Review of Specialty Day Hip and Knee AAOS Meeting Saturday, March 15, 2014

Nicholas J. Giori M.D., Ph.D.
Stanford University
VA Palo Alto HCS
Disclosures

• None
HIP SYMPOSIA

• Surgical Approach for Primary THA
• Components for THA: Are they equivalent?
• Preventing Hospital Readmissions and Managing Complications
• Hip Preservation
• Bearing Choices
• Modularity in THA: Choices and Compromises
• Metallosis
• Revision THA
Surgical Approaches

- Joel Matta – Anterior Approach
- Bernard Stulberg – Incorporating the anterior approach into a senior surgeon’s practice
- Adolph Lombardi – Anterolateral approach
- Mark Pagnano – Mini-Posterolateral Approach

Bottom line:
- All the approaches work well for total hip arthroplasty – IF DONE WELL.
- The learning curve (with higher complication rate) for the anterior approach lasts from 30 to 100 cases
  - This needs to be discussed with the patient
  - Low volume surgeons may never get through the learning curve
Femoral components

- **Short stems**: Roger Emerson
  - Facilitate the anterior approach
  - Preserve the diaphysis for revision situations
  - Easier to remove if needed
  - Best for Dorr A and B bone
  - Presented a case series of 139 short taper stems of a particular design
    - 7.5 year survivorship 98.5% (revision for any reason)
    - Caution that not all short stem designs may perform well – each stem design must be evaluated individually
Femoral components

Tapered Stems — John Meding

• Reviewed 20 year experience of 6 different tapered designs

• Excellent long term survivorship - 86 to 99%

Extensively Coated Stems — Charles Engh

• 97% 20 year survival

• Proximal stress shielding is seen, but has not been a major clinical issue
Femoral components

Cemented Stems – John Callaghan

• 35 year experience

• Polished femoral stems (Exeter and Charnley type) with contemporary cement technique have excellent long term fixation
Preventing Hospital Readmissions and Managing Complications

- Defining Complications for THA – William Healy
  - Reporting of complications is not standardized
  - The Hip Society created a list of THA complications with standardized definitions.
  - This list can be used to track complications and adverse events in a standardized way
  - 20 THA complications and adverse events and their definitions were endorsed by the Hip Society
THA complications

- Bleeding
- Wound Complication
- Thromboembolic Disease
- Neural Deficit
- Vascular Injury
- Dislocation/Instability
- Periprosthetic Fracture
- Abductor Muscle Disruption
- Leg Length Discrepancy
- Deep Periprosthetic Joint Infection

- Heterotopic Ossification
- Bearing Surface Wear
- Osteolysis
- Implant loosening
- Cup Liner Dissociation
- Implant Fracture
- Re-Operation
- Revision
- Re-Admission
- Death
Preventing Hospital Readmissions and Managing Complications

• Data on Hospital Readmissions after THA in US
  Vincent Pellegrini
  – Medicare Claims Data 2002-2007
    • 6.8% 30 day readmission
    • 4.2 day mean length of stay

Major non-orthopedic reasons for readmission:
  – 50% perioperative cardiac events
    • Can reduce risk with β-blockers in appropriate patients
  – Stroke
  – VTE
Preventing Hospital Readmissions and Managing Complications

• Mgmt of the Surgical Wound — Kevin Garvin
  – Infection, hematoma, and other wound complications are most common reasons for readmission after THA
  – Risk factors:
    • Anticoagulation (can modify the anticoagulant used)
    • Transfusion (consider TXA, spinal hypotensive anesth)
    • Obesity (consider wt loss program for BMI > 40)
    • Smoking (smoking cessation)
    • Diabetes (control perioperative glucose)
    • Length/complexity of surgery – management of the wound
  – Future work will be needed to see if readmissions can be controlled by controlling these modifiable risk factors
Preventing Hospital Readmissions and Managing Complications

- Prophylaxis and Mgmt of Thromboembolic Dz

  Paul Lacheiwicz

  - Convergence of ACCP, AAOS, SCIP guidelines
  - Aspirin alone or with pneumatic compression – OK in patients with no prior VTE or risk of bleeding
  - In patients with higher risk of VTE, many are delaying the use of potent anticoagulants until POD 1 or using warfarin
  - Newer oral agents (dabigatran, rivaroxiban, apixiban) have a higher risk of bleeding than LMWH and no greater efficacy
  - Mobile compression devices have very low rates of VTE (0.53%) and PE (0.2%) without increase in risk of bleeding
  - Ultrasound screening for VTE is not recommended
Preventing Hospital Readmissions and Managing Complications

• Role of the internist – Richard Iorio
  – At HJD they have incorporated a trans-departmental approach to decrease perioperative morbidity/mortality and readmissions
    • Anesthesia
    • internal med
    • Pulmonary
    • Cardiology
    • Endocrine
    • nutrition, bariatrics, PT, psychiatry
Charnley Award

