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Heterotopic ossification is abnormal formation of mature bone in soft tissues where it is normally not expected to exist. It cannot be differentiated from normal bone structurally. Central nervous system damage due to traumatic injury^{8,13} or rarely a nontraumatic insult^{5,12} can lead to HO.

Case Report

Twenty one year old male was brought in outpatient department with history of inability to walk. It was insidious in onset and was gradually progressive. There was neither history of trauma nor fever.

Clinical examination revealed small bulge on medial aspects of both knees (**Figure 1 A**). There was restriction of range of motion at both the knee joints. Knee flexion was possible to only 20 degrees from neutral position on either side. Patient was advised to get his MRI of knees performed as soon as possible as MRI is supposed to be most informative for evaluating soft tissues in and around joints.

Coronal short tau inversion recovery (STIR) image (**Figure 1 B**) shows hyperintense signals in soft tissues on medial aspects of both knees. This is a non specific finding and can be seen in almost all infective or inflammatory conditions affecting this region.

Hence we returned back to basics and started with proper history taking. Patient informed that eight months ago he was admitted in the intensive care unit after his

Perigenicular Heterotopic Ossification: A Rare Sequelae of Non Traumatic Brain Injury

Heterotopic ossification (HO) is an uncommon, disturbing and avoidable complication in patients with injury to central nervous system. It is more common in traumatic injury to central nervous system than non-traumatic injury. Reports about HO in non traumatic brain injury are rare and hence being reported here

Key Words: Central nervous system, Heterotopic ossification, injury, Range of motion

relatives found him in a state of sudden unconsciousness. He had not sustained any injury to head, spine or knees. He was kept in intensive care unit for 45 days and had no intramuscular injection in the thighs. He was referred for additional physiotherapy after one and half months of initial care. However, he left it against medical advice and returned eight months later with history of difficulty in walking.

CT scan done at the time of ictus (**Figure 2 A**) showed fresh right ganglio-capsular bleed which was the cause of his sudden unconsciousness. However, he slowly recovered from it. Plain CT done at the time of presentation with difficulty in walking (**Figure 2 B**) showed resolved intracranial bleed with residual gliosis. Plain radiograph (**Figure 3 A**) and Axial CT images (**Figure 3 B**) demonstrated bilateral peri genicular areas of well formed bone on medial aspect. Thus the diagnosis of bilateral peri genicular heterotopic ossification was made.

Discussion

Perigenicular HO is a rare sequelae in patients who have had injury or insult to central nervous system. Its cause or exact mechanism is still unknown. According to Buring K,³ local or distant mesenchymal cells transform into bone forming osteoblasts and thus start this new ossification into areas where normally no bone exists. HO due to neurogenic cause arises in the connective tissues away from joint space and joint capsule.¹³



Figure 1: A) Photograph showing soft tissue swelling on medial aspect of both knees, B) MRI STIR coronal image showing hyper intense signals in soft tissues on medial aspect of both knees.

A prospective study¹² on heterotopic ossification in non-traumatic myelopathies showed that 6.04 % of patients who had non traumatic spinal cord injury developed HO. They also concluded that any neurologic insult can lead to HO. It is more common with traumatic injury than non traumatic injury. Moreover, the incidence is more common with spinal cord lesions than the brain lesions.

HO has typical clinico-radiological features. Clinically at the onset there are local signs and symptoms similar to inflammation.^{2,4} In the case reported here, the patient had joint swelling with decreased range of motion. Three phase bone scan is the investigation of choice to detect the onset of HO¹⁴. In the present case, it has been found that MRI (Figure 1A) done outrightly was nonspecific. On the contrary plain radiograph (Figure 3 A), and plain CT scan (Figure 3 B) were diagnostic.

Small HO cannot significantly affect range of movement of joint. However, larger areas of HO can be distressing as the restricted joint movement can significantly impair day to day activities. Massive HO can even lead to bony ankylosis.

Hence, it is necessary to prevent and treat HO. Slow passive movements that do not cause much stress and strain on the affected joints play a vital role towards this and can maintain adequate function even though HO has started.¹¹

Medications like non steroidal anti-inflammatory drugs (NSAIDs) and diphosphonates¹⁰ have been found to be useful in prevention and treatment of HO. Garland et al⁶ proposed that diphosphonates can inhibit occurrence and even post resection recurrence of HO. Another study⁹ believes that NSAIDs are more useful in preventing post surgical recurrence. Preventive local radiotherapy in such cases is not yet studied.¹

Surgery for removing this newly formed distressing bone should only be done when the new formed bone has fully matured. Radiotherapy and surgery have a debatable status in primary prevention.⁷

The closest differential is myositis ossificans that can occur after local trauma and massage. A careful history,

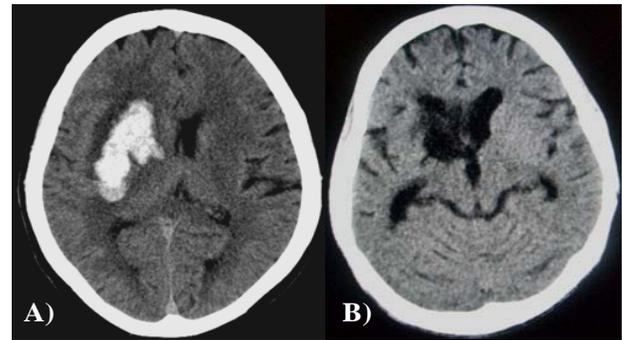


Figure 2: A) Plain CT scan of brain showing acute right gangliocapsular bleed, B) Plain CT follow up scan showing resolved bleed with gliosis.

clinical examination and evaluation for hematuria due to rhabdomyolysis can differentiate them satisfactorily.

Heterotopic ossification must always be kept in mind in all patients with traumatic as well as nontraumatic injury or insult to central nervous system. Thus, it can either be prevented in first place or detected early to prevent it from delimiting quality of life of the affected individual.

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None of the authors have any financial interest in the subject under discussion.



Figure 5: A) Plain radiograph showing mature bone in medial soft tissues, B) Plain CT scan showing mature bone in perigenicular soft tissues.

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