09:00  Segmental Resection Midshaft Tibia with Intercalary Allograft Replacement  
Samuel Kenan  
Hospital for Joint Disease, NYC

09:10  Efficacy of Percutaneous Radiofrequency Ablation for the Treatment of  
Chondroblastoma and Chondromyxoid-fibroma - Preliminary Results  
Tamar Berenstein, Daniella Katz, Yaacov Applbaum, Amos Peyser  
Hadassah-Hebrew University Medical Center, Jerusalem

09:20  Allograft/Prosthesis Composite Replacement Following Wide Resection Proximal  
Humerus for Benign and Malignant Bone Tumors  
Samuel Kenan  
Hospital for Joint Disease, New York

09:30  Function after Resection of the Shoulder: a Patient's Perspective  
Yair Gortzak, Anthony M Griffin, Benjamin Deheshi, Peter C Ferguson, Jay S Wunder  
Mount Sinai Hospital, Toronto

09:40  Cementless Hip Arthroplasty, A New Modality for Metastatic Disease of the Hip  
Ran Thein, Ahron Chechik, Boaz Liberman  
Sheba Medical Center, Tel-Hashomer

09:50  Combined Radiographic and Sonographic Guidens for Radiofrequency Ablation of  
Osteoid Osteoma in Delicate Regions  
Israel Dudkiewicz, Moshe Salai, Amir Amitai, Yehezkel Tytiun, Alexander Belinki  
Rabin Medical Center, Petah Tikva

10:00  Prediction of Pathologic Fracture Risk of the Femur after Combined Modality  
Treatment for Soft Tissue Sarcoma of the Thigh  
Yair Gortzak¹, Gina Lockwood², Ashish Mahendra¹, Anthony M Griffin¹, Ying Wang²,  
Benjamin Deheshi¹, Jay S Wunder¹, Peter C Ferguson¹  
¹ Mount Sinai Hospital, Toronto Ontario, ² University Health Network, Toronto Ontario

10:10  Surface Lesions of Bone: Diagnostic and Treatment Dilemmas and Approaches  
Nogah Haramati¹,², Samuel Kenan³,⁴  
¹ Albert Einstein College of Medicine, Bronx, ² Montefiore Medical Center, Bronx,  
³ NYU School of Medicine, New York, ⁴ Hospital for Joint Diseases, New York

10:20  Nicotine Modulates Bone Metabolism Associated Gene Expression in Osteosarcoma  
Cells  
David Rothem¹,², Michael Soudry¹,², Rami Eliakim¹,², Aviva Dahan¹  
¹ Rambam Health Care Campus, Haifa, ² Technion-Israel Institute of Technology, Haifa
**Segmental Resection Midshaft Tibia with Intercalary Allograft Replacement**

*S. Kenan*

*Orthopaedic, Orthopaedic Oncology, Hospital for Joint Disease, NYC*

**Introduction:** Malignant tumor may originate in the tibial shaft. Following wide segmental resection such defect could be reconstructed using vascularised fibular graft with good results. However, question remains whether simple intercalary allograft replacement could obtain similar results.

**Methods:** Between 1990 to 2006, ten patients with malignant bone tumor involving the tibial shaft underwent wide segmental resection. Age range 6-62. males(8) Female(2). Diagnosis adamantinoma(3), Osteosarcoma(2),Ewing(2), Myofibroblastic arcoma(2),chondrosarcoma(1). In all fresh frozen allograft was used. secured by intramedullary rod(6), plate and screws(4)

**Results:** Follow-up in four patients from 14 to 18 years. Ten years follow-up in one, and five years follow-up in 3 patients. There were two local recurrences in one amputation at follow-up of 18 years. In two patients stress fracture at follow-up of three years required improve fixation and autogenous bone graft. In all patients with follow-up above two years complete healing at the junction allograft host bone were achieved.

