Do orthopaedic surgeons resurface the patella?

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ABSTRACT

Background:

Total knee replacement (TKR) is one of the most common and successful surgical procedures worldwide. There is no consensus among surgeons regarding the need for patellar resurfacing during TKR. Patellar resurfacing can result in lower reoperation rates while forgoing this procedure results in a shorter operation time and elimination of complications such as avascular necrosis and patellar fracture.

Methods:

Two hundred and seventy-nine orthopaedic surgeons of 10 subspecialties from 57 countries were surveyed as to their preferences regarding patellar resurfacing during TKR. Preferences were analyzed according to country of origin, field of expertise, and seniority and were compared with published data.

Results:

The survey response rate was 95%. Surgeons were split between resurfacing the patella (45%) and not resurfacing it (55%). North American surgeons favor patellar resurfacing more often than European surgeons (94% compared with 24%, $P < 0.0001$) and surgeons from other countries (94% compared with 47%, $P = 0.01$).

Conclusions:

The present study found no consensus among orthopaedic surgeons regarding patellar resurfacing during TKR. Patellar replacement is practiced more often by North American surgeons than by surgeons in other parts of the world.

Key Words

evidence-based, knee, arthroplasty, resurfacing, patella

INTRODUCTION

Osteoarthritis (OA) of the knee leads to degeneration and loss of articular cartilage resulting in pain and relative functional deterioration. Patellar related pain can be caused by malalignment, inflammatory arthritis, osteochondritis dissecans, infection, fracture referred pain, and overuse. Nonsurgical options for OA include medication (nonsteroidal anti-inflammatory drugs [NSAIDs] or other pain relieving medication) or nonpharmacological measures (weight loss, periarticular muscle strengthening, and aerobic exercise) combined with self-management programs.[1]

When conservative management fails, several operative options are available, including arthroscopy, osteotomy, arthrodesis, and arthroplasty. Total knee replacement (TKR) is one of the most frequent operations performed worldwide and is the most common surgical solution for knee OA and rheumatoid arthritis (RA). While replacement of femoral and tibial components is routine, resurfacing of the patella remains optional and is based on surgeon preference.

Surgeons that favor patellar resurfacing claim a lower incidence of revisions and less anterior knee pain. On the other hand, studies have shown that primary resurfacing can cause patellar fracture, avascular necrosis,[2] instability,[3] and patellar tendon injury in addition to prolonging the surgical procedure.[4] Because of this, some surgeons perform selective patellar resurfacing according to the shape of the patella, bone stock, articular cartilage status, radiographic features, as well as, patient characteristics such as height and weight.[5]

In an era of evidence-based medicine, guidelines for diagnosis, treatment, and prognosis should be based on scientific findings rather than on the opinion of experts. Prospective randomized clinical trials are considered the best quality of evidence in the medical literature. Such clinical trials are the source for systematic reviews and meta-analyses, which together comprise level-1 evidence that guides clinical decision-making.[6,7] While physicians are expected to consider such evidence, other factors, such as marketing, peer pressure, preliminary data, or lower quality of evidence, as well as tradition, also influence decision-making.[6] Such factors may be more of a problem in areas where high-level evidence is not available or where evidence is inconclusive.[7] Another difficulty with the scientific approach of evidence-based medicine lies in interpreting clinical outcomes. Clinician-reported outcomes may differ considerably from patient-reported outcomes, making it all that more difficult to judge the advantages of one approach over the other.[7]

The purpose of this survey was to determine the current common practice worldwide regarding patellar resurfacing during primary knee arthroplasty. We hypothesized that experience, country of origin (dictating infrastructure of medical services and resources), and area of expertise as well as published level 1 evidence would influence surgeon preferences.

MATERIALS AND METHODS

A question regarding patellar resurfacing during knee arthroplasty was included as part of an international survey

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on orthopaedic surgeon preferences. The survey (Table 1) was distributed to orthopaedic surgeons at two major international conferences held in the United States and Europe: the annual meeting of the American Academy of Orthopaedic Surgeons (AAOS) held in San Diego, February 2011 and the annual meeting of the European Federation of National Associations of Orthopaedics and Traumatology (EFFORT) held in Copenhagen, June 2011.

Orthopaedic surgeons identified by team members and responders (acknowledged as practicing orthopaedic surgeons) were asked to fill out the questionnaire. Written instructions were provided in the survey form together with a few other questions in other fields of orthopaedic surgery. The responders also were asked to provide their country of origin, field of specialty, number of years of experience, and professional status (i.e., senior surgeon, fellow, or resident).

Statistical Analysis

A univariate analysis was performed using the Chi-square test to detect significant differences in choices between surgeons from different regions of the world (North America, Europe, or other), different subspecialties (sports and knee surgery and other), and different levels of experience (seniors, fellows, or residents).

RESULTS

A total of 292 surgeons of ten subspecialties received the survey. Sixty-two percent were senior surgeons, 23% were residents, and 15% were fellows. Fifty-seven countries (53% European, 24% North American, 8% Asian, 7% South American, 6% Middle Eastern, and 2% African) were represented. Two-hundred and seventy-nine (95%) participants responded to our questionnaire. The average level of experience was 11 years (range 1-45 years), and 35% were knee and/or adult reconstruction surgeons.

