

Mid-Term Clinical Results of VerSys Hip System (Zimmer) Uncemented Total Hip Replacement Arthroplasty

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Recent reports suggest that uncemented total hip replacement arthroplasty (THR) results in favorable short- to mid-term clinical results. In the present study, we assessed the mid-term clinical results of VerSys Hip System uncemented THR at our hospital.

Materials and Methods: We studied patients who received THR using VerSys Hip System and who could be followed-up more than 3 years. Clinical records were used to retrospectively identify patient characteristics, which included age, gender, disease requiring THR, preoperative and postoperative pain score of the Japan Orthopaedic Association scoring system, range of motion in flexion and abduction, operating time, intraoperative complication, and additional operation or revision surgery. Additionally, we investigated the loosening and alignment of implants from X-ray films.

Results: Ninety-one patients and 108 hip joints were investigated. Subjects were 11 males and 97 females (mean age, 64.6 years). Mean follow-up period was 6.9 years. Reasons for requiring THR were as follows: secondary osteoarthritis, 87 joints; idiopathic osteonecrosis of the femoral head, 16 joints; rapidly destructive coxarthrosis, 4 joints; and idiopathic ossification of the labrum, 1 joint. Mean operating time was 166 minutes. A total of 11 intraoperative fractures occurred, and wiring was performed in 3 of those cases. Adverse events pertaining to the surgery were limited; however, another adverse event was that 1 case resulted in intraoperative perforation of femoral cortex, for which a revision surgery was performed. There was no dislocation. Pain score using the Japan Orthopaedic Association scoring system and range of motion tests showed statistically significant improvement following THR. At the final follow-up, although no loosening of femoral implants was observed, the loosening of acetabular component was seen in 1 case. Varus insertion of femoral implant was recognized in 40 joints. Moreover, the average inclination angle of acetabular implants was 52.2 degrees.

Conclusion: These data suggest that patients receiving VerSys Hip System uncemented THR demonstrate favorable results pertaining pain score and range of motion. However, high rate of intraoperative fracture and malalignment of implants, which may be at a risk of dislocation and/or polyethylene wear in future, suggests that this implant technique requires improvement.

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Key words: uncemented THR, mid-term clinical result, complication

Introduction

It is reported that the clinical results of 10-year survival of uncemented total hip replacement arthroplasty (THR) are comparable with those of cemented THR, which has a history of more than 50 years and has been reported to have excellent long-term results¹. However, the clinical

results of VerSys and Trilogy (VerSys Hip System, Zimmer, Warsaw, Indiana, USA) have never been reported. In the present study, we report the mid-term clinical results for VerSys Hip System uncemented THR at our hospital.

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Table 1 Demographic and Clinical Characteristics of Subjects

Number of cases	108 joints males, 11; female, 97
Mean age at operation (years)	64.6 (range, 34–83)
Mean follow-up period (years)	6.9 (range, 3–10)
Mean operation time	166 min
Reasons for requiring THR	secondary osteoarthritis (85 joints) idiopathic osteonecrosis of the femoral head (16 joints) rapidly destructive coxarthrosis (4 joints) idiopathic ossification of the labrum (1 joint)

Materials and Methods

We studied patients who received THR using VerSys Hip System at our hospital and who could be followed-up for more than 3 years. Clinical records were used to retrospectively identify patient characteristics, which included age, gender, disease requiring THR, pre- and postoperative points of pain using the Japan Orthopaedic Association (JOA) score, range of motion (ROM) in flexion and abduction, operating time, intraoperative complication, and additional operation or revision surgery. Additionally, we investigated the loosening and alignment of implants from X-ray films.

The implants used in these patients were VerSys HA/TCP Fiber Metal Taper for the femur and Trilogy Acetabular Cup Multihole (Zimmer Corporation). In all cases, Longevity Crosslinked Polyethylene Liner with a 20 degree elevated rim was used, except for two cases which used 10 degree elevated rim. Surgeons used an inner head of 26 mm in diameter for all cases. Surgery was performed through posterolateral approach in all cases.

For statistical analysis, the paired *t*-test was applied.

Results

Ninety-one patients and 108 hip joints were studied. Subjects were 11 males and 97 females (mean age, 64.6 years; range, 34–83). Mean follow-up period was 6.9 years and follow-up rate was 75%. Mean operation time was 166 minutes. Reasons for requiring THR were as follows: secondary osteoarthritis (87 joints), idiopathic osteonecrosis of the femoral head (16 joints), rapidly destructive coxarthrosis (4 joints), and idiopathic ossification of the labrum (1 joint) (Table 1). Intraoperative complications included fracture in 11 joints (10.2%), and wiring was performed in 3 of those cases during the operation. In 1 case among the 8 cases without wiring, the subsidence of the femoral component of approximately 1 cm was observed. Moreover, in another case, the perforation of femoral cor-

tex occurred intraoperatively, requiring revision surgery using long stem; although, we did not find any other revision cases. We found that morselized bone grafts were performed in 66 joints because of acetabular defects. We did not observe any cases of dislocation.

The pain score of the JOA scoring system was significantly improved from 16.2 points preoperatively to 38.3 points postoperatively ($p < 0.001$). For ROM tests, flexion improved from 59.6 degrees to 86.9 degrees postoperatively ($p < 0.001$), and abduction significantly improved from 11.8 degrees preoperatively to 23.6 degrees postoperatively ($p < 0.001$) (Fig. 1).

