Unicompartmental Knee Replacements (UKR)

- Unicondylar/unicompartmental knee replacements
- Unicompartmental knee replacement vs TKA
  - Historically 5% of patients candidates with OA (in US 4.7% of arthroplasties UKAs)
  - Current data USA/UK 30-50% pts would qualify

Total Knee Replacements

- Commonly performed
- Infection rate 1-2% in Medicare population
- Durable
- Removing all cartilage- including normal cartilage
- 10-15% of TKA patients will have chronic pain

Unicompartmental Knee Replacements (UKA)

- High surgical learning curve—technically more difficult
- Half the major/minor complication rate
- Only removes affected cartilage
- Shortened recovery/ better physiological function
- Infection rate < 0.5%
- Higher revision rate

MEDIAL UNICONDYRAL KNEE REPLACEMENTS (UKR)
Unicompartmental Knee Replacements (UKR)

- Medial UKA - 90% of UKAs
- Lateral - 10% of UKAs

Unicompartmental Knee Replacements (UKR)

- Why UKA vs TKA?
  - Minimally Invasive
  - Cruciate mechanism - “normal” kinematics
  - ROM better than TKA
  - Function better than TKA
  - Pain relief equivalent to TKA

Who are candidates for medial UKAs?

- Full thickness medial OA
- Intact ACL
- Intact cartilage lateral
- < 15 degree flexion contracture
- > 90 degrees flexion

Unicompartmental Knee Replacements (UKR)

- NOT contraindications:
  - Patellofemoral joint OA!
  - Chondrocalcinosis/AVN
  - Age
  - Activity level
  - Obesity

Unicompartmental Knee Replacements (UKR)

- Contraindications:
  - Inflammatory Arthritis
  - ACL deficient knee
  - Previous upper tibial osteotomy

UKR SURVIVORSHIP
Oxford UKR

- Most common UKA utilized
- 41 years of use/research
- Developed in Oxford, England
- National Registries

Unicompartmental Knee Replacements: Survivorship

- Bottomly et al. *JBJS*, 2016
  - 10 year follow-up results (Oxford UKR)
  - 1084 UKAs, avg. age 66.5yrs at time of surgery
  - 10 year survival rate for revision or exchange of any part of prosthesis was 93.2%
  - High volume center in UK

Unicompartmental Knee Replacements: Survivorship

- Emerson et al. *JBJS*, 2016
  - 10 year follow-up results (Oxford UKR)
  - 173 UKAs, single US surgeon
  - 10 year survival rate for revision or exchange of any part of prosthesis was 88%

Unicompartmental Knee Replacements: Survivorship

- Argenson et al. *JBJS*, 2013
  - 20 year follow-up results
  - 160 UKAs, avg age 66 at time of surgery
  - 70 knees alive at 20yr follow-up, avg age 88 yrs old
  - ROM 127 degrees

Unicompartmental Knee Replacements: Survival

- Argenson et al. *JBJS*, 2013
  - 14/70 (20%) had required a revision
  - 9/14 converted to TKA average 13 years after initial procedure
  - Survival rate with revision for any reason was 83% at 15 years, and 74% at 20 years
Unicompartmental Knee Replacements (UKR): Complications
- Dutchman et al. JBJS, 2014
  - 29,333 patients between 2005 and 2011
  - 27,745 (94.6%) TKAs, 1588 (5.41%) UKR
  - 30 day incidence of morbidity and mortality
  - Significant differences in outcome: DVT, PE, operative time, and length of stay favored UKR

Unicompartmental Knee Replacements (UKR): Complications
- Bolognesi et al. JBJS, 2013
  - 68,603 TKA pts vs 3098 UKR pts in Medicare population
  - 2000-2009
  - Rate of UKR increased six-fold from 2000 to 2009
  - TKA group greater mortality at 90 days, 180 days, and one year
  - TKA group higher rate of DVT and infection
  - Revision rate TKA 1.2% at one year and 3.7% at 5 years
  - Revision rate UKR 2.3% at one year and 8.0% at 5 years

