

Enchondromas of Long Bones and Other Skeletal Lesions Found Incidentally Need Critical Evaluation, But Rarely Systematic Follow-Up

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Abstract

Purpose: Incidental bone lesions are a challenge for the specialist, who has to give recommendations for further management. This review of our cases will assist in the decision whether the lesion can be “neglected”, needs further active follow-up or direct initiation of treatment. **Patients and Methods:** 153 cases of incidental bone findings were presented to our musculoskeletal tumor service for evaluation from July 2008 through June 2021. 73 of them were cartilaginous tumors and 63 of these were diagnosed as enchondroma of a long bone based on X-Ray and MRI. **Results:** Follow-up imaging of the enchondroma patients was available for 35 patients at 1 to 13 years (mean 4.3 y), with no change in size except for one femoral diaphyseal enchondroma with increasing diameter from age 18 to 20 years. 14 additional patients answered written contact stating that they remained asymptomatic at 2 to 12 years (mean 5.6 y). None of the patients has been reported to the Swiss Confederation Cancer Registry to have developed malignancy. Among the 10 other cartilaginous tumors were one chondrosarcoma grade II exhibiting different imaging, 3 non-long-bone localizations (pelvis, scapula and rib), 2 Ollier-type enchondromas, and 2 osteochondromas. Incidental findings other than cartilaginous tumors were fibrous dysplasia (n = 31), non-ossifying fibroma (n = 31) and 18 other “sporadic” entities. **Conclusions:** Incidentally found enchondromas not exhibiting aggressive features need no systematic follow-up and patients can be “discharged” with the advice to present, if symptoms would develop. This also applies to fibrous dysplasia

Intraarticular Nodular Fasciitis in the Knee Joint with *USP6*-Gene Rearrangement

—A Case Report with Special Attention to Diagnostics of Intraarticular Lesions

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Abstract

Background: Nodular fasciitis (NF) is currently considered a self-limited clonal neoplastic process. It shares the rearrangement of *USP6*-gene with aneurysmal bone cysts and myositis ossificans. The presented case is of interest as this is a rare site of presentation of NF; so far only few single cases of intraarticular NF have been reported with documented *USP6*-gene rearrangement. Intraarticular neoplasias of the knee joint are rare; the most frequent being tenosynovial giant cell tumor (TSGCT). Given a nationwide annual incidence rate of 14 for the lower extremity and about 75% affecting the knee joint about 10 new cases involving the knee joint can be expected per 1 million persons/year. All other types of benign neoplasms are comparably rare while malignant intraarticular processes are extremely rare with most of them reported as single case studies. **Aim:** We report our case to emphasize the importance of preoperative diagnostics including the option of biopsy. Intraarticular malignant processes are extremely rare and frequently are operated on accidentally with negative consequences for the patient. Tactics and techniques to treat benign processes depend on the correct pathologic diagnosis. **Case presentation:** The 38 year old man noticed slowly increasing swelling of his left knee joint after wakeboarding. Because of continuing discomfort 2 months later MRI diagnostic revealed, apart from retropatellar cartilage lesions, a popliteal mass compatible with a Baker cyst. The lesion of interest (later diagnosed as NF) was neither recognized by the radiologist nor the treating clinician. During the following 8 months the patient felt increasing swelling of the knee joint. The repeat MRI documented the crescent intraarticular solid synovial mass in the medial patellofemoral recess without signs

Cement Spacer Formed in a 3D-Printed Mold for Endoprosthetic Reconstruction of an Infected Sarcomatous Radius

A Case Report

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Investigation performed at Orthopaedie Zentrum Zurich and University Hospital BALGRIST, Zurich, Switzerland

Abstract

Case: The ulcerated recurrent clear cell sarcoma of the forearm with bony invasion of the radius needed an uncontaminated resection and control of infection. A mold was printed based on CT-reconstructed 3D models of the patient's anatomy to create an antibiotic-loaded cement spacer as endoprosthetic replacement used in combination with soft-tissue reconstruction and systemic antibiotics.

Conclusion: This then undescribed novel technique allowed for fast local recovery of the patient's hand function and return to work. In selected cases, such an anatomically formed spacer may be preferred for faster functional recovery and longer intervals before definitive reconstruction is possible.

Polymethylmethacrylate bone cement plays an important role in orthopaedics as a permanent device to stabilize implants. Temporary antibiotics delivering spacers to treat bone infection are in use since the description by Buchholz and Engelbrecht in 1970¹. They are standard in 2-stage revision of periprosthetic infection². Off-the-shelf molds are now frequently used to form a femoral head or articulating spacers in infected knee arthroplasty and made commercially available² based recently on computer-designed articulating spacers³.

With the availability of additive manufacturing and three-dimensional (3D) printing technologies, new options exist for orthopaedic procedures such as providing 1:1 replica of the patient anatomy, patient-specific navigation instruments for corrective osteotomies or joint replacement, as well as patient-specific endoprostheses, bone replacements, and orthotics⁴.

