Bone Grafting Versus Non-Grafting In Management of Benign Bony Cystic Lesions

A Comparative Study

Thesis

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Mohamed Ahmed Ahmed El Mowafi

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List of Abbreviations

Abbr.	Full-term
AATB	: American Association of Tissue Banks
ABC	: Aneurysmal bone cyst
ASIS	: Anterior superior iliac spine
BMPs	: Bone morphogenetic proteins
CT	: Computed tomography
DFDBA	: Demineralized freeze dried bone allograft
DVT	: Deep venous thrombosis
FD	: Fibrous dysplasia
FDA	: Food and Drug Administration
GCT	: Giant cell tumor
H_2O_2	: Hydrogen peroxide
HBV	: Hepatitis B virus
HCV	: Hepatitis C virus
HS	: Highly significant
HTLV	: Human T-cell lymphotrophic virus
MP	: Middle phalanx

MRI : Magnetic resonance imaging

MTSRS : Musculoskeletal Tumor Society Rating Score

NS : Non-significant

PMMA : Polymethylmethacrylate

PP : Proximal phalanx

PSIS : Posterior superior iliac spine

S : Significant

SBC : Simple bone cyst

SI : Sacro-iliac

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Introduction

The majority of the benign cystic bone tumors are treated adequately by curettage.[1] Compared with resection, curettage is associated with a higher rate of local recurrence; however, curettage often allows for a better functional result.[1] Curettage can be extended by the use of adjuvants, such as liquid nitrogen, phenol, polymethylmethacrylate (PMMA), or thermal cauterization to extend the destruction of tumor cells.[2] Therefore benign bone tumors are often treated with intra-lesional curettage, which creates a bone defect.[3]

The management of benign bony defects has been the subject of much debate between orthopeadic surgeons in recent years.[4] There has been an increasing trend towards intra-operative filling of these lesions, especially when dealing with defects in weight-bearing areas, aiming to increase final bone strength and, especially for giant cell tumor (GCT), to reduce the risk of local recurrence.[4]

Available options to fill benign bone defects include autologous bone grafts[5], allografts[6], PMMA bone cement[7], demineralized bone matrix and bone graft substitutes.[8]

The auto grafts have limited availability, donor site morbidity, cosmetic problems and more blood loss.[9] Allograft is an attractive alternate to autogenous bone as it

avoids donor site morbidity and its relative abundance permits it to be tailored to fit the defect size.[10] However, risk of infection, disease transmission and rejection of foreign body is associated with the use of allograft.[9]

PMMA cement may provide instant stability, but it is not the most biological method for filling of bone.[11] There is concern that when used near the surface of a joint, it may cause thermal injury and damage to chondrocytes leading to secondary osteoarthritis.[12]

As regards bone substitutes, there is very little evidence for their efficacy and there have been very few comparisons with the normal degree of healing expected in bone defects.[13]

Despite the fact that there is a strong capacity to create new bone after trauma, there have been very few studies reporting on the ability of a surgically created bone defect to fill in if left empty.[14]

Enchondroma in the hand or foot can be successfully treated without filling.[15] However, Chigira et al. curetted benign bone tumors in different locations without filling and, even in large defects, they found bone remodeling with sufficient strength for daily activity.[16] Waldram & Sneath

stated that bone grafting is not necessarily required after curettage of a giant cell tumor.[17]

In benign cystic lesions and giant cell tumors of bone treated by curettage and without filling with bone graft or other substitute, the hematoma in the cavity has strong capacity to create new bone and remodel with sufficient strength for daily activity.[4]

The paucity of data on the natural history of bone defects aroused our interest to do this comparative study to assess the efficacy of curettage of benign bony lesions without grafting versus the conventional grafting.