The survey revealed that during primary knee arthroplasty 45% of the surgeons routinely perform patellar resurfacing and 55% do not. North American surgeons were found to favor patellar resurfacing more often than European surgeons (94% compared with 24%, $P < 0.0001$) and surgeons from other countries (94% compared with 47%, $P = 0.01$). There were no significant differences based on subspecialty or seniority.

DISCUSSION

TKR using various techniques and implants is performed worldwide on a daily basis as a definitive functional solution for knee OA. The femoral and tibial components are always replaced, but there is still no agreement among surgeons whether the patella should be primarily resurfaced. There is no consensus among surgeons regarding the need or indications for patellar resurfacing. Although routine patellar resurfacing is supported by evidence of decreased risk of reoperation and perhaps less anterior knee pain,[8] some studies suggest that patellar resurfacing is associated with a higher risk of fracture, avascular necrosis, patellar tendon degeneration, and does not provide any advantage with respect to function.[2,4] In addition, there is no clear-cut evidence to support superiority over nonresurfacing.[9,10]

TABLE 1. International survey on patellar resurfacing in knee arthroplasty

In total knee replacement, would you routinely resurface the patella?
Yes
No

In a meta-analysis of randomized control trials (RCTs), He *et al.*[11] analyzed the results after resurfacing and nonresurfacing of the patella and showed no benefit of resurfacing in regards to knee pain and function, yet the reoperation rate for patellofemoral problems was higher in the nonresurfacing groups (4.95% in the resurfacing group, 7.40% in the nonresurfacing group).[11]

In another meta-analysis of RCTs, Fu *et al.*[12] found that the rate of reoperation was lower after TKR with patellar resurfacing; however, they could not recommend patellar resurfacing as a matter of routine since the absolute risk difference for reoperation was small. Parvizi *et al.*[13] found that one in 10 patients will require a secondary resurfacing after having primary TKR without patellar resurfacing and also that these patients are less satisfied.[13]

Calvisi *et al.*[14] in their systematic literature search could not conclude whether or not patellar resurfacing is required, yet they suggested that resurfacing can reduce the risk of postoperative anterior knee pain and patellar related reoperation and that choosing not to resurface might lead to patient dissatisfaction. Results of a large RCT were published by Breeman *et al.*,[15] and their conclusion was that on the basis of a 5-year follow-up, there is no clear benefit to resurfacing the patella during TKR, since resurfacing had no significant effect on patient functional status, total treatment cost, or patient quality of life.

Given the aforementioned data, there seems to be no indication for *routine* patellar resurfacing during TKR. While some patients may require reoperation for anterior knee pain, the overall result for the general population is similar with or without resurfacing.

It is, therefore, a challenge to try and identify patients who might benefit from patellar replacement and perform selective resurfacing. Possible indications are preoperative anterior knee pain, patient obesity, high-grade chondromalacia, or patellar malalignment. Selective patellar resurfacing appears to be the ideal solution if selection could be based on robust criteria with a sound evidence base.[16]

Bourne and Burnett[17] developed a decision algorithm for selective resurfacing. Based on their analysis of the literature, patients younger than 60 years of age with no preoperative patellofemoral symptoms, healthy-appearing patellar articular cartilage at the time of surgery, and a properly tracking patella, in whom a patella-friendly implant is used are not candidates for patellar resurfacing.[17]

The results of our survey found that surgeons are split between those who routinely do or do not resurface the patella during TKR. This result is in agreement with the literature demonstrating minimal benefit and minimal risks with that procedure and no difference in functional

outcome. However, our results also showed a preference among North American surgeons for patellar resurfacing compared with surgeons from other parts of the world. Berry and Bozic[18] published similar results for the United States; in their poll, 76% of hip and knee surgeons resurface the patella in all patients. Similar trends in Nordic countries were published by Robertson *et al*.[19] in 76% of TKR in Denmark the patella is replaced compared with 11% in Norway and 14% in Sweden.[19]

One might speculate that this difference may reflect an incentive for the surgeon; however, to the best of our knowledge there appears to be no financial benefit for North American surgeons to replace a patella (reimbursement for TKR with and without patellar resurfacing are the same).[20] The difference might be attributed to preferences of patients who might be less tolerant of the idea that reoperation might be necessary. Currently, we are unable to provide a convincing explanation for our findings. Thus, although numerous clinical trials have been conducted in efforts to establish guidelines, there is no consensus among surgeons as to the use of patellar resurfacing during TKR.

The present study demonstrates that there is no consensus among orthopaedic surgeons regarding patellar resurfacing during TKR (45% routinely perform patellar resurfacing and 55% do not). North American surgeons were found to favor patellar resurfacing in TKR more so than surgeons in other parts of the world, with no differences found in regards to seniority or subspecialty. The results of this study reflect the present state of the literature, which does not endorse or oppose the use of resurfacing.

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