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ORIGINAL ARTICLE

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Total hip replacement in patients with Parkinson's disease

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Abstract From 1970 to 1994, 107 total hip arthroplasties (THAs) were performed in 98 patients with Parkinson's disease. The average age of the patients was 72 years. Preoperative diagnoses were osteoarthrosis in 58 hips, failed endoprosthesis in 19, aseptic loosening in ten, femoral neck fracture in 18, and other diagnoses in two. Milder neurological stages I–III were assigned to 96 patients, and tendon release for contracture was performed in eight patients. Of the 38 complications eight were urinary tract infections and six dislocations. Of these 15 occurred in the 58 primary THAs and 23 in the 49 nonprimary THAs. In patients with primary THAs there were no dislocations; however, one of the four postoperative deaths occurred following primary THA. We followed 75 hips for 7 (2–21) years; 51 patients had died by the time of the study. Neurological status deteriorated over time with 57% of patients progressing to functional stages IV or V, although consistent improvement was noted for pain relief. Function was directly related to the stage of the neurological disease.

Résumé De 1970 à 1994, 107 arthroplasties totales de la hanche (THA) ont été exécutées chez 98 patients atteints de la maladie de Parkinson. L'âge moyen des patients était 72 ans. Le diagnostic préopératoires étaient une coxarthrose pour 58 hanches, un échec de prothèse pour 29, une fracture du col fémoral pour 18, et une autres cause pour 2. 96 patients avaient un état neurologique correspondant à un stade I à III. Des ténotomies pour contractures ont été faite chez huit patients. Il y avait 38 complications parmi lesquelles huit infections urinaires et six luxations. 15 des complications se sont produites dans les 58 arthroplasties primaires et 23 dans les 49 non-primaires. Dans le groupe des arthroplasties primaires il y avait un des quatre morts postopératoires mais aucune luxation. 75 hanches ont été suivies pendant 7 (2–21) années. 51 patients étaient décédés au moment de l'étude. L'état neurologique s'est altéré avec le temps avec 57% des patients atteignant les stades IV ou V. Une amélioration constante a été notée dans le soulagement de la douleur. La fonction était en rapport direct avec le stade de la maladie neurologique.

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Introduction

Among the general population in the United States older than 60 years the prevalence of Parkinson's disease is 1% [1]. The annual incidence rate is 20.5/100,000 and concomitant dementia is three times more frequent than in a control group [10]. Modern medical treatment effectively relieves tremor, rigidity, and akinesia; however, impairment of the righting reflexes in the more advanced stages is aggravated by the postural hypotension that is a side effect of levodopa. High rates of complication, unsatisfactory results, and death are reported in the orthopedic management of patients with Parkinson's disease, particularly in hip fractures [3, 4, 11, 12, 13, 14] and total shoulder replacement [8]. In total knee arthroplasty reports of uniformly good results [15] contrast with other reports of uniformly poor results 9]. The present study is based on a previous small series from the same institution [5] and is the first to evaluate the risks and benefits of total hip arthroplasty in a larger population of patients with Parkinson's disease.

Table 1 Classification of severity of Parkinson's disease according to Hoehn and Yahr [6] in 98 patients undergoing 107 THAs

Stage	Characteristics	Entire group	Primary group[a]
I	Unilateral involvement Minimal or no functional impairment	14	11
II	Bilateral or midline Balance not affected	52	40
III	Early loss of equilibrium Mild to moderate disability	38	6
IV	Severe disability Barely able to stand or walk	2	0
V	Confined to bed or wheelchair	0	0
Unknown		1	1

