MAOA SECOND PLENARY SESSION
April 21, 2006

49. Minimum 20-Year Follow-Up of Cemented Revision Total Hip Arthroplasty

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Newer cementing techniques were developed in the mid 1970's to improve the results of cemented total hip replacement. The senior author began using these techniques in revision surgery in 1977. In this paper, the authors address the question, "What is the durability of cemented revision total hip arthroplasty using contemporary cementing technique at minimum 20-year follow-up?"

Between 1977 and 1983, the senior author performed 83 consecutive non-selected cemented total hip arthroplasty revisions for mechanical failure in 77 patients. The average age at the time of revision was 62.4 years. The hips were evaluated for bone loss at the time of revision, need for re-revision, radiographic loosening, and osteolysis. Clinical results were evaluated using the WOMAC Osteoarthritis Index.

At minimum 20-year follow-up, 12 acetabular components and 5 femoral components were revised for aseptic loosening. Of the living patients, nine acetabular components and two femoral components were re-revised for aseptic loosening. For all patients, 25% of acetabular components and 12% of femoral components, when including those re-revised for loosening, were loose on radiographs. The average WOMAC Score in living patients was 22 (range 0-65) with 0 the best score possible and 96 the worst score.

In this study of contemporary cemented revisions, 14% of acetabular components and 6% of femoral components were re-revised for loosening. Of those patients living 20 years, 35% of acetabular components and 19% of femoral components were re-revised for loosening. Radiographic loosening, including those components re-revised, occurred around 25% of acetabular and 12% of all femoral components. These results should provide a comparison for the results of cementless revision, and revisions performed with impaction grafting and cement, when this length of follow-up becomes available.

50. ♦A Prospective, Randomized Study of Entry Portal on Hip Biomechanics After Femoral Nailing

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INTRODUCTION: The purpose of this study was to prospectively compare hip abductor function following antegrade IM nailing of femur fractures using two different entry portals. Our null hypothesis was that: No significant difference in hip abduction moment would be observed between femur fractures treated with piriformis fossa versus trochanteric antegrade femoral nailing.

METHODS: We enrolled 49 patients in an IRB approved, prospective, randomized study. Isolated femur fracture patients were treated with either a piriformis fossa or trochanteric entry portal IM nail. Quantitative gait analysis was performed at seven months postoperative. Gait temporal-spatial, kinematic and kinetic variables were processed for each trial.

RESULTS: A minimum one-year clinical follow-up was obtained for 72%, and 100% had fully healed. Twelve, six per group, had complete motion analysis data. The null hypothesis that there would be no significant difference in hip abduction moment between piriformis and trochanteric entry portals was rejected. The piriformis group had significantly less internal hip abduction moment than the trochanteric group at terminal stance or push off, $p=0.006$.

DISCUSSION AND CONCLUSION: This study clearly demonstrates the significant effect of femur fracture treatment, entry portal, on the biomechanics of the hip abductor musculature. The significance lies in the fact that uncomplicated fracture healing occurred in 100% of the studied patients, but complete functional recovery, hip abductor function, differed between the two groups.

51. Emergence of Community Acquired Methicillin Resistant Staphylococcus Aureus in a Pediatric Population

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INTRODUCTION: A marked increase in community-acquired methicillin resistant staphylococcus aureus (MSRA) osteomyelitis and septic arthritis prompted a review of records of pediatric patients admitted with acute hematogenous osteomyelitis (AHO) or septic arthritis.

METHODS: Chart review obtained data that allowed comparison of non-MRSA and MRSA infections with regard to site of infection, frequency of subperiosteal abscesses, frequency of MRI evaluation, number of surgeries required, duration of hospitalization, laboratory values, blood culture results, underlying diseases, and complications.

RESULTS: Of 104 patients treated over a four-year period (2000-2003), 27 (26%) had infections due to MSRA, 26 of which occurred during the last two years of data collection. From 2000 to 2002, the average number of infections was 18 per year, but during 2003, there were 48 bone and joint infections, 20 of which were MRSA infections. Patients with MRSA infections had much different clinical courses than non-MRSA patients: 72% of MRSA patients had subperiosteal abscesses compared to 24% of non-MRSA patients. Surgery was needed in 85% of MRSA patients compared to 45% of non-MRSA patients. Over half (55%) of patients with MRSA infections had a complicated clinical course compared to less than a quarter (23%) of non-MRSA patients. All the MRSA infections were community acquired rather than hospital acquired.

DISCUSSION AND CONCLUSION: From 2000 to 2003, the number of patients admitted for skeletal infections doubled from 24 to 48 and the percentage of MRSA rose from 4% to 42%. This is an alarming trend that has implications regarding treatment recommendations.

52. Complications of LISS Plate Fixation in Complex Proximal Tibia Injuries

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OBJECTIVES: To report the results, complications, and pitfalls in treatment of complex injuries of the proximal tibia with LISS plates.

DESIGN: Descriptive, chart reviews.

SETTING: University Level I trauma center

PATIENTS: Thirty-seven consecutive patients with complex proximal tibia fractures (41C1, 41C2, 41C3, 41A2, 42A2) treated with LISS plate.

INTERVENTION: All fractures were treated with LISS plates.

MAIN OUTCOME MEASUREMENTS: Healing, alignment, and complication.

