

Introduction of total hip arthroplasty in Lithuania

Results from the first 10 years

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Background Hip replacement as a routine procedure was introduced in Lithuania in 1991. At Klaipeda Hospital, one of the 2 hospitals at which this was begun, the arthroplasties were followed prospectively from the start. This study concerns the 10-year results from a country with no previous experience of hip replacement. The results are compared with those from a hospital with considerable experience of total hip replacement.

Methods We compared the revision rate for the first 658 primary ScanHip arthroplasties inserted at Klaipeda to that for the first 939 ScanHip primary arthroplasties inserted at Lund University Hospital, Sweden. Only patients with osteoarthritis were included, and the end-point was revision for aseptic loosening with exchange of one or both components.

Results We found that patients operated at Klaipeda Hospital had a significantly higher risk of revision (12%) than those operated in Lund (6%).

Interpretation Although we could not identify any specific reason for the Swedish results being better than the Lithuanian results, it is probable that previous surgical inexperience of hip replacement in Lithuania played a role. We believe that the findings will stimulate surgeons in Lithuania to analyze their failures and improve the results.

In 1991, primary total hip replacement was introduced as a routine procedure in Lithuania. Initially there were only 2 centers, located in the cities of Klaipeda and Vilnius. Previously, there had been

no hip surgery involving modern implants and bone cement in the country. None of the orthopedic surgeons had any previous experience of hip replacement. From the very beginning, prospective follow-up was started at Klaipeda Hospital. It was considered important to monitor the initial results in order to be able to identify any potential problems and to enable comparison of the results with those of others.

The ScanHip implant (Mitab, Sweden) initially selected for use in Lithuania was manufactured in Sweden and went on the market in Sweden in 1983. It was used at the University Hospital, Lund, Sweden which, unlike the Klaipeda center, already had a long experience of hip surgery at the time this implant was introduced.

We compared the cumulative revision rate (CRR) of the ScanHip implant at Klaipeda and Lund for the 10 years following its introduction in each country.

Patients and methods

All hips with the ScanHip Classic I stem combined with the all-polyethylene ScanHip cup (Kesteris et al. 1996) that had been inserted because of osteoarthritis were included in the analysis. In Klaipeda, the use of this implant was started in 1991 and it was the first total hip arthroplasty (THA) to be used routinely. It was the only implant used for the first 4 years, but later other systems

Table 1. Data on THA patients revised for aseptic loosening at Klaipeda (Lithuania) and Lund (Sweden)

Hospital	Total no. of hips	No. of hips revised			No. of patients who died	Age	Sex Female/Male
		Cups	Stems	Both			
Lund	939	4	13	13	238	69 (SD 11)	491/448
Klaipeda	658	19	2	29	103	63 (SD 10)	478/180

were introduced. However, most (about 85%) of the THAs inserted at Klaipeda during the 10-year period of the study were ScanHip implants. The use of the Classic I stem was discontinued in Lithuania in 2001, as it was no longer manufactured. At Lund University Hospital, Sweden, the ScanHip implant was first introduced in 1983, but the Classic I stem was only used until 1996. The ScanHip was the only primary implant used in Lund over the 10-year period. Thus, our material covers the operations performed during the first 10 years that the implant was in use at each hospital.

In Klaipeda, 658 ScanHips were implanted in 585 patients from November 1991 to December 2001, while at Lund University Hospital 939 prostheses were implanted in 832 patients from November 1983 to December 1993 (Table 1). In both countries the follow-up ranged from 3 to 14 years.

All the THAs at Klaipeda Hospital were performed by 3 orthopedic surgeons who had received a short period of training in Sweden. At Lund University Hospital, > 90% of the THAs were performed by 6 experienced surgeons.

