

Registration of hip prostheses at the Rizzoli institute

11 years' experience

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On the basis of outstanding results obtained by Scandinavian arthroplasty registers (Herberts and Malchau 2000, Havelin 1999, Lucht 2000, Paavolainen et al 1991), a similar local register was set up at Rizzoli Institute, in Italy. It began in 1997, with a retrospective analysis of all total hip replacements performed at the Institute since 1990; since then it has been continuously updated with all hip prosthetic surgeries.

Rizzoli Institute is the only orthopaedic unispecialistic research hospital in Italy. It is composed of 10 wards, some of them mainly specialized in joint replacement. Patients of the Institute come from all over the country either for primary or for revision surgery. In particular the most complex diseases are treated at our institute (sequelae of congenital hip dysplasia, secondary arthritis, revision surgery). Rizzoli Institute is in Emilia-Romagna, a region in the north of Italy with about 4 million inhabitants (of whom 1,100,000 are over 60 years old). Based on the experience acquired at our institute, in the last two years our register has been extended to more than 50 hospitals and private clinics of the region, which combined carry out about 3,500 total hip replacements per year.

Methods

The recording of data is done for each joint replacement operation. A form is filled in with identification of the patient, information about diagnosis or reason for re-operation, surgical approach, antibiotic and antithromboembolic prophylaxis, use of bone grafts, perioperative complications. Acetabular, femoral and head components

are separately registered, on the basis of stickers with catalogue numbers provided by manufacturers with the implants. Fixation of the components is recorded as well.

Post-surgery checks are also recorded, without, however, noting the clinical status of the patient, but only recording the presence of the prosthesis in site. Revision is used as an end-point in the analyses.

The Oracle database is set at CINECA (Inter-University Calculation Center in Bologna). The transmission of data via web is encrypted to ensure confidentiality. Statistical analysis was done by a full-time statistician.

Since December 1999, the register was extended to include all public and private hospitals in the Emilia-Romagna region, and since June 2000 endoprostheses and knee prostheses began to be registered as well.

Results

All joint replacements performed at our Institute have been registered since 1990 (Table 1). Surgical practice has tripled during the last 11 years.

The annual number of total hip replacements performed at Rizzoli is approximately 900, and the number of revisions is 200. Median age of patients at primary surgery is 66, and 63.5% of patients are women.

Diagnosis for primary surgery and reasons for revision are illustrated in Table 2

The proportion of uncemented, cemented and hybrid primary replacements and revision operations is summarized in Tab 3; in Tab 4 articular

Table 1. Number of operations recorded in RIPO. In *italics* operations carried out in all centers of Emilia-Romagna excluding Rizzoli

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
Hip												
Primary arthroplasty	427	570	630	548	599	678	770	809	865	867	932 (3112)	7695
Primary endoprosthesis											128 (1423)	128
Revision	59	82	136	144	171	168	211	216	233	226	223 (418)	1869
Knee ^a												91
Primary											79 (563)	
Revision											12 (27)	
Total	486	652	766	692	770	846	981	1025	1098	1093	1368	9777

^a since 1/07/2000

Table 2. Diagnosis for primary total hip replacement and reasons for revision of patients treated at Rizzoli Institute in the period Jan 1990 – Dec 2000

Etiology		Reason for revision	
Coxarthrosis	4500	Aseptic loosening of both components	884
Sequelae of congenital dysplasia	1314	Loosening of the cup	457
Idiopathic femoral head necrosis	433	Loosening of the stem	277
Femoral fracture	538	Deep infection	34
Post-traumatic arthritis	385	Dislocation	60
Sequelae of coxitis	37	Prosthesis fracture	31
Post-traumatic femoral head necr.	125	Two steps revision	61
Tumor	54	Pain without loosening	14
Rheumatic arthritis	255	Bone fracture	12
Others	54	Others	39
Total	7695	Total	1869

Table 3. Type of fixation of hip prosthesis of patients treated at Rizzoli Institute in the period Jan 1990 – Dec 2000.

