A Comparison of Patella Retention versus Resurfacing for Moderate or Severe Patellar Articular Defects in Total Knee Arthroplasty: Minimum 5-year Follow-up Results

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Purpose: The purpose of this study is to assess the clinical and radiological results of patients who underwent patellar retention or resurfacing for moderate or severe patellar articular defects during total knee arthroplasty and evaluate the clinical efficacy of patellar resurfacing according to the articular defect of the patella.

Materials and Methods: From May 2003 to March 2006, 252 patients (277 cases) underwent total knee arthroplasty by one surgeon. Intraoperatively, we divided these patients into a moderate articular defect group (50-75%: group I) and a severe articular defect group (75-100%: group II) and randomly performed patellar resurfacing. The average age was 67.2 years. There were 234 female and 17 male patients. The average follow-up period was 74.6 months. Clinical outcomes were analyzed using the Knee Society (KS) knee score. Functional score, Hospital for Special Surgery (HSS) score, Feller patellar score and range of motion (ROM). Radiological outcomes were analyzed using the congruence angle, Insall-Salvati ratio and patella tilt angle.

Results: The KS knee score and functional score at the last follow-up were 84.4/73.1 in the retention group and 85.2/71.8 in the resurfacing group (p=0.80, p=0.63) in group I. In group II, the values were 82.1/75.1 and 87.0/71.2, respectively (p=0.51, p=0.26). The HSS score and Feller patella score were 86.7/20.3 in the retention group and 84.3/21.7 in the resurfacing group (p=0.31, p=0.29) in group I. In group II, the values were 91.6/21.2 and 85.5/22.1, respectively (p=0.37/p=0.30). The knee ROM (p=0.36/p=0.41), congruence angle (p=0.22/p=0.16), Insall-Salvati ratio (p=0.16/p=0.21) and patella tilt angle (p=0.12/p=0.19) were not statistically different between the two groups.

Conclusions: In this study, we could not find any correlations between the degree of patellar articular defect and patellar resurfacing in terms of the clinical and radiological results. Therefore, patellar articular defects is thought to be less meaningful in determining patellar resurfacing.

Key words: Knee, Total knee arthroplasty, Patellar articular defect, Patellar resurfacing.
patellar resurfacing is necessary. Among them, patellar cartilage condition has been considered as a major determinant of patellar resurfacing, and it has become a practice to resurface the patella based on the intraoperative assessment of a patellar cartilage defect\(^{10}\). Although there have been some studies that suggest the opposite, most of those studies did not address clinical outcomes.

We conducted a retrospective study to investigate the correlation between the efficacy of patellar resurfacing in total knee arthroplasty and the patellar cartilage condition in patients with moderate or severe patellar cartilage defects. The patients were divided into two groups, the patellar resurfacing group and the retention group, and clinical and radiological outcomes of patellar resurfacing were assessed.

Materials and Methods

Of the patients who had undergone total knee arthroplasty for osteoarthritis by the same surgeon at our institution between May 2003 and March 2006, 252 patients (277 cases) with intraoperative findings of moderate or severe patellar cartilage defects that involve ≥50% of the patellar articular surface (Outerbridge grade III-IV) were enrolled in the study (Fig. 1). The patients were divided into two groups, the retention group and the resurfacing group, for comparison. In 25 patients with a bilateral total knee arthroplasty, the patella was resurfaced in one knee and retained in the other. To calculate the cartilage loss in percentage, the size of a defect measured directly during surgery and the image captured with a digital camera positioned perpendicular to the articular surface were processed by computer program. There were 109 knees in the retention group and 168 knees in the resurfacing group. The knees with 50-75% cartilage loss were classified into group 1 and those with ≥75% cartilage loss into group II. Patients were randomized to treatment with or without patellar resurfacing. In group 1, the patella was retained in 96 knees and resurfaced in 145 knees. In group 2, the patella was retained in 13 knees and resurfaced in 23 knees. The mean age at the time of surgery was 67.2 years (range, 42 to 82 years). There were 235 females and 17 males. The mean follow-up period was 74.6 months (range, 60 to 93 months).

The exclusion criteria included a valgus or varus angle of ≥15° on the low extremity orthoscanogram, a congruence angle of >16°, a patella tilt angle of >5°, an abnormal Insall-Salvati ratio, a lateral retinacular release during total knee arthroplasty, patellar dislocation, and systemic arthritis including rheumatoid arthritis.

The arthroplasty was performed via a medial parapatellar approach using the E-motion posterior cruciate ligament retaining (B.Braun, Tuttingen, Germany) prosthesis in all patients. The femoral and tibial components were cemented in all knees. The horizontal and vertical lengths of the patellar cartilage and of the defect were measured (Fig. 1). Based on the measurements, the patients were divided into those with 50-75% cartilage loss and those with ≥75% loss. In the resurfacing group, a symmetrical dome-shaped cemented all-polyethylene patellar component was used. In the retention group, osteophytes around the patella were removed but cartilage debridement, abrasion arthroplasty, and multiple perforations were not performed.

Clinical evaluation was performed using the Knee Society knee (KS knee) score, functional score, Hospital for Special Surgery (HSS) score, Feller patellar score, and range of joint motion preoperatively and postoperatively. The range of joint motion was measured by an independent investigator who was unaware of the study using a goniometer: the active range of joint motion

Fig. 1. These photos show how to measure patellar articular defect in total knee arthroplasty. (A) This photo shows how to measure the horizontal length of the cartilage defect of the patella. (B) This photo shows how to measure the vertical length of the cartilage defect of the patella.