**Discussion and Conclusion:** following wide resection midshaft tibia, reconstruction using fresh frozen allograft has proved to be very successful. In all patients allograft incorporated and healed completely with minimal complication rate. Vascularized fibular graft could obtain good results, however it is associated with potential donor site morbidity. and should be reserved for specific indications. Allograft reconstruction to bridge a large segmental defect demonstrate a good results, well tolerated by the patient, with excellent functional results.
Efficacy of Percutaneous Radiofrequency Ablation for the Treatment of Chondroblastoma and Chondromyxoid-fibroma - Preliminary Results

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Introduction: Percutaneous radiofrequency (RF) ablation of osteoid osteoma has been proved as an effective treatment. However, there is limited data regarding other tumors. It also has been described in the treatment of other benign and malingnant tumors like chondroblastoma and metastasis. In fact the reported cases of chondroblastoma that were treated with RF were radiological small lesions erroneously diagnosed prior to treatment as osteoid osteomas. They were diagnosed as chondroblastomas only retrospectively. The aim of this study is to describe the success of RF as a definitive treatment and an alternative to traditional surgery for the treatment of large chondroblastoma and chondromyxoid-fibroma which were diagnosed as such prior to ablation.

Materials and Methods: From April 2006 to April 2007, 3 patients with chondroblastoma and 1 patient with chondromyxoid-fibroma were treated with RF ablation using cool-tip probe. Three procedures were done in the CT suit and one in the operating room. There were 3 girls and 1 boy. Mean age was 12 y 9 m (range 11 y 6 m -14 y 6 m). Clinical and radiological follow-up was performed to assess outcome. The mean follow-up was 18.25 months (range 15-27 months).

Results: Three patients healed after single treatment and one needed repeated treatment. No immediate or delayed complications were observed. Follow up MRI showed no enhancement in the lesion and an extra-lesional sclerotic ream signifying RF effect beyond the lesion area. All patients returned to complete normal painless function.

Conclusion: In spite of the small number of patients, percutaneous RF ablation was shown to be an effective and safe minimally invasive procedure for the treatment of chondroblastoma and chondromyxoid-fibroma, avoiding the morbidity of commonly used wide excision surgeries.
Allograft/Prosthesis Composite Replacement Following Wide Resection Proximal Humerus for Benign and Malignant Bone Tumors

S. Kenan
Orthopaedic, Orthopaedic Oncology, Hospital for Joint Disease, New York

Introduction: Restoration of glenohumeral stability and mobility following wide resection proximal humerus present a major challenge

Methods: Between 1988 to 2007 twenty patients underwent wide resection proximal humerus. Ages 16-54 years. Male(12), Female(8). Diagnoses osteosarcoma(9), GCT(4), Chondrosarcoma(4), Ewing(1), leiomyosarcoma (1), angiosarcoma(1). Primary resection and replacement in(14), revision of failed osteoarticular allograft(4), revision of failed prosthesis in(2). Resection level from 7 to17cm. Reconstruction modality using fresh frozen allograft with joint capsule and tendon attachment assembled into custom long stem prosthesis press fitted to the host bone

Results: Follow up from 5 months to 20 years. In seven patient follow-up from 10 to 20years. Follow-up in four patient from 4 to 9years.Follow-up was lost in (3). four patients with osteosarcoma died during the follow-up. No immediate complications. Long-term rigid, stable fixation with complete healing of the allograft host bone achieved in all patients. All regained stable painless limited range of motion. One surgery for all, no revision. MSTS functional result score was excellent with respect to pain control, emotional acceptance and manual dexterity, Unsatisfied with respect to range of motion.

