissection of the tissues around the rubber band was done to ensure it was free to slide within the soft tissues. It had to be ensured that when it was delivered out by cutting, no portion of it remains left out deep

within the soft tissues. For this the rubber band was cut at a point and a no.1 vicryl tied to the end. The other end was gently pulled and the rubber band slid out along with the tied suture at other end. Extensive lavage of the wound with diluted hydrogen peroxide, betadine and normal saline was done and closed on negative suction drain (No.10). Before closure, 2 vials of chloramphenicol powder (as per culture sensitivity report) was sprinkled in the wound to have high concentration of antibiotic locally.

Post operative parenteral antibiotic was given for 3 days only as per culture sensitivity report (Ceftriaxone) and oral antibiotic (Co-amoxyclov) till stitch removal. Surgical wound healed in 2 weeks time and sinuses healed in 4 weeks. The pathological fracture healed by 10 weeks, without any need for bone grafting (Figs. 3 and 4).

Fig. 1. Preoperative clinical picture and radiograph.

Fig. 2. Peroperative picture showing rubber band beneath the tendons.

Fig. 3. Followup at 3 months; finger movements regained.

3.2. Case 2

In this case, the wound on postero-medial aspect of upper third left leg, was debrided and curetted off all unhealthy granulation

tissue and pus. The underlying bone was exposed which seemed to be perfectly healthy. Probing was done around in soft tissues and resistance felt deep to the gastro-soleus muscle on the posterior aspect of tibia. A large red 1.5 cm × 0.8 cm plastic plug was

Fig. 4. Followup xray at 3 months.

Fig. 5. Case 2; peroperative picture.

discovered and delivered out using right angled artery forceps (Fig. 5). The wound was lavaged well with diluted hydrogen peroxide, betadine and normal saline and closed over a negative suction drain (No.12) Before closure, cotrimoxazole powder (as per culture sensitivity report) was sprinkled in the wound to have high concentration of antibiotic locally.

3.3. Case 3

In the third case, incision was given over the sinus and careful inspection showed a long stout thorn embedded in the soft tissues in close proximity of 5th metatarsal (Fig. 6). After careful removal of the foreign body, making sure that no broken piece is left inside,

Fig. 6. Case 3; peroperative picture.

the sinus tract was excised with lavage of the site with diluted hydrogen peroxide, betadine and normal saline and closed over an improvised negative suction drain made by cutting an infant feeding tube (12 F) and attached to a 50 ml syringe with piston pulled and occluded as smaller size drain was not available, and larger could not be put because of skin tension. Before closure, 1 vial of chloramphenicol powder (as per culture sensitivity report) was sprinkled in the wound to have high concentration of antibiotic locally.

Organism in all three cases detected by culture of the discharge was staphylococcus aureus with varying sensitivity pattern to different antibiotics as per the case. All the cases were initially put on iv antibiotics and thereafter shifted to oral antibiotics as per culture and sensitivity till the time the wound healed. In all the three cases wounds healed fast without any sign of discharge till last follow-up.

4. Discussion

McIver et al have described a case of impending compartment syndrome as a result of elastic decorative band on the wrist in a two and a half year old girl presenting in emergency department.⁶ Rasool et al have described the development of compartment syndrome of hand because of elastic bands on wrists in two infants, timely intervention prevented further complication.⁷ Whitaker et al have described amputation of part of index finger due to elastic rubber band self applied proximally to stop bleeding from a wound by a 68-year-old lady.⁸ While these are acute or subacute complications, chronic complications can also occur. Arora et al have described a 'Dhaga Syndrome'⁹ while Agarwal et al have described a 'Rubber Band Syndrome' or 'Elastic Band Syndrome'¹⁰ in a pediatric age group where growth is rapid and a religious thread (Moli thread) or some elastic band put on the wrist is forgotten due to circumferential skin creases (especially in chubby children) or hidden by use of loose bangles around the wrist in female children which hide the thread or band. Due to the rapid growth and increase in the circumference of wrist at this age, the

band cuts through the soft tissue around the wrist. This penetration is surprisingly painless and without neurovascular symptoms as the process is gradual. As the skin epithelizes over the band, the band becomes completely invisible.¹¹ This process of slow tissue penetration and rapid healing allows the thread to penetrate tendons and come to lie deep to them, as was observed in our case, so much so, that the band had reached the bones producing a 'constriction sign' on plain radiographs (Fig. 1).¹²

A whole panorama of occult objects has been described in literature to result in foreign body granulomas leading to discharging sinuses from religious threads (Moli Dhaga or Kalawa), black magic threads (Tabeez), decorative elastic bands, rubber bands, wooden splinters, remnants of broken glass, sea urchin spine, plastic objects, stings, ceramic, etc.^{20–22} It is notable that these objects are all radiolucent and hence cannot be easily detected on plain radiographs. Radio-opaque penetrating foreign bodies and foreign bodies in adults are easily diagnosed with history and plain radiographs. Hence, in children where clear history cannot be always given because of varying reasons, high degree of clinical suspicion is important in dealing with these radiolucent occult foreign objects.

Gupta et al have used musculoskeletal USG as a tool to detect unsuspected foreign bodies lying within soft tissues.¹³ Gupta et al have used FNAC, CT Scan and MRI to diagnose a swelling in sole of the foot which ultimately on USG showed a neglected thorn in the soft tissues.¹⁴ Dar et al have advocated the use of high resolution USG to easily detect radiolucent occult foreign bodies in soft tissues of ankle and foot.¹⁵ Stelmach et al have advocated use of CT scan for detection of occult foreign bodies and its various advantages over musculoskeletal USG and MRI.¹⁶ Agarwal et al used MRI to diagnose occult elastic band.¹⁷ Agarwal et al have reiterated that diagnosis should be clinical and accuracy depends on high degree of clinical suspicion.¹⁰ We also affirm that, in such cases diagnosis can be often suspected using only clinical picture and plain radiographs. Musculoskeletal USG, CT Scan or MRI can be used to confirm the diagnosis and also to document the clinical suspicion pre-operatively.

It is also notable that in most cases the size of the external wound / sinus at presentation is much smaller than the foreign body itself as has been described by Jaiswal et al.¹⁸ This is due to delay in final diagnosis which allows the body to heal the initial larger wound. Use of tourniquet during exploration, is important as considerable fibrosis and granulation tissue is present at the surgical site, per-operative bleeding from which, can make the finding of occult foreign body difficult. Also, it is important to plan the surgical incision as exploration and delivery of foreign body might require access to large area as also to consider vascularity of the area and the flaps raised.

In most cases, after the discovery of the foreign body, the parents and other relatives recall incidents which led to the embedded foreign bodies being forgotten.

5. Conclusion

High index of suspicion is necessary in absence of clear history and/ or radiological findings pertaining to chronic OM and no response to treatment of chronic OM. Not all discharging sinuses presenting to an orthopaedic outpatient department are chronic OM and hence clinical acumen is very important.

Conflict of interest

None.

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