We had applied the 3D-printing technology to generate a mold to form an articulating distal radius cement spacer. To the best of our knowledge, only 1 other case using this technique was reported in which the talus was replaced in a comminuted fracture⁵ extracting the CT images of the opposite uninjured talus.

The patient had been informed and agreed to submission of his case for publication. All details and radiographic images have been deidentified to protect patient confidentiality.

Case Report

At the age of 39 years, the patient had a contaminated resection of a clear cell sarcoma of the soft tissue around the styloid process of the right radius. Two years later, she had resection of a local recurrence followed by percutaneous radiotherapy 66 Gy. One year later, she developed a soft-tissue metastasis in the middle of the upper arm which was resected followed by radiotherapy 45 Gy.

Six years after the first resection, she presented to us with an ulcerated recurrence around the primary lesion with infiltration of the distal radius (Fig. 1 and 2). Because of the



Fig. 1



Ulcerated recurrence of the clear cell sarcoma over the distal radius and subcutaneous soft-tissue metastases further proximal.

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (<http://links.lww.com/JBJS/CC/B476>).

Keywords: cement spacer, patient specific 3-D-printed mold, endoprosthetic replacement, bone infection, bone tumor

Article

When SUV Matters: FDG PET/CT at Baseline Correlates with Survival in Soft Tissue and Ewing Sarcoma

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Abstract: Introduction: The role of positron-emission tomography/computed-tomography (PET/CT) in the management of sarcomas and as a prognostic tool has been studied. However, it remains unclear which metric is the most useful. We aimed to investigate if volume-based PET metrics (Tumor volume (TV) and total lesions glycolysis (TLG)) are superior to maximal standardized uptake value (SUVmax) and other metrics in predicting survival of patients with soft tissue and bone sarcomas. Materials and Methods: In this retrospective cohort study, we screened over 52'000 PET/CT scans to identify patients diagnosed with either soft tissue, bone or Ewing sarcoma and had a staging scan at our institution before initial therapy. We used a Wilcoxon signed-rank to assess which PET/CT metric was associated with survival in different patient subgroups. Receiver-Operating-Characteristic curve analysis was used to calculate cutoff values. Results: We identified a total of 88 patients with soft tissue (51), bone (26) or Ewing (11) sarcoma. Median age at presentation was 40 years (Range: 9–86 years). High SUVmax was most significantly associated with short survival (defined as <24 months) in soft tissue sarcoma (with a median and range of SUVmax 12.5 (8.8–16.0) in short (n = 18) and 5.5 (3.3–7.2) in long survival (≥24 months) (n = 31), with (p = 0.001). Similar results were seen in Ewing sarcoma (with a median and range of SUVmax 12.1 (7.6–14.7) in short (n = 6) and 3.7 (3.5–5.5) in long survival (n = 5), with (p = 0.017). However, no PET-specific metric but tumor-volume was significantly associated (p = 0.035) with survival in primary bone sarcomas (with a median and range of 217 cm³ (186–349) in short survival (n = 4) and 60 cm³ (22–104) in long survival (n = 19), with (p = 0.035). TLG was significantly inversely associated with long survival only in Ewing sarcoma (p = 0.03). Discussion: Our analysis shows that the outcome of soft tissue, bone and Ewing sarcomas is associated with different PET/CT metrics. We could not confirm the previously suggested superiority of volume-based metrics in soft tissue sarcomas, for which we found SUVmax to remain the best prognostic factor. However, bone sarcomas should probably be evaluated with tumor volume rather than FDG PET activity.

Keywords: staging; sarcoma; survival; PET/CT; SUV; TLG

Treatment of Unicameral and Aneurysmal Bone Cysts by Minimally Invasive Percutaneous Injection of Grafton[®] DBF Putty Using the Kyphon[®] Cement Delivery System

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Abstract

Background: Simple Unicameral and Aneurysmal Bone Cysts are benign lesions that may heal spontaneously especially after fracture which may be the first symptom. However, often size increases causing pain, and complications of fractures can severely compromise the patient. **Aim:** The results in a series of cases treated minimally invasive using a new device for the application of allogenic bone material appear highly promising and shall be presented. **Patients and Methods:** Eight consecutive patients with symptomatic Unicameral Bone Cysts (UBC) were treated by percutaneous instillation of Grafton[®] DBF Putty (demineralised allogenic bone containing fibers) mixed with autologous bone marrow using the Kyphon[®] Cement Delivery System (Medtronic), which allows the injection of this high viscosity paste by controlled high pressure. Five patients with Aneurysmal Bone Cysts (ABC) were treated accordingly after inactivation by Aethoxysclerol 3% and lacking bone formation. Using this approach a high rate of bone regeneration was observed in these patients at 8 months to 5 years follow-up (f/u). **Conclusion:** The presented technique of a minimally invasive biologic treatment led to highly satisfying results using the Grafton[®] DBF Putty with its higher potential for bone regeneration than demineralized bone matrix not containing fibres (DBM).