Unicompartmental Knee Replacements (UKR): Complications
- Berend et al. Orthopaedics 2010
  - 1000 consecutive UKAs
  - 2004-2008
    - Deaths 0%
    - Transfusions 0.5%
    - VTE 0.1%
    - Deep infection 0.1%
    - Manipulation 0.7%

Unicompartmental Knee Replacements (UKR): Complications
- Brown et al. JOA 2012
  - Total Complications UKA vs TKA
    - TKA 11.0% (252 of 2290 pts)
    - UKA 4.3% (27 of 629 pts)
Unicompartmental Knee Replacements (UKR): Complications

- Krych et al. *JBJS*, 2017 (MAYO)
  - 240 pts between ages 18-55 yrs old
  - 1998-2013
  - UKA 183 pts
  - Tibial osteotomy 57 pts
  - F/u 3 mos, 1, 2, and 5 years

UKA group: survivorship 77% at an average of 7.2 years

UKA group: activity level and function significantly favored UKA group on all follow-ups
UKA Cost-Effectiveness

- Kazarian et al. JBJS 2018
  - Lifetime cost-effectiveness for TKA, UKR, and non-surgical treatment (NST) for unicompartmental knee arthritis
  - Surgical treatments less expensive and provided greater number of quality-adjusted life yrs than NST from age of 40-69

UKA dominated other options

"Preferential use of UKA in all US patients with unicompartmental OA would result in an estimated lifetime societal savings of 987 million to 1.5 billion US dollars per annual wave of patients undergoing treatment"

Recommended UKA over TKA in order to maximize cost effectiveness

OVERVIEW UKAs

- DURABLE/EXCELLENT SURVIVORSHIP
- LOWER COMPLICATION RATE VS TKA
- HIGHER FUNCTIONAL OUTCOMES THAN TKA
- COST-EFFECTIVE
- HIGHER REVISION RATE THAN TKA

UKR: REVISION RATES

Why are UKR revised up to 4 times more often than TKAs??
UKAs and Revision Rate

- Bini et al. *JBJS*. 2013
  - All UKAs done at Kaiser Permanente 2002-2009
  - Median F/U 2.6 yrs
  - Looked at surgeon experience/hospital volume

- Oxford UKR 1.7%
- 9.5% for all poly tibia currently off the market
- 4 times revision rate with specific models

BMI not associated with failure
Surgeon yearly volume played significant role
Twofold higher risk for revision if surgeons performed 12 or fewer unicompartmental knee replacements a year

919 surgeons and 366 centers performed at least one replacement

Low Volume centers (50 or fewer over 8 yrs of study)
- 92.3% 5 years survival rate
- High Volume centers (More than 400 procedures)
- 94.1% 5 year survival
UKAs and Revision Rate

- Baker et al. *JBJS*, 2013
  - Low Volume surgeons (25 or fewer over 8 yrs of study)
    - 90.1% 5 years survival rate
  - High Volume surgeons (More than 200 procedures)
    - 96.0% 5 year survival

UNITED KINGDOM NATIONAL JOINT REGISTRY

- Surgeons doing one or two UKA per year have a 4% failure rate a year-40% 10 year survival
- Surgeons doing 30 plus per year have a 13% failure rate per year

UNITED KINGDOM NATIONAL JOINT REGISTRY

- 23% of UKA revisions for unexplained pain
- 9% of TKA revisions for unexplained pain
- 5 year rate of revision for unexplained pain
  - UKA 1.9%
  - TKA 0.2%
UNICOMPARTIMENTAL KNEE REPLACEMENTS

- Lower complications than TKA
- Better functional outcomes
- Excellent survivorship/durability
- Higher revision rate
  - Related to implant type
  - Surgeon volume
  - % of joints done that are UKRs

THANK YOU!