

Unicompartmental Knee Arthroplasty

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Unicompartmental knee arthroplasty (UKA) is a surgical procedure that selectively replaces only the damaged compartment of the knee for the treatment of osteoarthritis. It has specific and narrow indications, and treatment success is highly dependent on the surgeon's skill and implant selection. In addition, it is technically difficult to perform, early failure rates are relatively high, and the long-term survivorship of UKA has not yet been extensively studied^{1,2)}.

The theme of this issue of the *Knee Surgery & Related Research* (KSRR) is UKA. The current issue contains three original articles on this theme. In one article, Kim et al. described the long-term clinical results of UKA in patients younger than 60 years of age. Another article by Cho et al. focused on the design of implant and surgical technique of UKA. The last article by Ryu et al. compared the clinical and radiographic outcomes of HTO and UKA in relatively young patients with unicompartmental arthritis of the knee.

The traditional indications for UKA include degenerative arthritis of the knee affecting one compartment, >60 years of age, body weight <82 kg (180 lb), low-demand for activities, range of motion $\geq 90^\circ$, flexion contracture $\leq 5^\circ$, angular deformity $< 15^\circ$, and absence of symptoms and signs of inflammatory arthritis³⁾. However, the indications have continued to expand with recent advancements in surgical techniques and implant designs. As a result, UKA is currently considered a viable option in most patients regardless of age, activity level, and weight^{4,5)}. Although the indica-

tions for UKA considerably overlap with those for HTO, UKA is generally used to treat severe osteoarthritis (grade 3 or 4), whereas HTO is recommended in the presence of an anterior cruciate ligament injury or anteroposterior instability⁶⁾. In this issue of KSRR, Ryu et al. reviewed the indications and clinical outcomes of UKA and HTO and compared the short-term clinical outcomes of the two procedures for severe arthritis with kissing lesions.

Implants for UKA can be largely categorized as mobile-bearing and fixed-bearing types. Implant selection is dependent on the surgeon's preference, indications, and surgical technique, and the optimal implant design for excellent clinical outcome has not been fully elucidated^{7,8)}. Although different surgical techniques are employed according to the implant design and surgical instrument used in UKA, the surgical principles are similar. In the past, the conventional open approach necessitated complete exposure of the knee joint for UKA. By contrast, minimally invasive techniques are most commonly used in recent UKAs, which demands proper use of instruments and training to obviate failure^{4,9)}. The most important factors that determine the success of UKA are limb alignment, ligament balance, and implant fixation¹⁰⁾. In this issue, Cho et al. recommended increasing the flexion angle of the femoral component for greater knee flexion after UKA. However, it should also be taken into consideration that recent femoral components are already designed to provide an increased flexion angle compared to previous designs.

Excellent clinical outcomes of UKA have been demonstrated in a number of publications, such as alleviation of pain, restoration of range of motion, deformity correction, and improvement in knee scores and function scores. In particular, Kozinn and Scott³⁾ reported that UKA in elderly patients (>60 years) with degenerative arthritis provided excellent clinical outcomes when performed with strict patient selection criteria, which has since been confirmed in numerous studies^{5,11)}. Excellent implant survivorship has also been demonstrated in various recent studies, which attribute it to accurate selection of indications, continu-

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ous improvement of implant designs, refinement of surgical instrument, and advances in surgical techniques^{5,11}). Still, there is no established consensus on the long-term survivorship of UKA, which greatly varies according to the implant design and surgeon's experience. In general, the longevity of UKA has been considered to be inferior to that of TKA^{1,12}). On the clinical outcomes of UKA in young patients (≤ 60 years), conflicting results have been reported in the literature. In recent studies, there is a growing tendency of showing promising outcomes of UKA comparable to those of TKA in young patients^{1,13}). In 2017, Kim et al.¹⁴) reported successful mid-term outcomes of UKA obtained in less than 60-year-old young patients. The current issue also presents a study on the long-term clinical results of UKA performed in patients younger than 60 years of age. The significance of the study is that all the cases were followed up for the minimum 10-year postoperative period. In addition, it was a single center study involving a relatively large study population.

Complications that can occur following UKA include polyethylene wear and breakage, aseptic loosening, bearing dislocation, periprosthetic fracture, progression of arthritis to the contralateral compartment, infection, ankylosis of the knee, and persistent pain²). Early failure after UKA is strongly related to the surgical technique. Most complications occur within 1 or 2 years after UKA, which is mostly attributable to inappropriate patient selection or inadequate surgical technique. Therefore, appropriate patient selection, acquisition of precise surgical skills, and experience are required for prevention of such complications¹¹). One recent article published in *KSRR* in 2016¹⁵) is worth considering. It reviewed the causes and types of complications ($n=89$) that occurred following UKA ($n=1,576$) and investigated optimal treatment methods.

UKA has demonstrated excellent efficacy in terms of clinical outcomes, patient satisfaction, and implant survivorship. Therefore, the popularity of UKA is expected to increase over time as an effective treatment method for degenerative arthritis involving one compartment of the knee. However, considering the unresolved controversies surrounding the indications of the procedure, such as patient's age, and the long-term implant survivorship, further long-term research is warranted.

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