Regarding the alignment of femoral component, we observed a varus insertion of more than 2 degrees in 40 joints (37.0%). The postoperative subsidence of the femoral component was seen in 2 cases, of which 1 case was other than that formerly mentioned.

At 3 to 10 years follow-up, we did not observe loosening of femoral implants. Inclination of acetabular component was 52.2 degrees on average (range, 41–75.5 degrees). Although, in 1 case whose inclination was 68 degrees at 4.7 years follow-up, we found that significant wear of the polyethylene liner occurred, and finally, the loosening of the acetabular component occurred. We recommended him revision operation and have been observing his course carefully, because he refused reoperation (Table 2).

Discussion

This retrospective longitudinal assessment of the safety and efficacy of THR suggests this technique results in favorable patient outcomes. We experienced no cases of postoperative dislocation, though 1 case required revision surgery. Furthermore, we experienced no femoral implant loosening but 1 case of acetabular implant loosening. However, despite these positive findings, we recognized two potential issues with this uncemented THR tech-

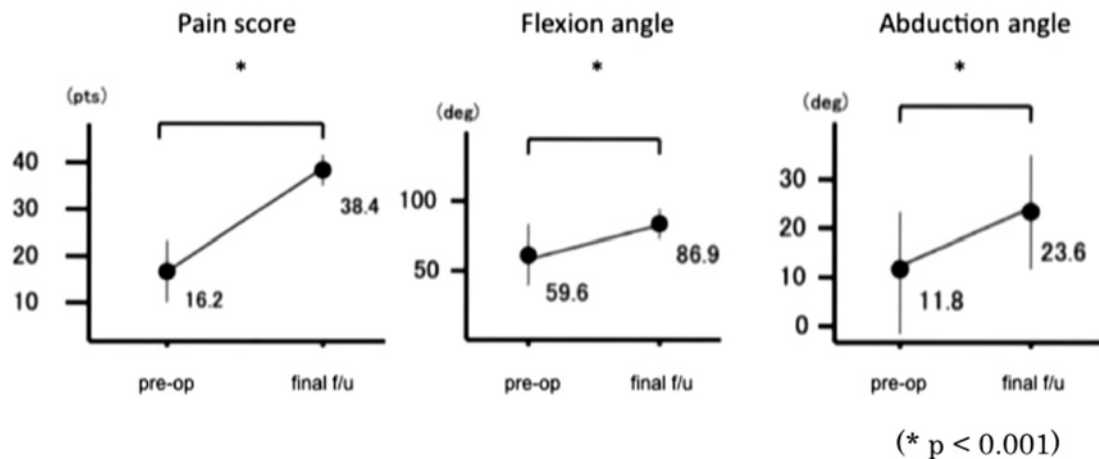


Fig. 1 Pain score of the Japan Orthopaedic Association scoring system and range of motion of flexion and abduction significantly improved following surgery (p<0.001).

Table 2 Clinical Results

Number of varus insertion of femoral implant	40 joints
Mean lateral inclination of acetabular shell	52.5 (41–75.5) degrees
Number of intraoperative fracture	11 joints*
Loosening	
femoral implant	none
acetabular implant	1 joint
Dislocation	none

*wiring: 3 joints, subsidence (>1 cm): 1 joint

nique. First, because the average inclination of the acetabular implant was relatively high (52.2 degrees) and surgeons used a posterolateral approach, a future possibility of dislocation cannot be denied. According to the previous study, Lewinnek et al reported that the safety range for lateral inclination for dislocation is 40 ± 10 degrees². Thinking of the differences of the acetabular inclination angles between his cases and ours, it remains unclear why no patients demonstrated postoperative dislocations in the present study. It might be related to the restricted range of motion up to 86.9 degrees in flexion on average. We had restricted range of motion in flexion to 90 degrees in postoperative rehabilitation. Thus, while patients experienced no dislocations, patients receiving THR may demonstrate limitations in ADL. Moreover, Patil et al reported that lateral inclination exceeding 45 degrees showed much more polyethylene wear than in cases with lateral inclination less than 45 degrees³; thus, patients in our series may also have some risk for polyethylene wear or breakage.

The second major issue concerning this technique is that varus insertion of the femoral component of more

than two degrees occurred in 37.0% of cases we studied. Although, at 4 years follow-up, it has been reported that varus insertion of the femoral component in uncemented THR results in no adverse effects⁴, however, this technique may still possibly lead to poor long-term results.

Last, we found that intraoperative femoral fracture occurred in 10.2% of our cases including a case of penetrating the femoral cortex. These troubles may have been caused by either poor technique or implant design. As such, poor technique or implant design may be a potential cause for problems when considering the high rate of varus insertion of femoral implants we observed in the present analysis, suggesting that the direction of reaming or broaching may not have been adequate. Thus, we suggest that the uncemented THR technique needs further refinement to reduce adverse events in patients receiving this treatment.

Conclusion

We suggest that the uncemented THR using VerSys Hip System results in favorable mid-term outcomes in patients. However, surgeons should consider potential is-

sues with this surgery primarily relating to implant alignment. Therefore, long-term observation of patients is required following this surgery.

Conflict of Interest: The authors declare no conflict of interest.

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