

# Patient characteristics in dislocations after primary total hip arthroplasty

## 60 patients compared with a control group

Urban Hedlundh and Hans Fredin

To determine patient-related risk factors for dislocation after a primary Charnley hip arthroplasty, we compared 60 patients with at least one dislocation to a randomly selected group of 118 patients with no dislocation. Apart from an increased mortality rate among the patients with a dislocated prosthesis, we

could not relate dislocations to any somatic and psychiatric disorder or to the use of any particular group of pharmaceuticals. However, suspicion of alcohol abuse was commoner among men in the dislocated group.

Department of Orthopedics, Malmö University Hospital, S-205 02 Malmö, Sweden. Tel +46 40-331000. Fax -336200  
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The reported incidence of dislocation after total hip arthroplasty varies (Carlsson and Gentz 1977, Khan et al. 1981, McCollum and Gray 1990, Morrey 1992) which may be partly due to different registration methods (Hedlundh et al. 1992) but may also be influenced by surgical experience (Etienne et al. 1978, Fackler and Poss 1980, Dorr et al. 1983, Hedlundh et al. 1994). However, only highly misplaced components seem to affect the dislocation rate (Carlsson and Gentz 1977, Lewinnek et al. 1978, Fackler and Poss 1980, Lindberg et al. 1982, Pierchen et al. 1994). The role of patient characteristics has not been thoroughly investigated. We compared characteristics of patients who had sustained at least one dislocation following total hip arthroplasty with a control group.

For comparison, 120 patients were randomly selected from a chronological computer registration list of our primary Charnley prosthesis. We chose the closest patient on the list with the same sex, similar age (within 10 years) and the same hip disease operated on within 1 year, both prior to and after the patient who had suffered a dislocation (Table 1). Patients with neoplasm of the hip and dysplasia after congenital hip dislocation were excluded as well as patients previously treated with an arthrodesis, a Girdlestone or a bi-polar hip procedure. 2 patients of 120 in the control group had to be excluded later. One of them had incomplete files and the second later sustained a dislocation of his contralateral hip after a revision due to aseptic loosening.

## Patients and methods

All hip replacements have been separately registered in our department since the start in 1968. Between 1979 and 1991, there were 2,733 primary total hip arthroplasties. 1,838 of these were a Charnley prosthesis inserted through a transtrochanteric approach.

Inspection of the original operating files from 1 January 1979 until 31 December 1993 was made in co-ordination with examination of official hospital records of in-patient diagnoses and operations and of the Swedish National Register (Ahnfelt 1990). One or more dislocations were found in 60 patients operated according to our standard procedure.

Table 1. Patient data

	Dislocated THA	Non-dislocated THA	All THA
Number	60	118	1838
Median age (range)	71 (43–89)	71 (52–85)	70 (22–94)
Gender (%)			
men	33	32	30
women	67	68	70
Operated side (%)			
left	50	50	45
right	50	50	55
Diagnosis (%)			
arthrosis	42	43	58
rheumatoid arthritis	28	25	15
hip fracture, not healed	30	30	23
others	0	2	4

Table 2. Mortality in dislocated and non-dislocated Charnley prostheses 1979-1991

	Dislocated THA	Non-dislocated THA	P-value
No. of patients	60	118	
No. of deaths (fraction)	32 (0.5)	29 (0.25)	0.001
Median age at death (range)	77 (56-90)	77 (59-91)	1
Time interval between operation and death (yr)	4.4	4.1	0.7
Mortality in certain subgroups			
men	12/20	11/38	0.02
women	20/40	18/80	0.002
arthrosis	10/25	10/51	0.06
rheumatoid arthritis	12/17	9/30	0.008
hip fracture, not healed	10/18	9/35	0.03

All patient files in the Orthopedic Department were scrutinized for patient data, orthopedic, medical and mental disorders, pharmaceuticals (anti-hypertensive and heart medicines, insulin and oral hypoglycemic drugs, hypnotics and sedatives, neuroleptics, oral adrenocortical steroids) and suspected drug abuse. No files were missing and they were reasonably detailed, although the significance and course of non-orthopedic disorders was incomplete. From the Department of Internal Medicine and the central patient data register at our hospital, we obtained the duration of the hospitalization in this department and the diagnoses between 1979 and 1991. No other hospital in the city of Malmö offered immediate medical hospital care during that period. However, infectious diseases, lung diseases and psychiatric conditions were treated elsewhere.

