

Incidence of hip replacement in southern Sweden

During the years 1981–1982, 1,729 hip replacements were performed in the population of 943,000 persons in the nine southernmost orthopedic districts of Sweden. This is equivalent to 7,600 hip replacements per annum in the 8.3 million Swedish population. Based on the highest annual district incidence, the national equivalent increases to 12,500. Arthrosis accounted for 57 per cent of the arthroplasties, hip fracture for 23 per cent, and failed total hip replacement for 10 per cent.

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Introduction

The annual demand for total hip replacements (THRs) in Sweden has been estimated to be 8–10 thousand (Lindberg 1982). However, more detailed analyses and prognoses for different diagnoses have not been presented.

We present the incidence of THR and hemiarthroplasty (HA) for different diagnoses in patients living in the southernmost part of Sweden, comprising 943,000 inhabitants. Our aim was to clarify the incidence of hip replacement in a mixed urban and rural society and to estimate the national need of hip arthroplasties in Sweden.

Patients and methods

Information about sex, age at surgery, waiting list, diagnosis, type of prosthesis, and the patient's home community (orthopedic district) for 1981 and 1982 was obtained from the nine southernmost orthopedic units in Sweden. Thirty-eight cases during 1981 and 35 cases during 1982 referred for surgery from hospitals outside the

investigated region were excluded from the study. The annual incidence of hip replacement was correlated with the number of inhabitants in the different orthopedic districts. The findings were extrapolated for the whole Swedish population.

Results

The total number of hip replacements during 1981 and 1982 was 1,729 (659 men, 1,070 women) (Table 1). Arthrosis accounted for 57 per cent (442 men, 548 women) of the arthroplasties, hip fractures for 23 per cent, failed THRs for 10 per cent, polyarthritis for 6 per cent, and other diagnoses (including 18 hip tumors) for 4 per cent.

During 1981 and 1982, the total incidence of hip replacement per 10,000 inhabitants older than 49 years of age was unchanged, as well as the total incidence for the main indications for surgery (Table 2). Correction for referrals between the orthopedic districts has been made in the tables. All the arthroplasties were THRs except 19 (1%) resurfacing arthroplasties, and 157 (9%) HAs

Table 1. Total number of hip replacements for different diagnoses in patients living in the nine most southern orthopedic districts in Sweden 1981 and 1982. The number of prostheses in patients younger than 50 years at surgery is given ().

Orthopedic district	Arthrosis	Hip fracture	Polyarthritis	Other hip disorders	Failed THR	Total
(He) Helsingborg	175	53 (1)	8 (1)	4	16 (2)	256 (4)
(H) Hässleholm	75	25	9 (1)	4 (3)	7	120 (4)
(K) Kristianstad	97	16	9 (3)	2 (1)	8 (1)	132 (5)
(L) Landskrona	59	11 (1)	6	12 (1)	5	93 (2)
(Lu) Lund	151	69 (1)	27 (10)	20 (5)	36 (5)	303 (21)
(M) Malmö	203 (4)	155 (2)	35 (6)	28 (8)	62 (9)	483 (29)
(S) Simrishamn	61	12	2 (1)	1	1	77 (1)
(T) Trelleborg	65	23 (1)	2	1	17	108 (1)
(Y) Ystad	104 (7)	32	6	3	12	157 (7)
All districts	990 (11)	396 (6)	104 (22)	75 (18)	164 (17)	1729 (74)

Table 2. Annual incidence/10,000 inhabitants older than 49 years, of hip replacement for different diagnoses in patients living in the nine most southern orthopedic districts in Sweden in 1981 and 1982

Orthopedic district	Total population in 10,000	Fraction of population older than 49 years	Arthrosis	Hip fracture. Incidence of cervical hip fracture for four districts is given ()	Other hip disorders (mainly polyarthritis)	Failed THR	Total incidence per 10,000 inhabitants older than 49 years
He	13.9	0.36	17	5	1	1	25
H	7.0	0.35	15	5	2	1	24
K	9.6	0.34	15	2	1	1	19
L	4.9	0.36	17	3 (26)	5	1	26
Lu	19.9	0.27	14	6 (26)	3	3	26
M	23.1	0.40	11	8 (27)	3	3	25
S	3.3	0.41	23	4	1	>0	28
T	7.4	0.29	15	5	1	4	25
Y	5.2	0.38	25	8 (19)	2	3	38
All districts	94.3	0.34	15	6	2	2	26

after hip fracture. The obtained information did not permit a distinction to be made between types of hip fracture leading to arthroplasty or hip replacement as a primary or a secondary fracture treatment. The general policy in the investigated region has been to use prosthetic replacement as a salvage procedure after failed primary osteosynthesis. The incidence of cervical hip fracture during the investigated period is given for four of the orthopedic districts in Table 2.