[a] Subgroup of 52 patients with 58 primary THAs for osteoarthrosis

Table 2 Complications

Complication	Entire series (n=107; 98 patients)	Primary group (n=58; 52 patients)
Dislocation	6	0
Trochanteric nonunion	4	2
Deep venous thrombosis	3	2
Pulmonary embolism	2	2
Deep wound infection	1	0
Hematoma	1	1
Urinary tract infection	8	5
Pneumonia	3	0
Transient peroneal nerve palsy	2	1
Cerebrovascular accident	2	0
Postoperative confusion	4	1
Ileus	1	0
Gastrointestinal hemorrhage	1	1
TOTAL	38 (36%)	15 (26%)

Six patients (three in the primary group) had two complications each

Patients and methods

Between 1970 and 1994, 107 total hip arthroplasties (THAs) were performed in 98 patients who had primary Parkinson's disease. Of those 98 patients, 52 underwent 58 elective primary THA for osteoarthrosis; they comprise the "primary group." To be included, a patient must have been evaluated by a neurologist at this institution preoperatively or immediately postoperatively, stating that primary Parkinson's disease had been evident at or before the arthroplasty. The disability caused by the disease was classified (Table 1) according to Hoehn and Yahr [6]. The study included 49 men and 49 women, and the mean age at arthroplasty was 72 (57–87) years. Preoperative diagnosis was osteoarthrosis in 58 hips, failed endoprosthesis in 19, aseptic loosening in ten, acute femoral neck fracture in seven, femoral neck nonunion in five, avascular necrosis following femoral neck fracture in four, failed implant for femoral neck fracture in two, failed cup arthroplasty in one, and failed resection arthroplasty in one. Previous surgery had been performed on 49 hips. In 38 patients there was a history of falls and 71 patients were taking anti-Parkinson medication. The severity of pain and limp, the use of walking aids, and walking distance were recorded preoperatively, again at 1 year postoperatively, and at the time of the latest follow-up. These data were compared and the differences tested for statistical significance.

Surgical approaches were anterolateral in 56 hips, transtrochanteric in 36, posterolateral in 12, and direct lateral in three. An adductor tenotomy was performed in seven hips, and a psoas tenotomy in one. Sixteen types of acetabular and 17 types of femoral component designs were used. Ninety-four acetabular and 103 femoral components were fixed with cement. Perioperative antibiotics were used in 99 arthroplasties.

Rates for survival free of reoperation and free of dislocation were estimated using the Kaplan-Meier method [7], and 95% confidence intervals were determined. Changes from the preoperative clinical status (pain, limp, use of walking aids, and walking distance) to the examination at 1 year postoperatively and the latest clinical follow-up were tested using the signed rank test on the differences.

Results

Complications are listed in Table 2. One of two pulmonary emboli was fatal and one deep wound infection required removal of the components. Six dislocations occurred within the first 3 months postoperatively, all in the nonprimary group. Approaches used in those with dislocations were anterolateral in four, transtrochanteric in one, and direct lateral in one. One patient developed late instability after a cerebrovascular accident. Treatment was closed reduction in all and acetabular component reorientation in one. One patient was placed in a spica cast and one received a hip guide brace.

Four patients died postoperatively – two of pneumonia, one of a cerebrovascular accident, and one of a massive pulmonary embolism. At 6 months postoperatively six patients had died and at the latest evaluation 51 patients had died.

Eight patients had nine reoperations: one for deep wound infection (with subsequent multiple débridement counted as one additional event), and the others for either periprosthetic fracture, trochanteric nonunion, trochanteric wire removal, late instability, aseptic loosening of the femoral component, of the acetabular component, and of the femoral and the acetabular component. The latter six reoperations were performed after primary arthroplasty. Survival rates free of reoperation at 5 years were 93% (95% confidence interval 87–99%) for the entire series and 93% (95% confidence interval 86–100%) for the primary group.