All the Klaipeda patients and the majority of Lund patients were operated on in a lateral decubitus position, with a posterolateral skin incision and a posterior arthrotomy. The cementing technique in Lund was retrograde filling and pressurization of Palacos bone cement with gentamicin after the bone bed had been cleaned by pulsating lavage and plugging of the femoral canal. In Klaipeda, there was no pulsating lavage and instead of Palacos, CMW1 bone cement with gentamicin was used. Furthermore, there were differences in head sizes (Table 2). All the data were registered prospectively in both centers. For the patients operated in Lund, the Swedish National Hip Register was consulted to find all patients who had possibly been revised elsewhere, and for the Klaipeda patients

Table 2. Distribution of head diameters at Klaipeda (Lithuania) and Lund (Sweden)

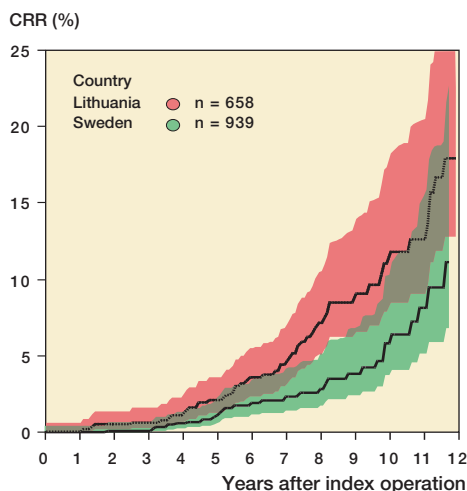
Variables	No. of patients	
	Klaipeda	Lund
Head diameter (mm)	22	146
	28	0
	32	793

revisions were looked for in the 2 other centers that performed revision arthroplasty in Lithuania. State Patient Fund provided information about Klaipeda patients who had died. Similarly, this information was obtained from healthcare authorities in Sweden. Personal identification number was used to obtain such data in both centres.

The endpoint chosen was revision for aseptic loosening with exchange of one or both components. There were 10 patients who were revised for reasons other than aseptic loosening (7 for dislocations and 3 for infections). Of those, none was revised for aseptic loosening at a later stage. These patients were considered to be successful cases regarding loosening.

Statistics

Cumulative revision rate (CRR) curves were produced using the life table method at monthly intervals. Curves were cut when 40 hips remained at risk. 95% confidence intervals (CI) were calculated using the Wilson quadratic equation with Greenwood and Peto effective sample-size estimates (Dorey et al. 1993). The Wilcoxon test was used when comparing the difference in revision rate between the two hospitals. In addition, Cox regression was used to adjust for differences in age and sex, and also for head size. The age of the patient at primary operation and also the head size in mm were used as continuous variables in which the risk



Cumulative revision rate for THA in Klaipeda (Lithuania) and Lund (Sweden) (95% confidence intervals).

ratio expresses the change in risk if the variable increases by 1 unit (1 year or 1 mm). The factors location and sex were categorical variables with Lund acting as a reference for Klaipeda, and with females acting as a reference for males

A p-value of < 0.05 was considered significant. SPSS and Excel software were used for the calculations.

Results

THAs inserted in Klaipeda had a higher CRR than those in Lund ($p = 0.003$, Wilcoxon test) (Table 1; Figure). The overall CRR after 10 years was 12% (CI: 8–18) for the Klaipeda patients as compared to 6% (CI: 4–10) for the Lund patients. Further analysis with Cox regression adjusting for age and sex showed that the Klaipeda patients had 1.8 times greater risk of revision (CI: 1.1–2.8; $p = 0.02$) and that age also reduced the risk of revision ($p < 0.001$). When head size was added as a continuous cofactor, it was not found to have a significant effect ($p = 0.1$), while location and age remained significant (Table 3).

Discussion

We found that the THAs from Klaipeda Hospital

Table 3. Cox regression data

	Estimated revision risk	95% CI	P-value
Age	0.96	0.94–0.98	< 0.001
Location	1.6	1.01–2.7	0.05
Sex	1	0.66–1.7	0.8
Head size	1	0.98–1.2	0.1

had a significantly higher CRR than those from Lund, which had similar results to those found at the national level according to the Swedish Hip Register (CRR of $6.6 \pm 0.9\%$ after 10 years for 1983–1992) (Malchau et al. 2002).

Radiostereometric studies have shown that a subsidence of 0.33 mm of a femoral component and > 1 mm migration of the cup during the first 6 months postoperatively predict revision surgery after 5–8 years (Kärrholm et al. 1994, Krismer et al. 1996). This suggests that the outcome of THA is already determined at the implantation of the prosthesis. Technical mistakes during implantation related to less surgical experience may result in primary instability and micromotion of the prosthesis, and finally result in aseptic loosening of the implant. As there was no previous experience of arthroplasty surgery in Klaipeda, but ample experience in Lund, our comparison may reflect the influence of surgical experience and technique on the results.