The annual total incidence of hip replacement per 10,000 inhabitants of all ages in the 943,000 population of the investigated region was 9.2. This is equivalent to 7,600 hip replacements per annum in the 8.3 million population of Sweden in 1981 and 1982. By using the highest annual district incidence, the national equivalent increases to 12,500.

The mean waiting period for surgery was more or less stable at the investigated orthopedic units, where it varied from 1 to 6 months. The obtained information was not detailed enough to permit an analysis of the correlation between priority and diagnosis.

Discussion

Based on a previous study on the need of hip surgery in southern Sweden (Lindberg & Sjöstrand 1972), symptomatic arthrosis in the investigated region, with a population of 943,000, is estimated to develop in 500 hips annually, but far from all the patients will need an arthroplasty (Lindberg & Sjöstrand 1972). Consequently, the

annual number of 500 hip replacements for arthrosis in this region probably included both the annual number of new patients with disabling arthrosis and a backlog of patients.

The relatively low incidence of hip replacement for arthrosis in the Lund and Malmö districts can be explained by referrals of patients with failed THR, polyarthritis, and less common hip disorders to these two university hospitals, thus resulting in less surgical capacity for arthrosis.

Arthroplasties in men with arthrosis were 80 per cent of those in women, which corresponded with the proportion men/women older than 49 years in the investigated region. This is in contrast to a previous study in southern Sweden by Lindberg et al. (1984), who found hip replacements for arthrosis in men to be only 60 per cent of those in women in the city of Malmö in the period 1968–1981, although men constituted 75–80 per cent of women in the population older than aged 49 years. This difference between a mixed urban and rural catchment area and a strictly urban catchment area is difficult to explain.

HA was performed in 40 per cent of the patients operated on with a prosthesis after a hip fracture. Because postoperative pain (Søreide et al. 1980, Hägglund et al. 1984) and dislocations (Johnsson et al. 1984) are more frequent after HA than THR and the early mortality rate associated with hip replacement as a secondary treatment is equal (Andersson & Möller-Nielsen 1972, Hägglund et al. 1984), THR is now generally preferred.

The different incidence of hip prosthesis after hip fracture could indicate different results of

primary osteosynthesis, different orthopedic attitudes towards the management of patients with hip fractures, and/or different orthopedic resources. A lower incidence of hip fracture in rural areas than in urban areas could also contribute (Falch et al. 1985, Mannius et al. 1987). All of these aspects will influence the relation between the incidence of hip replacement and the incidence of hip fracture. The increasing number of hip fractures (Frandsen & Kruse 1983, Wallace 1983, Johnell et al. 1984, Zetterberg et al. 1984a, Falch et al. 1985, Lüthje 1985) will continually increase the need for arthroplasty. However, improved results of primary osteosynthesis of the hip fractures may diminish this escalation.

The incidence of hip prosthesis after hip fracture in the investigated region in 1981 and 1982 (36 THRs and 24 HAs/year per 100,000 inhabitants older than aged 49 years) corresponded to the incidence in Gothenburg in 1981 (28 THRs and 29 HAs/year per 100,000 inhabitants older than aged 49 years) (Zetterberg et al. 1985) and with the incidence in Stockholm from 1975 through 1977 (12 THRs and 43 HAs/year per 100,000 inhabitants older than aged 49 years) (Holmberg et al. 1987), but the proportion of THRs/HAs differed. In Stockholm many patients with hip fractures were treated in general surgery departments.

The incidence of rearthroplasty of failed THR in the investigated region in 1981 and 1982 (9 THRs/year per 100,000 inhabitants) corresponded to the national Swedish incidence of 1981 and 1982 (78 THRs/year per 100,000 inhabitants) (Ahnfelt 1986a), but was higher than in Gothenburg in 1981 (4 THRs/year per 100,000 inhabitants) (Zetterberg et al. 1984b). The difference between the investigated region and Gothenburg could be explained by different prosthetic survival of THRs performed during the previous decade, different orthopedic attitudes towards the management of patients with a failed THR, and/or different regional orthopedic resources.