Keywords

Simple Unicameral Bone Cyst, Aneurysmal Bone Cyst, DBF Putty, Kyphon Cement Delivering System, Bone Marrow, Percutaneous Treatment



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CASE REPORT

Solitary Epiphyseal Enchondroma of the Proximal Humerus Causing Growth Deficiency in a 13-Year-Old Boy Lengthened over Intramedullary Nail

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Abstract:

A 13-year-old boy complained of shortness of his left arm with the desire for lengthening.

The X-Ray showed the enlarged ellipsoid shaped humeral epiphysis in varus position and irregular joint surface. The MRI documented a distorted bone structure involving the complete epiphysis, overgrowth of the tuberosities and partial closure of the physis. MR-angiography revealed normally appearing vessel formation; however, a biopsy was recommended to rule out a vascular malformation. A tru-cut needle biopsy confirmed the diagnosis of enchondromatous changes.

As the patient felt strongly disturbed by the shortness of his arm, lengthening was performed using the fully inserted magnetic driven Precice[®] nail.

Conclusion:

This case is of interest as epiphyseal enchondromas are rare and complete involvement of the proximal humeral epiphysis causing growth deficiency to our knowledge has never been described before. Lengthening using a device penetrating the cartilaginous region is debatable; however, so far, sarcomatous dedifferentiation in epiphyseal enchondromas has not been described.

Keywords: Epiphyseal Enchondroma, Humerus, Growth Deficiency, Lengthened, Magnetic driven nail, Ellipsoid shaped.

Article History

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1. INTRODUCTION

Solitary epiphyseal enchondromas are rare. Of 761 cases of enchondromas reviewed at the (Armed Forces Institute of Pathology and Walter Reed Army Medical Center,) only 33 cases were located in the epiphysis; the most frequent location was the proximal humerus with 8 of them in the humeral head and 2 in the tuberculi [1]. The enchondromas usually involve only parts of the epiphysis, *e.g.* [1 - 3]. No reference precisely states the total extent of the intraepiphyseal enchondromas; according to the figures of the different publications only one case completely involved the epiphysis in a case of a distal fibula enchondroma [1]. A 23-month-old girl with a large solitary epiphyseal enchondroma of the femoral head is presented by the study [2]. The patient was informed that data concerning his case would be submitted for publication, and he provided consent.

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2. CASE REPORT

At age 13, 6/12 years, the patient consulted a pediatric surgeon because of the shortness of his left upper arm with a strong desire for lengthening. Physical examination was normal except for the upper arm length difference of about 11 cm, about one-third of the length of the right normal humerus and mildly limited range of motion. The possibility of lengthening using an external fixator was discussed. X-Ray documentation for planning then revealed the impressive changes of the proximal humerus (Fig. 1), which were further studied by CT (Fig. 2) and MRI (Figs. 3 and 4) showing the complete involvement of the proximal humeral epiphysis including the tuberculi. To prove the diagnosis and rule out a vascular malformation component, a tru-cut core biopsy was performed revealing lobulated cartilaginous tissue compatible with enchondroma (Fig. 5).

As the patient continued to ask for lengthening, the option of using an internal device was proposed.

In the literature, no dedifferentiation of epiphyseal

Ankle Arthrodesis Nail Combined with Locking Compression Plate to Stabilize Two-Level Pathologic Tibial Fractures

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Abstract

Treatment of fragility fractures of the distal tibia in the elderly is demanding because of osteopenic bone quality, the delicate soft tissue cuff and frequent critical circulation. We report the case of two-level tibial pseudarthroses in an 83-year-old woman caused by multiple myeloma successfully stabilized by a long ankle arthrodesis nail combined with locking compression plate osteosynthesis. This case is unique, as to our best knowledge, herein diaphyseal fractures were treated for the first time using a technique reported hitherto primarily for fragility ankle and pilon fractures.

Keywords

Pathologic Fractures of the Tibia, Plasma cell myeloma, Ankle Arthrodesis Nail, Periprosthetic Tibia Fracture, Intramedullary Nail

1. Introduction

Treatment of fragility fractures of the distal tibia in the elderly is demanding because of osteopenic bone quality, the delicate soft tissue cuff and frequent critical circulation. Among other indications to minimize soft tissue damage retrograde nailing has been reported as salvage for failed surgical management of ankle fractures [1]. Retrograde nailing has been extended to special indications as ankle fragility/osteoporotic, open distal tibia and talus, complex tibial pilon fractures, and aseptic non-unions [2]-[8].

We report on a case of pathologic two-level fractures of the tibia due to exten-