We looked for hip-operated patients in the files of the special unit of Alcoholic Disease in our hospital. Gamma GT blood samples were also routinely taken preoperatively on THA patients until 1989 and were recorded in 83 percent of the patients. Levels above 0.7  $\mu\text{kat/L}$  were considered pathologic at the time of our study, although high values were overrepresented in rheumatoid patients without any alcoholic intake. Alcoholism was assessed by data from the unit of Alcoholic Disease, preoperative gamma GT blood levels in patients without rheumatoid arthritis and repeated notes in orthopedic patient files about drunkenness on any admission to the Orthopedic Department.

### Statistics

Comparisons of any two groups with less than 40 subjects in each were analyzed by Fischer's exact test and larger groups by the chi-square test and d.f. 1. Chi-square calculations on tables with a total of under 100 or on any cell containing a value less than 10 were corrected according to Yates.

To determine the importance of all variables, each one was first tested against the dependent variable dislocation. Qualitative variables were analyzed by the chi-square test, normally distributed variables by the *t*-test and quantitative variables with a skewed distribution such as operating time, in-patient care and gamma-GT by the Mann-Whitney U-test. All variables with  $p < 0.25$  were then analyzed in a step-wise logistic regression discriminating on dislocation with a 95 percent confidence interval.

### Results

The number of deaths among the patients with dislocated THAs before December 31, 1993 was 32/60 (0.5) compared to 29/118 (0.25) in the control group ( $p < 0.001$ ). The median age at time of death was 77 years in both groups and the times elapsed between hip operation and death were 4.4 and 4.1 years, respectively. No particular hip-diagnosis was associated with a higher mortality rate (Table 2). The death risk was the same in patients with single dislocations (9/18) and patients with recurrent dislocations (23/42).

Gender, length, weight, obesity, previous contralateral hip surgery and previous arthrotomy of the ipsilateral knee had no influence on the dislocation rate. The operating time was 120 min in hips that did not dislocate and 125 min in dislocated hips. There were no differences between single and recurrent dislocations.

No specific pharmacological group of prescribed drugs could be associated with dislocated hips in the total series or when separately analyzed between the sexes or in rheumatoid-non-rheumatoid patients.

Patients in the dislocated group were admitted approximately 4 times during 1979-1991, averaging 55 days in the Department of Internal Medicine, com-

pared to 3 times (46 days) among the non-dislocated cases ( $p$  0.4). Rheumatoid patients and female patients had more and longer periods of in-patient care, but no relation to dislocation rate was found when these patient groups were separately analyzed.

Half of the male patients (10/20) among the dislocated hip cases were alcoholics, compared to 0.2 (7/38) in hips that were not dislocated ( $p$  0.01). No difference was noted in women (3/40 vs. 7/80).

## Discussion

The dislocation rate after total hip arthroplasty is usually 3–5 percent of the operations (Lindberg et al. 1982, Woo and Morrey 1982, Schulte et al. 1994).

We used a standard Charnley procedure and similar registration methods during the entire study and found a dislocation rate of 3 percent. The experience of the surgical staff was about the same and no particular surgeon had a greater dislocation rate. The long operating time was caused by tantalum marker implantation and collection of specific blood samples for research projects.

Dislocations are commoner after THA for hip fractures that do not heal (Woo and Morrey 1982, Ahnfelt 1986, Nilsson et al. 1989, Gregory et al. 1991) and rheumatoid arthritis (Hedlundh et al. 1994). For a detailed study of background factors and patient characteristics, each type of hip disease should be evaluated separately. However, our material is too small for such an analysis.

Lindberg et al. (1982) noted more dislocations in alcoholics and neurologically disabled patients and Khan et al. (1981) found more dislocations among patients with mental and neurological disorders. It is difficult to classify alcoholism retrospectively. In our uptake area, only persons with severe abuse attend the special Department of Alcoholic Diseases and most colleagues hesitate to report moderate drinking in the medical records. The value of gamma-GT determination is also debated. Nevertheless, our study indicates that alcoholism is associated with dislocations, particularly in males.

Our major finding is the high mortality in patients with dislocations. Closed reposition followed by a short immobilization time can hardly be an explanation. Ekelund et al. (1992) and Newington et al. (1990) found dislocation rates between 9 and 15 percent in octogenarians. We observed 11 dislocations in our 235 patients aged 80 and older (5 percent). Our data do not indicate that our patients dislocate and die simply because of age. It seems more reasonable to believe that dislocations are commoner in patients

with poor health associated with little muscular strength and decreased co-ordination.

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