A CASE OF EXTRA ARTICULAR ANKYLOSIS OF HIP DUE TO HETEROTOPIC OSSIFICATION TREATED BY EXCISION OF BONE BLOCK

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ABSTRACT: Heterotrophic ossification (HO) is the formation of lamellar bone in soft tissue. HO is a common complication in patients with spinal cord and head injury. HO is no trivial complication. A limitation of functional range of joint motion has serious consequences for the activities of daily living of people who are already severely incapacitated because of their original injury. Movement limitation of the hip joint is challenging to treat. Surgical excision of bone block can be a formidable exercise, but will give gratifying results if done carefully.We report a case of HO involving left hip joint following head injury. A twenty-five year old male patient sustained head injury one and half years ago. At that time there was no evidence of injury to hip joints. He was noted to have severe restriction of range of motion (ROM) of left hip joint with a mass around the hip joint.Radiographs and 3D CT reconstruction revealed HO involving anterior, lateral, posterior and medial aspects of left hip joint ensheathing femoral neurovascular bundle with extra-articular HO. The joint space was well preserved. Blood investigations showed erythrocyte sedimentation rate (ESR) alkaline phosphatase levels within normal limits.After complete evaluation, surgical excision of bone block was done and functional range of movements of left hip achieved.
KEY WORDS: heterotrophic ossification, hip joint, spinal cord injury, head injury; indomethacin; BMP-bone morphogenic protein; range of motion.

INTRODUCTION: HO, also known as heterotrophic bone formation, is the presence of lamellar bone in soft tissue. The incidence of HO following head injury is 10-20%[1]. Men are at a higher risk of developing HO than women and also form a larger amount of bone[2, 3].Michelson et al postulated that immobilization and forcible mobilization are the most important triggers of heterotrophic bone formation[4, 5]. 10% of these patients with head injury develop HO and limitations in joint motion resulting in loss of function[6, 7, and 8].Histologically, HO cannot be differentiated from callus formation of healing fracture. The transformation of primitive cells of mesenchymal origin, present in the connective tissue septa within muscle, into osteogenic cells is thought to be the pathogenesis of HO[9].Chalmers et al[10] described 3 conditions necessary for HO formation: osteogenic precursor cells, inducing agentsand a permissive environment. This would trigger the transformation of mesenchymal cells into bone-forming cells[11].This differentiation is induced by Bone morphogenic protein (BMP) [12]. The development of HO is extra articular. Bone forms in the connective tissue between the muscle planes and not within the muscle itself[13]. The new bone can be contiguous with the skeleton but generally does not involve the periosteum[13, 14]. Mature HO shows cancellous bone and mature lamellar bone, vessels, and bone marrow with a minor amount of hematopoiesis[15, 16].

Common sites of HO after head injury are hip, shoulder and elbow joints. In the hip joint it is commonly observed around anterior, inferomedial and posterior aspect. HO of the hip joint with

near ankylosis and ensheathing femoral neurovascular bundle is less common condition and poses a difficult challenge to the orthopaedic surgeon.

We are reporting a case of periarticular HO of left hip with extraarticular ankylosis by a bone block bridging from pelvis to femur ensheathing the femoral neurovascular bundle. Surgical excision of bone block was done successfully without injuring the femoral neurovascular bundle.

CASE REPORT: A twenty five year old male presented with painless stiff left hip of one and half year duration.He had deformity of flexion and external rotation of 20 degrees each with complete loss of moments of left hip.He had difficulty in sitting cross legged and squatting.He had sustained a head injury one and half year back and recovered completely without neurological defects.Ipsilateral knee and ankle were normal. There was no other joint involvement.

Fig. 1: Preoperative photograph of patient showing limitation of left hip movement.

ESR and alkaline phosphatase levels were normal. Radiographs and 3D CT reconstruction revealed an ossified mature bony mass surrounding the left hip joint on all sides with an intact joint space. The femoral neurovascular bundle was ensheathed within the HO mass.

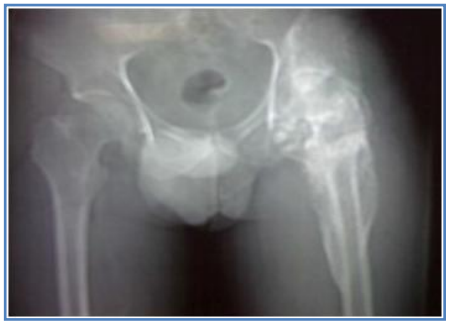

Fig. 2: Preoperative radiograph of left hip joint showing HO.

