Routine Patellar Resurfacing During Total Knee Arthroplasty is not Cost-Effective in Patients without Patellar Arthritis

Harold I. Salmons BS1,2, Benjamin Zmistowski MD1, Yale A. Fillingham MD1, Derek Ward MD1, Robert P. Good MD1, Jess H. Lonner MD1,2
1 The Rothman Institute; 2 Sidney Kimmel Medical College

Introduction

- During total knee arthroplasty (TKA), whether or not one should routinely resurface the patella is controversial.
- Leaving an unresurfaced patella following index TKA may lead to anterior knee pain (AKP), patellofemoral crepitus, and future secondary resurfacing operations.
- However, routinely resurfacing the patella (PR) may lead to patellar fracture, aseptic loosening, patellar instability, avascular necrosis, and patellar chunk.
- The purpose of the present study is to utilize the existing level one evidence to assess the cost-utility of routine patella resurfacing during primary TKA.
- Hypothesis: Selective resurfacing of the patella is more cost effective than routine patellar resurfacing during primary TKA.

Methods

- Preoperative Data: Year, Exclusion Criteria, length and proportion of follow-up, criteria to perform PR, preoperative functional scores
- Postoperative Data: Functional scores, rate of AKP, delayed patellar resurfacing, reoperation for maltracking, and revision for patellar-related complications

- The potential outcome events that may be associated with a decision to resurface the patella during TKA were defined (see Figure 1: Sample of Decision Tree for each analysis).
- Two analyses were performed: 1) Included all studies that qualified per the systematic review; 2) Used probabilities based upon those studies in which randomization was performed among patients without evidence of patellar arthritis (selective PR).
- Quality adjusted life years scores (QALY) spanning 5 years were calculated based on literature-based cost estimates.

Results

- 14 prospective randomized controlled studies were included combining 3,562 patients undergoing 3,823 TKAs
- Combining all studies: persistent AKP postop found in 20.9% unresurfaced vs 13.2% of resurfaced patellae (p<0.001)
- Reoperation for patellar pathology occurred in 3.7% of unresurfaced versus 1.6% resurfaced patellae (p<0.001)
- However, when analyzing only studies that excluded arthritic patellae, post op AKP was equivalent between unresurfaced vs resurfaced groups (p=0.97)
- Across all studies, routine PR showed improved utility scores for the five-year post-arthroplasty period (2.94 versus 2.87)
- In considering routine resurfacing in patients without arthritis, the utility output was 3.06 and only 0.0013 points improved over the patella retention.
- At a cost of $329 (PR) vs $90.34 (retention), the incremental cost per QALY achieved increased to $183,584

Discussion

- Decision of whether or not to resurface the patella during primary TKA remains controversial.
- The pooled data of this analysis agrees with literature that routine PR is cost effective.
- Two separate level-one studies have demonstrated no difference in the incidence of AKP or need for secondary surgery in patients without significant patellar cartilage wear.
- From our pooled results, incremental cost per QALY for PR was $3,032 - a reasonable cost. However, when considering routine PR in patients without significant patellar wear, the cost per QALY dramatically increased to $183,584 – outside of the accepted norm.
- One study investigating selective PR found only 34.4% of patients met their criteria of Outerbridge Grade IV arthritis.
- Adopting these findings here, we show that the cost avoidance in the USA if patellae are not resurfaced in 66% of TKA recipients without patellar arthritis could be $108,559,370 annually.
- Limitations: importance of accurate utility scores, variation in costs, and limited study duration to 5 years.

Conclusion

- This cost effectiveness analysis shows that it is not cost effective to routinely resurface the non-arthritic patella during primary TKA.
- We show that selective PR may provide a more effective means of maximizing benefits and minimizing the risk of complications.

References