Discussion and Conclusion: reconstruction of gleno-humeral joint is challenging. Osteoarticular allograft provide good early results with poor long term result related to fragmentation and high revision rate. Shoulder arthrodesis provides stability with good use of elbow, however, the procedure is very demanding with high complication rate. In our experience the use of combined allograft prosthesis has been successful; provide painless range of motion with lifelong durability emotionally and esthetically well accepted.
cementless Hip Arthroplasty, A New Modality for Metastatic Disease of the Hip

R. Thein, A. Chechik, B. Liberman

Department of Orthopedics, Sheba Medical Center, Tel-Hashomer

Background: With the progression in the treatment of oncologic diseases, one can expect increase the life expectancy of those patients. This group of patients challenged their physicians not only to increase their life expectancy but also to increase their quality of life. The hip joint is a common location for metastatic disease. Actual as well as impending fractures at this site are frequently due to mechanical instability after tumor invasion and are usually treated surgically with cemented hip arthroplasty.
We have hypothesis that cementless hip arthroplasty is a suitable treatment for this situation. The objective of this study was to analyze survival and influences on survival after cementless hip arthroplasty for metastatic hip disease.

Methods: 50 patients who had undergone a total of 52 hemiarthroplasty or total hip arthroplasty procedures without cement for treatment of a pathologic or an impending pathologic hip fracture between 2004 and September 2008 at our institution were included in this study. Data that had been acquired prospectively within the ortho-oncologic clinic registry of our institution were reviewed retrospectively.

Results: The duration of follow up was between 3 months to 4 years. No patient needed revision from any reason. One patient was treated with P.O. antibiotic due to superficial infection. 17 patients died during the follow up and their median duration of survival after the arthroplasty was 9 months. Two of them died on the first 4 weeks, one due to DIC and the other due to his basic disease. All the other patients who died, died on the first 12 months due to their oncologic disease.

Conclusions: one of the excepted procedures for patients who have fracture or impending fracture due to metastatic disease is hip arthroplasty. On this study we have shown that this group of patient with metastatic disease, that has a limited life expectancy, can be treated with cementless hip arthroplasty or hemiarthroplasty. There was no frailer of the surgery during our follow up and around 40% (17) of the 50 patients in our series died on the first year after the surgery. Our impression is that cementless hip arthroplasty or hemiarthroplasty is a reasonable treatment, provide better life quality and stand with the standard of the other treatments which can be provide to this group of patients.
Combined Radiographic and Sonographic Guidens for Radiofrequency Ablation of Osteoid Osteoma in Delicate Regions

I. Dudkiewicz¹, M. Salai¹, A. Amitai¹, Y. Tytiun¹, A. Belinki²

¹ Orthopaedic Surgery, Rabin Medical Center, Petah Tikva, ² Invasive Radiology, Rabin Medical Center, Petah Tikva

Accurate resection or ablation of osteoid osteoma is often associated with passage in "delicate" regions, close to vulnerable neurovascular structures.

At our medical center, we use radiographic navigated radiofrequency ablation of osteoid osteoma in all cases where the nidus is visible on plain radiographs, or on the screens of the invasive radiology screens. Accurate triangulation aiming at the nidus is done, targeting at the nidus then performed by a threaded k-wire (which is then drilled into the nidus), followed by radiofrequency ablation.

This technique saves much radiation associated with CT guidance of the procedure and is less cumbersome.

In delicate areas of location of the osteoid osteomas, such as: the cubital fossa, the sciatic notch area, the popliteal fossa, and others, we have used sonographic guidance, which navigated us to the nidus without potential injury to the related vulnerable neuro-vascular structures in these regions.

During 2007, four patients out of 15 patients who were operated due to Osteid Osteoma underwent sonographic resection. The lesions were located in the pelvis, the posterior acetabular lip, the posterior part of the femoral neck and the cubital fossa.

In all the cases performed by this technique, no damage whatsoever occurred.