Although ScanHip implants were used at both centers, there were differences concerning the head size used. As it has previously been suggested that increased head size is associated with increased volumetric wear and possibly osteolysis (Kesteris et al. 1996), we also included head size in the Cox regression but did not find that it significantly affected the CRR. However, we have previously found that an extended follow-up (beyond 10 years) may be needed to demonstrate a significant increase in CRR with the 32-mm head (Tarasevicius et al. 2006).

In Lithuania, no pulsating lavage and no cement pressurization was used. The cementing technique is known to be of importance for long-term results. Cleaning of the bone bed with pulsating lavage, plugging of the femoral canal, and cement pressurization have all been associated with an approxi-

mately 20% reduction in the risk of revision for aseptic loosening (Herberts and Malchau 2000). Furthermore, although both contained gentamicin, the cement types used were different in the two hospitals: Palacos in Lund and CMW1 in Klaipeda. This may also have contributed to the increased revision rate since Espehaug et al. (2002) reported that CMW1 had an increased risk of long-term failure as compared to Palacos.

Marston et al. (1996) reported that the risk of revision for trainees was 11 times higher than that for experienced surgeons. The risk of revision in Klaipeda was twice as high as in Lund. That the difference was not higher may be related to the fact that as only 3 surgeons were performing the arthroplasties, they must quickly have gained surgical skill.

At the introduction of a new type of surgery, less severe cases are normally chosen for surgery—and later when surgeons have gained experience, the more difficult cases are selected. As THA surgery had not been available in Lithuania, however, there had been an accumulation of severe cases; thus, it is probable that the average THA case was more severe in Lithuania than in Sweden.

We have thus found that introduction of the total hip arthroplasty in Lithuania was associated with a higher risk of revision than in Sweden. We were unable to identify any specific reason for this finding and many factors may explain the difference, such as different cementing technique, cement type, and surgical experience. This monitoring of the introduction of a new type of surgery is important because precise registration and follow-up allow early identification of problems. Our findings will stimulate Lithuanian surgeons to analyze their failures and improve their results.

Contributions of authors

ST: data collection, compilation and analysis, and writing of manuscript. UK, AS, VJ: data collection and editing of man-

uscript. OR: statistical analysis and editing of manuscript. HW: organization of study and editing of manuscript.

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Dorey F, Nasser S, Amstutz H. The need for confidence intervals in the presentation of orthopaedic data. *J Bone Joint Surg (Am)* 1993; 75 (12): 1844-52.

Espehaug B, Furnes O, Havelin L I, Engesaeter L B, Vollset S E. The type of cement and failure of total hip replacements. *J Bone Joint Surg (Br)* 2002; 84 (6): 832-8.

Herberts P, Malchau H. Long-term registration has improved the quality of hip replacement: a review of the Swedish THR Register comparing 160,000 cases. *Acta Orthop Scand* 2000; 71 (2): 111-21.

Karrholm J, Borssen B, Lowenhielm G, Snorrason F: Does early micromotion of femoral stem prostheses matter? 4-7 year stereoradiographic follow-up of 84 cemented prostheses. *J Bone Joint Surg (Br)* 1994; 76 (6): 912-7.

Kesteris U, Ilchmann T, Wingstrand H, Onnerfalt R. Polyethylene wear in Scanhip arthroplasty with a 22 or 32 mm head: 62 matched patients followed for 7-9 years. *Acta Orthop Scand* 1996; 67 (2): 125-7.

Krismer M, Stockl B, Fischer M, Bauer R, Mayrhofer P, Ogon M. Early migration predicts late aseptic failure of hip sockets. *J Bone Joint Surg (Br)* 1996; 78 (3): 422-6.

Malchau H, Herberts P, Eisler T, Garellick G, Soderman P. The Swedish Total Hip Replacement Register. *J Bone Joint Surg (Am) (Suppl 2)* 2002; 84: 2-20

Marston R A, Cobb A G, Bentley G. Stanmore compared with Charnley total hip replacement. A prospective study of 413 arthroplasties. *J Bone Joint Surg (Br)* 1996; 78 (2): 178-84.

Tarasevicius S, Kesteris U, Robertsson O, Wingstrand H. Femoral head diameter affects the revision rate in total hip arthroplasty: An analysis of 1,720 hip replacements with 9-21 years follow-up. *Acta Orthop* 2006; 77 (5): 706-9.