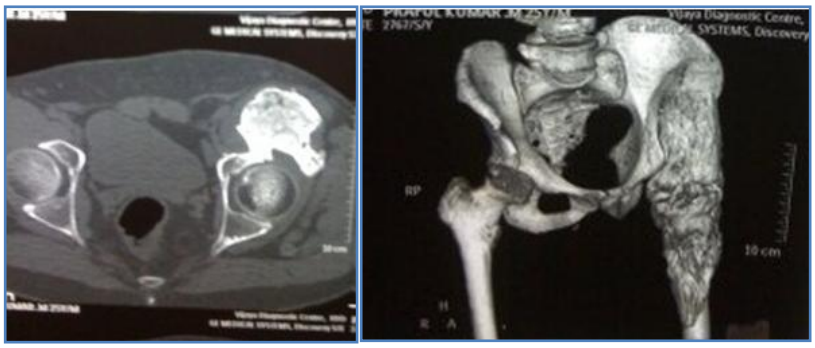

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Fig. 3: Preoperative 3D of pelvis showing HO.

Surgical excision of bone block was done by the ileofemoral approach. The femoral neurovascular bundle was isolated proximal to the hip joint above the inguinal ligament. The bone block was dissected free of tissues on anterior, lateral, posterior and medial aspects and excised. At the end of the procedure hip movements were checked. Degree of flexion was 100°, abduction 30°, adduction 30°, internal rotation 20° and external rotation 40°. The raw area of bone was covered with adjacent fatty tissue to prevent reformation of the bone. The femoral neurovascular bundle was dissected free and protected throughout the procedure. Wound was closed in layers over suction drain.

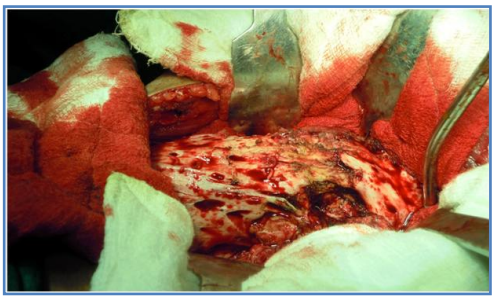

Fig. 4: Intraoperative picture showing bone block

Postoperatively the patient was administered a course of indomethacin 75mg per day for three weeks to minimize the chances of a recurrence. Active assisted mobilization of the hip was begun on the third post-operative day. Ambulation was begun on the third post-operative day. Patient was followed up at 1, 3, 6 and 12 months. Movements of hip at two year follow up are: flexion 90, abduction 30, adduction 30, internal rotation 20 and external rotation 40 degrees. Patient is presently self-employed and his functional ROM of hip is maintained.

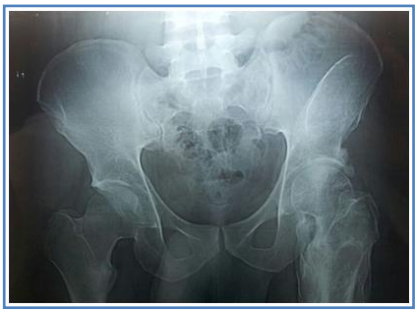

Fig. 5: Post operative radiograph of pelvis after 2 years follow-up

a **b**

Fig. 6: Post operative photographs of patient showing improved ROM after 2 years follow-up.

DISCUSSION: There are two forms of HO: acquired and hereditary. The acquired form is commonly seen as a sequel to injury to nervous system. The hereditary form is rare and causes myositis ossificans progressiva. In the acquired form the exact triggering mechanism for the formation of HO is unknown, but local, systemic, neural and humeral causes have been suggested. There is either a migration of distant mesenchymal cells to the area involved, with subsequent transformation of these cells into osteoblasts or a transformation of the local mesenchymal cells directly into osteoblasts.

The indication for surgical excision of the bony mass is mechanical restriction of joint mobility causing disability. Surgical excision has to be done when the HO is metabolically not active. Preoperative imaging studies help define the extent of bone block to be resected.Our patient had severe restriction of ROM of left hip joint with bone block bridging from iliac wing to femur causing ankylosis. Surgical excision of this ossification mass is a formidable exercise at any institute. The purpose of this report is to highlight the fact that carefully done surgical excision will give gratifying results.

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