• Long term wear of HXLPE in THA
  Senior author: David Murray
  – Compared to standard UHMWPE in prospective randomized study
  – RSA to measure wear
  – NO SIGNIFICANT WEAR of HXLPE compared to UHMWPE (0.03 mm/year)
  – HXLPE has no detectable steady state wear in vivo
Stinchfield Award

• Redefining the “safe zone” for optimal wear and stability in THA
  
  Senior authors: John Callaghan and Thomas Brown
  – Finite element analysis
  – Varied femoral and acetabular anteversion, head diameter, cup inclination
  – Smaller “safe zone” will move around with variations in these parameters
Modifiable vs. Non-Modifiable risk factors for infection following THA — Richard Iorio

- 3600 cases reviewed from a single center
- Risk Factors:
  - ASA > 2 (OR 4.76)
  - BMI > 40 (OR 3.86)
  - Increased operative time (OR 2.45)
  - Low case load (OR 1.97)
  - Revision (OR 5.28)
  - Diabetes complications (OR 6.8)
  - Staph Aureus colonization and hemiarthroplasty (4.64)
  - Smoking (additive risk factor when combined with other risk factors) (OR 7.2 to 12.2)
Bearing Choices

HXLPE: As good as expected — Richard McCalden

• Reviewed 1484 HXLPE THA’s – min 5 years
• HXLPE from all the major companies
• No cases of observed linear wear on x-ray or liner fracture
• HXLPE is the current gold standard for bearing surfaces in joint replacement
Bearing Choices

Ceramic bearings for THA – William Capello

• Reviewed 8 publications with more than 10 year follow-up

• 1111 hips
  – No osteolysis
  – 0 to 1.3% ceramic fracture
  – 0 to 3% squeaking
  – Less taper corrosion than CoCr head on metal trunion

• Still a viable option in THA
Bearing Choices

• MoM THA with Lg Heads

   NOT WORTH THE RISK

   Donald Garbuz

   – Marked increase in metal ion levels – bearing surface and taper junction
   – Adverse local tissue reactions a problem
   – 32% pseudotumors in asymptomatic patients
   – High rates of complications and re-revisions following revision surgery
Metallosis

Diagnosis of Metallosis vs. Infection – Della Valle

• Aspiration and cell count – is the best test to differentiate metallosis from PJI
  – Optimal cut-off 4350 WBC/microliter and 85% PMN
  – must do a MANUAL cell count as necrotic cells from metallosis will be read as PMN’s in automated counts
  – ESR and CRP will be more elevated in the infected hip – very sensitive
Results of Revision THA – William Griffin

• Revision of MoM THA with monoblock acetabular component is associated with higher complication rates due to bone and soft tissue deficits
  – Higher infection rate – 6%
  – Higher dislocation rate – 4%
  – Failure of acetabular fixation – 6%
  – Decreased clinical scores

• 20% major complications
• 16% reoperations
• Available on the AAOS website
• Risk stratification table
• Evaluation of the MoM hip arthroplasty
  – Clinical – rule out other intrinsic/extrinsic hip problems
  – Laboratory – Cell count/diff, ESR, CRP, metal ion levels > 7 ppb
  – Imaging – x-ray, ultrasound, MARS MRI
  – Follow-up recommendations
Revision THA

Mostly technique and classification review

- **Extended Trochanteric Osteotomy** – William Jiranek
- **Acetabular Revision** – Scott Sporer
  - Paprosky Classification
- **Femoral Revision** – Wayne Paprosky
  - Fluted tapered stems are now the workhorse of femoral revision surgery
  - Allows fixation when there is less than 2 cm diaphysis
  - Risk of stem fracture reduced
  - Can use larger diameters with low risk of thigh pain
Infection — Bassam Masri

• There is resurgence of interest in one stage exchange, but two stage is the gold standard
• Keys to success are wide exposure, implant removal, thorough debridement, irrigation
• Cement spacers can be of varying types. In this lecture, Dr. Masri discussed their successes with the PROSTALAC spacer
KNEE SYMPOSIA

- Non-Op and Non-Arthroplasty Mgmt of OA
- Unicompartmental TKA
- Periop Mgmt of the TKA patient
- Optimizing outcome following TKA
- Alignment: How do we get it right
- Performing a Primary TKA
- Patella and Extensor Mechanism
- Infection
- Stiffness and Instability
Non Arthroplasty treatment of OA

• Injectibles
  – Corticosteroids – AAOS inconclusive
  – HA – Not recommended by the AAOS
  – PRP – AAOS inconclusive
  – Orthokine/Regenokine – autologous IL1-Ra, IL-4, IL-10
    • Available in Germany – not FDA approved
  – Regenexx – Bone marrow derived MSC
    • Minimal data
  – This is an area of ongoing research and development
Unicompartmental Knee Replacement

