Replacement of Destroyed Metacarpal Bones by Benign Tumors with Autografting Complete Metatarsal Bones: A Report of Two Cases

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Abstract

Aggressive benign tumors of the hand are rare; they occur in young age group and can be destructive to the whole bone. En bloc removal is advised to prevent recurrence. Replacement of the removed bone was done by several methods. We present a report of two cases; one a child with aneurismal bone cyst, and an adult woman with aggressive giant cell tumor. Both bones removed completely and replaced by the third metatarsal bone of the left foot. The child after 18 months and the women after 42 months of follow up, preserved good function of the hand and did not show any recurrence or morbidity at the donor site. This method is a good choice of treatment.

Keywords: Aneurismal bone cyst; Giant cell tumors; Hand tumors; Metacarpal replacement

Introduction

Aggressive benign tumors of the hand are rare; they occur in young age group and can be destructive to the whole bone. En bloc removal is advised to prevent recurrence. Replacement of the removed bone was done by several methods. We present a report of two cases; one a child with aneurismal bone cyst, and an adult woman with aggressive giant cell tumor. Both bones removed completely and replaced by the third metatarsal bone of the left foot. The child after 18 months and the women after 42 months of follow up, preserved good function of the hand and did not show any recurrence or morbidity at the donor site. This method is a good choice of treatment.

Case Presentation

Case 1

Eight years old boy presented with painful swelling of the left hand in the area of the second metacarpal bone of three months duration. The swelling was spontaneous with no history of previous trauma or infection in the hand. On physical examination, hard oval swelling on the dorsum of the hand in the second metacarpal area measuring 3 cm x 2 cm. The mass was moderately tender on deep palpation. The range of movement of the second MPJ was moderately affected, and the neurovascular bundle was intact. Radiological examination revealed a large lytic lesion involving the whole second metacarpal bone, expansile ballooning in shape reported as aneurismal bone cyst (Figure 1).

Decision was made to do en bloc removal and replacement with complete third metatarsal...
bone. Dorsal approach was appropriate, lazy S incision done, separation and isolation of the extensor tendons, then removal of the whole MC with its periosteum. The harvested metatarsal, with its periosteum, was implanted at the site of the removed metacarpal and fixed with intramedullary K wire for eight weeks. Care was taken to reconstruct the MPJ. Plaster of Paris (POP) volar splint keeping slight dorsiflexion of the wrist and 80 degree flexion of the MPG kept for 8 weeks. The K wire was removed by the end of 12 weeks when index mobilization started. Histopathologic examination of the excised metacarpal revealed aneurismal bone cyst (Figure 2). After 18 months follow up, the graft was completely incorporated and the second MPJ movements were satisfactory, no recurrence at the site, normal appearance of the hand and no morbidity at the donor foot.

Case 2

Thirty six years old housewife referred with a painful swelling of her left hand for six months. She carried a histopathological report of giant cell tumor from a biopsy of the second metacarpal bone (Figure 3). Radiological examination showed complete destruction of the bone. Treatment was by en bloc removal of the affected second metacarpal bone with replacement by the left third metatarsal bone placed and fixed by K. wire for 12 weeks. Dorsal approach was used as well, care taken to reconstruct the second MPJ. Rehabilitation by passive and active movement of the joint after three weeks from surgery. After 42 months the hand was free of recurrence and maintained good function with no morbidity at the donor left foot (Figure 4).

Discussion

Aggressive benign tumors of the hand are rare; they can destroy the whole metacarpal bone. They occur in young age group, grossly affecting the function of the hand. These tumors can be multicentric and tend to recur after local removal [4,7,9,12]. En bloc resection is the preferred method to ensure the cure of the disease. To preserve the function of the hand, replacement of the removed metacarpal is done by several methods; free fibular graft, vascular iliac crest strut, cement spacer, all with or without endoprosthesis, and autotransplant of metatarsal bone [6-9,13-15]. We presented two cases of successful autotransplant of metatarsal bone for a completely destroyed second metacarpal with the MPJ. The first was for a child with aneurismal bone cyst, and the second for a woman with aggressive giant cell tumor. After 18-42 months of follow up this method proved to cure the disease with retrieval of a good satisfactory function as well as the cosmetic appearance of the hand. Mikkelson OA and Menon J used metatarsal head to replace destroyed MPJ in rheumatoid patients with satisfactory results [6,7]. Saikat Sau also used metatarsals to replace destroyed metacarpal bones by giant cell tumors with satisfactory results [8].

Figure 1: Clinical photo of case No.1: (a) 3D CT. (b) Plain x-ray.

Figure 2: Clinical photo of case No. 1 Aneurismal bone cyst, section showing dilated vascular channels with hemorrhage and scattered multinucleated giant cells.

Figure 3: Clinical photo case No. 2 GCT section shows heavy infiltration by osteoclastic multinucleated giant cells in a compact fashion surrounded by mono-nuclear stromal cells.

Figure 4: Clinical photo of case No. 2. (a) Swelling of the hand. (b) Plain x-ray. (c) Metatarsal replaced and fixed in place. (d) 12 weeks postoperative function of the hand. (h) Donor site x-ray.
functional results [16]. Because of the rarity of these tumors, studies of large number of patients are not available, however many case report studies have been published consistent with our results. We recommend metatarsal replacement as it is more physiological and less demanding. In addition, it provides cure with satisfactory function and cosmeses.

**References**