RESULTS: Eighteen fractures (49%) healed without any complications. Eight patients (22%) developed deep infections that required debridements and hardware removals, one eventually required an above knee amputation. Clinically, one patient had varus deformity and one had loss of fixation with hyperextension and varus collapse. Radiographically, we found significant varus malalignment in four cases, valgus in one case, hyperextension in four cases, and hyperflexion in one case. Loss of alignment during healing was found in two cases into varus, one case into hyperflexion, and one case into combined varus and hyperextension. Other complications were one wound dehiscence, one delayed soft tissue breakdown, four hardware prominences, one peroneal nerve injury at the distal part of a nine-hole plate, and one postoperative compartment syndrome. Two patients had non-LISS plate related complications. One had a tibial tubercle nonunion that was observed and the other had an intra-articular screw placement that was removed.

CONCLUSION: We have found that, using standard “less invasive” technique, the complication rate in our patients was higher than previous reports by originators particularly infection, hardware prominence, malalignment, and loss of alignment. Some of the complications may be lessened as more experience is gained but some may be inherent in the treatment of very high-energy fractures with this technique. This provides useful information for trauma surgeons in avoiding pitfalls and patient counseling.

53. ♦Primary Pedicle Screw Augmentation with Cement in the Osteoporotic Lumbar Spine

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PURPOSE OF STUDY: A new previously published technique of pedicle screw augmentation with a hemi-kyphoplasty technique using polymethylmethacrylate (PMMA) may be of significant utility in posterior instrumentation in the osteoporotoic lumbar spine. Biomechanical studies were done to compare the pullout strength of this kyphoplasty technique to that of a current cement augmentation technique (control) used clinically. Axial pullout loads were measured after a 5000 cycle caudal-cephalic fatigue sequence of each screw to simulate physiologic fatigue. Specimens included ten human cadeveric lumbar vertebrae with an average Bone Mineral Density of 0.76 g/cm^2 +/- .02 and nine control vertebrae (BMD 1.08 +/- 0.1).

METHODS USED: The kyphoplasty technique used an inflatable bone tamp to create a cavity in the vertebral body (VB) under fluoroscopic guidance. The control technique (average of 1.5 cc of PMMA inserted under manual pressure into the hole made by the pedicle screw after insertion and removal) was used on the contralateral pedicle.

SUMMARY OF FINDINGS: The average pullout strength of the clinically used technique was 756 N +/- 300. The average pullout strength of the kyphoplasty technique was 1414 N +/- 338. Pull-out for the normal control spines averaged 811 N +/- 261. This represents a 187% increase in pullout strength in osteoporotic vertebrae ($p<0.001$).

CONCLUSION: Previous studies suggest an average pedicle screw pull-out force in osteoporotic spines of 206 N +/- 159. “Standard” pedicle screw augmentation provides a 2-3 fold increase in pullout load to a level comparable to normal adult vertebrae. The pullout strength of the kyphoplasty technique was almost seven times the unaugmented value (1414 N to 206 N) and 1.74 times the value for normal control vertebrae. The kyphoplasty technique has significantly greater pull-out strength than the “standard” technique of cement augmentation and exceeds the pull-out strength of unaugmented pedicle screws in normal spines.

54. Two Level Reconstruction of Comminuted Posterior Wall Acetabular Fractures

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PURPOSE: The purpose of this study was to evaluate the efficacy of a two level reconstruction technique using 1.5 mm or 2 mm mini screws as part of the fixation construct for posterior wall acetabular fractures with intra-articular comminution.

METHODS: Between 1995 and 2004, 29 patients with comminuted posterior wall acetabulum fractures were treated in this manner. In 27 of 29 patients, there was a posterior hip dislocation. All the dislocations except two were reduced within six hours from injury. Patients were evaluated by plain radiographs (AP and Judet views) and CT scan prior to surgery. The operative procedure involved individual reduction and fixation of osteochondral fragments with 1.5 mm or 2 mm mini screws inserted internally, sparing the articular cartilage. Subsequently, the overlying posterior wall fragment was fixed with 3.5 mm lag screws with neutralization of the whole construct using a 3.5 mm reconstruction plate. Patients underwent CT scanning after surgery to evaluate the fixation construct and accuracy of reduction. In addition, 15 patients had CT scans performed three months following surgery to assess maintenance of the reduction. At final follow-up, patients were evaluated with plain radiographs (three views) and outcome was assessed using the Merle d'Aubigne Score. The mean follow-up was 3 years (range, 2-6 years).

RESULTS: The fixation construct appeared satisfactory in all cases. In six patients, a residual defect or gap >2 mm was present on the postoperative CT scan. CT scanning at three months postoperatively revealed no loss of the original reduction achieved using the mini screws. Radiological osteoarthritis and osteonecrosis were present in one patient each. Both patients required total hip replacement surgery. There were no infections. The Merle d'Aubigne Score was excellent in 17 cases, very good in 6, good in 4, and poor in 2 (93% good-to-excellent results).

CONCLUSION: Treatment of comminuted posterior wall acetabular fractures using the two level reconstruction technique with either 1.5 mm or 2 mm mini screws appears to provide stable fixation of the fragments and is associated with favorable results.

If noted, the author indicates something of value received. The codes are identified as: a – research or institutional support; b – miscellaneous funding; c – royalties; d – stock options; and e – consultant or employee.

♦The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use).