- Patient Selection – Richard Scott
  - “Classic Criteria” 1989
    - Non-inflammatory arthritis
    - Deformity less than 10 deg varus or 5 deg valgus
    - Intact ACL
    - Flexion contracture less than 15 degrees
    - Body Weight less than 80 to 90 kg
    - Patellafemoral changes less than grade II or III
  - Currently, some surgeons advocate being less strict about ACL, body weight, and patella-femoral criteria
Unicompartmental Knee Replacement

• Why UKA fails — Michael Berend
  – Aseptic Loosening – technique related
  – Incomplete pain relief - multifactorial
  – Lateral compartment OA – second decade

• Custom implants — Thomas Thornhill
  Patient Specific Guides — Keith Berend
  Robotic Knee Replacement — Andrew Pearle
  – All are designed to address technique and fit related issues
Optimizing Outcome after TKA

- Patient Satisfaction — Michael Dunbar
  - 18% dissatisfaction in some series
  - Related to relief of pain and improvement of function
    - The longer the symptoms prior to surgery, the more satisfied after surgery
  - Unmet expectations — 10x RR of dissatisfaction
    - Need to reset expectations preoperatively
Why total knees fail – Kevin Bozic
– Revision burden is increasing – 9.3% of TKA procedures
– Infection 25%, Mechanical loosening 18.5%
– Elderly, female patients with a moderate number of comorbidities have the highest risk
Alignment – What is the target? – Johan Bellemans

- Raised the question whether strict adherence to anatomic alignment is needed
- Some argue that the patient’s natural alignment (e.g. commonly varus in males) is a better target.
  - More harmony with the soft tissue envelope
- So-called “Kinematic Alignment” is the subject of current debate and discussion
- Surprising conclusion of this session is that we may not know what we are shooting for!
Optimizing Outcome after TKA

Failure to restore mechanical alignment increases risk of loosening after TKA –

Ormande Mahoney

- A counterpoint to the previous talk
- Retrospective review of cases
- 4x increased risk of loosening with each degree of varus
- Avoidance of varus postoperative alignment is an extremely important determinant of TKA fixation durability.
Alignment – How to get it “right”

Kevin Garvin

• Conventional instruments are the gold standard
  – Computerized techniques can reduce coronal plane outliers, but cost effectiveness has not been established as it is not clear whether the number of eventual revisions is reduced.

• Debates
  – Computer assistance
  – Patient specific instruments
  – Robotic surgery
Insall Award

- Morbid Obesity Alone Affects TKA Complications, Mortality, and Resource Management  
  James Browne
Ranawat Award

- Randomized clinical trial Femoral+Sciatic block to Periarticular injection after TKA
  - Patients receiving periarticular injections had similar pain scores and satisfaction with pain management, shorter length of stay, but greater narcotic use on the day of surgery
Coventry Award

At 5 years, TM tibias were durable and reliable in TKA, a randomized controlled trial – Pagnano

• Highly porous metal tibias provided durable fixation and reliable clinical outcomes compared with cemented tibias
Infection

• Prevention – Javad Parvizi
  – Optimize nutrition
  – Glycemic control
  – Smoking
  – Vascular insufficiency
  – Obesity
  – Perioperative antibiotics
  – Reduce OR traffic
  – Possible MRSA decolonization – no solid recommendation
  – Reduce transfusions
Infection

• Update on diagnosis— Bob Booth
  – In-press article in CORR by Parvizi et al. on the use of biomarkers for infection diagnosis
  – \( \alpha \)-defensin is secreted by PMN’s in the presence of bacteria
  – Immunoassay for \( \alpha \)-defensin is nearly 100% sensitive and specific for diagnosis of periprosthetic joint infection
  – Can be combined with the CRP to avoid false positives
Infection

Single stage revision in selected patients –
Fares Haddad

• Currently doing single stage reimplants for patients with:
  – Sensitive organisms ID preoperatively by aspiration
  – Appropriate abx available for cement
  – Immunocompetent host with minimal bone loss

• 25% of all revisions for infection candidates for single stage with these criteria at their institution

• Ongoing subject of research and protocol development
Infection

Bioresorbable antibiotic eluting beads as an adjunct to treatment — Edward McPherson

- Calcium Sulfate dissolvable beads mixed with vancomycin and/or tobramycin
- Ongoing research in
  - 2-stage revision for infection
  - 1 stage poly exchange for acute infection
  - Aseptic revision TKA
- 3.5% rate of wound drainage — avoid high bead volumes
- HO formation was low (0.4%)
- Hypercalcemia in less than 1% of cases — treat with hydration