For 75 hips a minimum of 2 years of follow-up data was available; the latest follow-up was at a mean of 7.1 (2–21) years In the primary group, consisting of 44 hips the mean follow-up was 7 (2–15) years. The improvement for "limp," "use of walking aids," and "walking distance" from preoperatively to 1 year postoperatively was statistically significant (P <0.01) for both groups, except for "walking aids" in the primary group. Function deteriorated over time, as seen in a significant (P <0.01) increase in limp, increased use of walking support, and decreased walking distance in both groups from 1 year postoperatively to the latest follow-up. In parallel with this, disability related to Parkinson's disease increased. In 78% of the patients definite neurological progression was noted. At the time of latest follow-up 57% of the patients had progressed to functional stage IV or V.

Good to excellent pain relief was achieved in 93% of the patients. The improvement in pain rating between

preoperatively, at 1 year, and at latest follow-up, was significant ($P < 0.001$). There was no difference ($P > 0.1$) between the 1 year and latest follow-up. Of the 67 patients (75 hips) with a minimum of 2 years of clinical follow-up, 62 patients had no or only slight pain.

A minimal radiographic follow-up of 2 years could be obtained for only 43 patients, with a mean of 5.2 (2–15) years. More than half of the patients were severely debilitated at the time of latest follow-up, and many of them (or their families) elected not to have radiographs taken because of the lack of symptoms. Excluding the revised components no additional radiographically loose components were seen. Heterotopic ossification was rare and never a limiting factor.

Discussion

From 1970 to 1994, 107 THAs were performed in patients with Parkinson's disease, accounting for 0.4% of the approximately 28,000 THAs (primary and revision) performed during the same period at this institution.

No reports have specifically addressed the outcome of total hip arthroplasty in patients with Parkinson's disease. Extrapolations have been made [5] from various reports on arthroplasty for femoral neck fractures. Dislocation rates from 2–37% have been reported [3, 4, 11, 13, 16]. Our series demonstrated no dislocation in the group of primary total hip arthroplasty for osteoarthrosis and 12% in the nonprimary group. Five of the six dislocations occurred in patients who had had previous hip surgery. The type of approach used did not appear to influence this rate. Our dislocation rate compares favorably with the results of Amstutz et al. [2], who reported a 10.6% rate of dislocation in revision hip surgery.

Adduction contracture is a common finding in patients with Parkinson's disease. Adductor tenotomies were thought to be necessary to prevent instability in seven patients; a psoas tenotomy for severe flexion contracture was performed in one patient. Staeheli et al. [14] reported adductor releases in 10% of their patients. Careful intraoperative testing identifies the patients at risk for instability.

The high complication rate of 36% was unevenly distributed between the primary group (26%) and the group with all other indications (47%), reflecting the more advanced disability of these patients and their previous operations. Of the 38 complications 12 were of an infectious nature. This is well known in orthopedic patients with Parkinson's disease. Staeheli et al. [13] reported a 20% rate of urinary tract infections and a 10% rate of pulmonary infections.

Mortality rates at 6 months postoperatively of 20–47% have been reported for patients with Parkinson's disease who undergo prosthetic replacement for femoral neck fractures [3, 4, 13]. Although the 5.6% mortality rate in the present series compares favorably with the latter, it certainly is higher than in the general population undergoing total hip arthroplasty.

Progression of Parkinson's disease is the rule, with severe disability or death occurring within 5 years after disease onset in about 25% of the patients. After 10–14 years more than 80% are severely disabled or dead [6]. Our patients reflect well this dismal prognosis. More than half had progression to stages of severe impairment at the latest follow-up, and 51 had died. Their functional status improved in the early follow-up and declined with the inevitable progression of the neurological disease. They were functioning as well as could be expected, rather than losing ambulatory capacity prematurely from hip arthrosis. This represents a positive functional outcome from hip arthroplasty.

In conclusion, patients with Parkinson's disease who undergo THA must be monitored carefully postoperatively, especially for infectious complications, which were common in the present series. No dislocations occurred in the group of primary THAs. Contractures required tendon releases in 7.5% of the patients. Outcome with regard to pain relief was excellent but poor with regard to function because of the inevitable progression of the neurological disease.

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