In Sweden, 6,600 THRs were performed annually in 1981 and 1982 (Ahnfelt 1986a), and this increased to 8,200 in 1984 and 8,500 in 1985 (Ahnfelt 1986b). Unfortunately, there is no information about the national incidence of HA, making an exact comparison with our study impossible. Presuming that the proportion of HAs was the same in all of Sweden as in the investi-

gated region in 1981 and 1982, the actual total number of arthroplasties performed in Sweden per annum would have been 7,300. The figure is just slightly less than the projected national need of 7,600 arthroplasties based on the total incidence in southern Sweden, but much smaller than the 12,500 based on the incidence in Ystad. Because the average Swedish orthopedic service is probably less comprehensive than in the investigated region with orthopedic units performing hip arthroplasties at all the hospitals, the regional figure might imply a minimum national need of hip replacements and the figure for Ystad a maximum national need.

The figure derived from Ystad might even approach an optimal national need of hip replacements, because the annual incidence of hip replacement in Ystad has been at least as high as in 1981 and 1982 since 1976 (Nordström 1982) and is still unchanged in 1986, and the waiting period has never exceeded 4 months during the 1980s (Nordström 1987). This indicates a balance between the surgical capacity and the continuous flow of known patients with a disabling hip disorder. The proportion of the population of Ystad older than aged 49 years (38%) is slightly more than that of all of Sweden (34%).

In an international perspective, our annual incidence of 92 hip replacements per 100,000 inhabitants was high. In England and Wales (43 million inhabitants), 19,000 THRs and 8,000 other arthroplasties after femoral fractures were performed in general hospitals in 1978 (Laing & Taylor 1982). This equals 63 hip arthroplasties per 100,000 inhabitants. The number of hip replacements performed in private hospitals was not known. Laing & Taylor speculated that the need of THR for arthrosis had almost reached a steady state at that time. However, the increasing incidence of hip fracture in England (Wallace 1983) might increase the need for hip arthroplasties.

In Norway (4.1 million inhabitants) the number of THRs increased from 2,700 in 1980 to 3,500 in 1982 (Raugstad et al. 1984). This equals an increasing annual incidence of THR from 66 per 100,000 inhabitants to 85 per 100,000. The opposite prevailed in Denmark (5.1 million inhabitants), with decreasing figures from 4,100 THRs in 1983 to 3,700 THRs in 1985 (Indenrigsministeriet in Denmark 1986). This equals a decrease from 80 to 73 THRs per 100,000 inhabitants.

In the United States (227 million inhabitants), an estimated 75,000 THRs were performed in 1981 (American Consensus Conference 1982). This equals an annual incidence of 30–35 THRs per 100,000 inhabitants. However, the projected national need of THR in the white population at that time was higher, with 60 THRs per 100,000 inhabitants based on epidemiologic data from the Mayo Clinic (Melton et al. 1982). However, the few nonwhite residents in the county served by the Mayo Clinic made an adequate projection of the American national need of THRs in these ethnic groups impossible, as different patterns of hip

disorders and socioeconomic conditions prevail in the white and the nonwhite populations.

When comparing these international figures, it should be remembered that the incidence of HA in Norway, Denmark, and the United States was not known.

The only way to get a good picture of the future need of hip replacements in any country is to continually register hip surgery on a nationwide basis. First then, an optimal humanitarian and medicoeconomic planning for hip replacements will be possible.

