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Original Article

Cementless total hip arthroplasty in patients aged ≥80 years

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ABSTRACT

Background/purpose: We evaluate the clinical and radiological results of cementless total hip arthroplasties (THAs) in patients aged ≥80 years.
Methods: We compared the clinical and radiological results of 30 cementless THAs done in patients aged ≥80 years (older group) and aged 60–69 years (control group).
Results: The Harris Hip score significantly decreased in the older group 1 year after the operation and at the final follow-up observation ($p = 0.001$), but no joints required revision surgery due to poor initial fixation or early loosening.
Conclusion: Cementless THA in the elderly is safe and durable at the time of the follow-up.

1. Purpose

The average Japanese life expectancy is 80.21 years in males and 86.61 years in females,[1] and Japan is one of the countries where people enjoy longevity. Many orthopedic disorders including degenerative disorders often cause functional impairment and disturb daily life. Osteoarthritis of the hip is a representative disorder affecting activities of daily living (ADL). With an increase in the average life expectancy, opportunities to perform total hip arthroplasty (THA) in aged patients have been increasing.[2] THA has been reported to improve pain and functional impairment, allowing the reacquisition of ADL.[3–8] However, since aged patients often have a past medical history before the operation and a high risk of postoperative complications, such as dislocation and pneumonia, perioperative management is important.[9–11] In aged patients undergoing THA, initial implant fixation is a problem due to the possible bone fragility caused by bone quality deterioration. There has been a study that compared the outcomes of cemented THA between aged (≥80 years) and younger groups,[12] but no study that compared the outcomes of cementless THA. We retrospectively evaluated the clinical and radiological results of cementless THA between patients aged ≥80 years and those aged 60–69 years.

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2. Patients and methods

Between 2001 and 2012, we performed cementless THA in 27 patients (32 joints) aged ≥80 years, of whom 25 (30 joints) who could be followed up for ≥1 year were included as the subjects in the older group. All of them were female, and the primary disorder was osteoarthritis of the hip in 24 joints, post-traumatic femoral head necrosis in 5, and rapidly destructive coxopathy in 1. In bilateral cases, THA was performed staged. As a control group, 27 females aged 60–69 years who underwent THA for osteoarthritis of the hip during the same period were included. The study had ethical approval and all patients gave informed consent. Autologous blood was donated and stored whenever possible, and surgery was performed using the posterior approach in all patients. Full weight bearing was allowed 2–3 weeks after the operation. A Converge cup and Natural Hip stem (Zimmer, Warsaw, Indiana, USA) were used in 6 joints and a Reflection cup and Synergy Select stem (Smith & Nephew, London, UK) in 24 joints in each group. The clinical results, the Harris Hip score,[13] hospitalization period, complications, final walking ability, and mortality rate were evaluated. Radiographic assessment was performed by two orthopedic surgeons using Noble's classification[14] for the preoperative medullary cavity shape of the femur, DeLee & Charnley's classification[15] for radiolucent lines on the acetabular side, and Gruen's classification[16] for those on the femoral side.

2.1. *Statistical analysis*

Statistical analysis of differences between the two groups was performed using GraphPad Prism 5 version 5.0. Chi-square test was used for qualitative variables, and Student's *t*-test was used for quantitative variables. Levels of significance reaching 95% or more were accepted.

3. Results

The mean age at the time of the operation was 83.1 years (80–89 years) in the older group and 64.1 years (60–69 years) in the control group. The mean follow-up period was 67 months (16–121 months) in the older group and 66 months (18–126 months) in the control group ($p = 0.924$). The number of patients with a past history of disease was 16 (53.3%) in the old group and 6 (20%) in the control, being significantly higher in the former. The past diseases are shown in Table 1. The number of patients requiring allogeneic blood transfusion was 6 in the older group and 0 in the control group, being significantly higher in the former ($p = 0.0098$).

Table 1 – Preoperative complications.

	Older group	Control group
Hypertension	11	6
Arrhythmia	2	1
Respiratory disease	6	1
Angina pectoris	2	0
Diabetes mellitus	3	0
Thrombosis	2	
Renal failure	1	
Malignant tumor	2	

Table 2 – Changes in the Harris Hip score.

	Older group (SD)	Control group (SD)	*p*-Value
Preop	41.32 (6.36)	42.56 (4.77)	0.123
Postop 1 year	80.10 (6.08)	90.29 (4.80)	0.001
Final follow-up	73.72 (11.88)	89.32 (4.37)	0.001

Table 3 – Postoperative complications.

	Older group	Control group	*p*-Value
Confusion	3 (10%)	1 (3.3%)	0.300
Pneumonia	3 (10%)	1 (3.3%)	0.300
Urinary tract infection	2 (6.7%)	1 (3.3%)	0.359
Dislocation	2 (6.7%)	1 (3.3%)	0.359

The Harris Hip score after the operation improved compared with the preoperative score in both groups, but significantly decreased in the older group 1 year after the operation and at the final follow-up observation (Table 2). Mean improvement of the pain component of Harris Hip score was 19.6 (SD 6.76) in the older group and 21.9 (SD 4.09) in control group ($p = 0.143$). The mean hospitalization period was 50.8 days (22–76 days) in the older group and 44.8 days (24–75 days) in the control group, without a difference between the two groups ($p = 0.141$). As postoperative complications, neither local infection nor thrombosis developed, while confusion, pneumonia, urinary tract infection, and dislocation occurred, and their incidences did not significantly differ between the two groups (Table 3). None of the patients with dislocation as a postoperative complication developed redislocation requiring revision surgery. At the time of the final follow-up observation, 6 patients (20%) in the older group required walking assistance, but all patients in the control group could walk unassisted; the walking ability was significantly lower in the older group ($p = 0.024$). Two patients (6.67%) in the older group died, while none in the control group died ($p = 0.492$).

As a result of radiographic assessment, the preoperative medullary cavity shape of the femur according to Noble's classification was the stovepipe canal in 7 joints (23.3%) in the older group and 1 (3.3%) in the control group ($p = 0.022$). After the operation, no joint showed radiolucent lines on the acetabular side. On the femoral side, radiolucent lines in Gruen's Zone 2 or 6 were observed in 4 patients in the older group and in 2 in the control group. No sinking occurred in any joint. No joints required revision surgery due to poor initial fixation or early loosening.

4. Discussion

A problem of THA in aged patients is the possibility of a decrease in initial fixation due to bone fragility caused by bone quality deterioration. Aged patients often have a past history of disease before undergoing surgery and a high risk of developing postoperative complications. Therefore, perioperative management is important.