We recommend utilizing this simple, cheap, available method, which is associated with least radiation in the management of osteoid osteomas, especially in the young population involved.
Surface Lesions of Bone: Diagnostic and Treatment Dilemmas and Approaches

N. Haramati 1,2, S. Kenan 3,4

1 Radiology, Musculoskeletal Radiology, Albert Einstein College of Medicine, Bronx, 2 Radiology, Musculoskeletal Radiology, Montefiore Medical Center, Bronx, 3 Orthopaedic Surgery, Orthopaedic Oncology, NYU School of Medicine, New York, 4 Orthopaedic Surgery, Orthopaedic Oncology, Hospital for Joint Diseases, New York

Background and purpose of the study

Bone forming surface lesions of bone span the entire spectrum from the post traumatic bizarre parosteal osteochondromatous proliferation (BPOP) or Nora's lesion, to high grade surface and dedifferentiated parosteal osteosarcomas[1]. Osteochondromas have been classically differentiated from other surface lesions due to the marrow contiguity, but this too has been recently shown to be mimicked BPOP. [2] In some cases, two simultaneous lesions may occur in close physical proximity leading to erroneous diagnoses and potentially, to drastically different treatment plans. [3] Cartilage forming and non-calcified surface lesions also span the range from the non-neoplastic and benign to the highly malignant. The wide variability in the radiographic appearances of these lesions often leads to uncertainty in diagnosis. We review our experience with surface lesions of bone with emphasis on diagnostic and therapeutic challenges and suggested approaches.

Material and Methods

Our material is extracted from the bone tumor case records of both authors (>1,000) and the 1,700 case archive of The New York Area Bone Pathology Club.

Results and short discussion

1. Close collaboration between the oncologic surgeon, radiologist and pathologist is essential in the diagnostic and therapeutic approach to bone surface lesions.
2. Maximizing the non-invasive imaging techniques and close communication between the oncologic surgeon, radiologist and pathologist is vital.
3. Refraining from violating the lesion with biopsy until guided by the oncologic surgeon will perform the definitive surgery is strongly recommended.

Specific cases will be shown illustrating the diagnostic dilemmas. The surgical options along with clinical case results will be reviewed.

References

Nicotine Modulates Bone Metabolism Associated Gene Expression in Osteosarcoma Cells

D. Rothem, M. Soudry, R. Eliakim, A. Dahan

1 Orthopaedic Surgery A, Orthopaedic, Rambam Health Care Campus, Haifa, 2 Gastroenterology and Nutrition Research laboratory, Gastroenterology, Rambam Health Care Campus, Haifa, 3 The Bruce & Ruth Rappaport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa

Background and Purpose of the Study: Smoking has a broad range of physiological effects such as risk factor in osteoporosis as well as bone fracture incidence and increased nonunion rates. Recent studies showed that nicotine has effect at the cellular level in human osteoblast cells. In this study we explored and identify possible mechanisms underlying nicotine-induced changes in bone metabolism.

Material and Methods: In order to define changes in bone metabolism we incubated the human osteosarcoma cells, MG63 with various concentrations of nicotine and the nicotinic receptor antagonist, D-tubocurarine. Then, we explored nicotine affect using cell proliferation assays and expression of genes associated with bone metabolism (osteocalcin, type I collagen and alkaline phosphatase) using RT-PCR.

Results and Short Discussion: Nicotine affects cell proliferation in a biphasic manner including toxic and antiproliferative effects at high levels of nicotine and stimulatory effects at low levels. Low-levels of nicotine upregulated osteocalcin, type I collagen and alkaline phosphatase gene expression. Both increased cell proliferation and gene upregulation induced by nicotine was inhibited by the addition of D-tubocurarine. However, high nicotine concentrations down regulated the inspected genes. Our results demonstrate for the first time that the addition of nicotine concentrations analogous to a light–moderate smoker, yield increased osteoblast proliferation and bone metabolism while the addition of nicotine concentration, analogous to heavy smokers, lead to the opposite effect. The inhibition of these effects by D-tubocurarine at low nicotine concentration suggests that nicotine acts via nicotinic acetylcholine receptor (nAChR).
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