References

- Ahnfelt, L. (1986a) Re-opererade totala höftledsplastiker i Sverige under åren 1979–1983 (in Swedish with an English summary). Thesis, Faculty of Medicine, University of Göteborg, Sweden.
- Ahnfelt, L. (1986b) Personal communication.
- American Consensus Conference (1982) Total hip-joint replacement in the United States. *JAMA* 15, 1817–1821.
- Andersson, G. & Möller-Nielsen, J. (1972) Results after arthroplasty of the hip with Moore's prosthesis. *Acta Orthop. Scand.* 43, 397–410.
- Falch, J.A., Ilebekk, A. & Slungaard, U. (1985) Epidemiology of hip fractures in Norway. *Acta Orthop. Scand.* 56, 12–16.
- Frandsen, P.A. & Kruse, T. (1983) Hip fractures in the county of Funen, Denmark. *Acta Orthop. Scand.* 54, 681–686.
- Holmberg, S., Kalén, R. & Thorngren, K.-G. (1987) Treatment and outcome of femoral neck fractures. An analysis of 2,418 cases admitted from their homes. Accepted for publication in *Clin. Orthop.*
- Hägglund, G., Nordström, B. & Lidgren, L. (1984) Total hip replacement after nailing failure in femoral neck fractures. *Arch. Orthop. Traumat. Surg.* 103, 125–127.
- Indenrigsministeriets arbejdsgruppe vedrørende ventetider til sygehusbehandling (1986) Ventetider til sygehusbehandling (In Danish). Aka-print, Århus.
- Johnell, O., Nilsson, B., Obrant, K. & Sernbo, I. (1984) Age and sex patterns of hip fracture-changes in 30 years. *Acta Orthop. Scand.* 55, 290–292.
- Jonsson, R., Bendjelloul, H., Ekelund, L., Persson, B.M. & Lidgren, L. (1984) Comparison between hemiarthroplasty and total hip replacement following failure of nailed femoral neck fractures focused on dislocations. *Arch. Orthop. Traumat. Surg.* 102, 187–190.
- Laing, W. & Taylor, D. (1982) Hip replacement and the NHS. Office of Health Economics, London.
- Lindberg, H. (1982) The need for total hip arthroplasty. Consensus conference on total hip joint replacement, Stockholm.
- Lindberg, H., Carlsson, Å.S., Lanke, J. & Horstmann, V. (1984) The overall mortality rate in patients with total hip arthroplasty, with special reference to coxarthrosis. *Clin. Orthop.* 191, 116–120.
- Lindberg, L. & Sjöstrand, L.O. (1972) Behovet av höftkirurgi. Prognos för Lund 1972–1980 (in Swedish with an English summary). *Läkartidningen* 69, 4109–4112.
- Lüthje, P. (1985) Incidence of hip fracture in Finland. *Acta Orthop. Scand.* 56, 223–225.
- Mannius, S., Mellström, D., Odén, A., Rundgren, Å. & Zetterberg, C. (1987) Incidence of hip fracture in Western Sweden 1974–1982. Comparison of rural and urban populations. *Acta Orthop. Scand.* 58, 38–42.
- Melton, L.J., Stauffer, R.N., Chao, E. Y. S. & Ilstrup, D.M. (1982) Rates of total hip arthroplasty. A population-based study. *N. Engl. J. Med.* 20, 1242–1245.
- Nordström, B. (1982) Total hip arthroplasty in a county hospital. Consensus conference on total hip joint replacement, Stockholm.
- Nordström, B. (1987) Personal communication.
- Raugstad, T.S., Alho, A., Mølster, A. & Strand, T. (1984) Total hip replacements in Norway – trends from 1980 to 1983. *Acta Orthop. Scand.* 55, 388.
- Søreide, O., Lillestøl, J., Alho, A. & Hvidsten, K. (1980) Acetabular protrusion following endoprosthetic hip surgery: a multifactorial study. *Acta Orthop. Scand.* 51, 943–948.
- Wallace, W.A. (1983) The increasing incidence of fractures of the proximal femur: an orthopaedic epidemic. *Lancet* 1, 1413–1414.

- Zetterberg, C., Elmersson, S. & Andersson, G. B. J. (1984a) Epidemiology of hip fractures in Göteborg, Sweden, 1940–1983. *Clin. Orthop.* **191**, 43–52.
- Zetterberg, C., Ahnfelt, L., Andersson, G., Elmersson, S. & Herberts, P. (1984b) Behov av ortopedisk-kirurgiska resurser för behandling av frakturer och artros/artrit (in Swedish with an English summary). *Läkartidningen* **81**, 4414–4417.
- Zetterberg, C., Elmersson, S. & Andersson, G. B. J. (1985) Reoperations of hip fractures. *Acta Orthop. Scand.* **56**, 8–11.

Acknowledgements

We would like to thank the orthopedic units at the hospitals in Helsingborg, Hässleholm, Kristiansstad, Landskrona, Malmö, Simrishamn, Trelleborg, and Ystad for providing epidemiologic information.