Fixation	Primary total hip replacement		Revision of both components		Total	
	n	%	n	%	n	%
Cemented	1309	17.0	101	9.5	1410	16.1
Uncemented	4153	54.0	672	63.3	4825	55.1
Hybrid (uncemented cup, cemented stem)	2203	28.6	178	16.8	2381	27.2
Hybrid (cemented cup, uncemented stem)	30	0.4	110	10.4	140	1.6
Total	7695	100.0	1061	100.0	8756	100.0

coupling is shown. In both tables data are not registered for revision of a single component.

Unlike the Swedish and Danish registers, but similar to the Norwegian one, a large number of different prosthesis brands had been used.

Most frequently used cups and stems for primary

surgery at Rizzoli Institute are reported in Tables 5 and 6.

In RIPO, complications occurring during hospitalization are also recorded. Intraoperative complications include fractures and anaesthesiologic complications. Among local postoperative com-

Table 4. Articular coupling of hip prosthesis of patients treated at Rizzoli Institute in the period Jan 1990 – Dec 2000

Articular coupling	Primary		Revision of both components		Total	
	n	%	n	%	n	%
Metal on polyethylene	3382	44.0	527	49.7	3909	44.6
Ceramic on ceramic	2745	35.6	210	19.8	2955	33.7
Ceramic on polyethylene	1078	14.0	295	27.8	1373	15.7
Metal on metal	490	6.4	29	2.7	519	5.9
Total	7695	100.0	1061	100.0	8756	100.0

Table 5. Most commonly used cups 1990–2000 (primary surgery)

Cup	n	%
ANCA FIT – Cremascoli	1692	22.0
PCA – Howmedica	1012	13.1
FITEK – Sulzer	702	9.0
DUOFIT – Samo	685	8.8
ANCA – Cremascoli	614	8.0
DURALOC – Samo	438	5.7
MULLER – Cremascoli	414	5.4
MULLER – Sulzer	341	4.4
ABG – Howmedica	258	3.4
STANDARD CUP – Sulzer	196	2.5
BIOCERAMICA – Samo	139	1.8
CONTEMPORARY – Howmedica	131	1.7
VITALOCK TALON – Sulzer	128	1.7
HARRIS GALANTE – Zimmer	82	1.1
EXETER – Lima	69	0.9
METASUL STAR CUP – Sulzer	66	0.9
ELLIPTICAL CUP – Stratec	59	0.8
PRIMARY CUP METASUL – Sulzer	59	0.8
TRILOGY – Zimmer	58	0.8
MULLER – Samo	54	0.7
REFLECTION – Smith and Nephew	48	0.6
LUBINUS SP2 – Link	43	0.6
Others	407	5.3
TOTAL	7695	100

Table 6. Most commonly used stems 1990–2000 (primary surgery)

Stem	n	%
ANCA – Cremascoli	1235	16.0
PCA – Howmedica	1064	13.7
ANCA FIT – Cremascoli	896	11.6
AHS – Cremascoli	760	9.9
CONUS – Sulzer	562	7.3
LC – Samo	508	6.6
MULLER AUTOBLOCCANTE – Sulzer	283	3.7
ELITE – De Puy	225	2.9
DEFINITION – Howmedica	201	2.6
DUOFIT – Samo	199	2.6
LUBINUS SP2 – Link	191	2.5
EXETER – Howmedica	181	2.4
GEMINI – De Puy	137	1.8
BIOCERAMICA – Samo	135	1.8
MERIDIAN – Howmedica	121	1.6
AML – De Puy	118	1.5
CLS – Sulzer	98	1.3
CITATION – Howmedica	98	1.3
ANCA-FIT CLU – Cremascoli	84	1.1
P507 – Samo	69	0.9
METABLOC	64	0.8
CEMEK	53	0.7
SL REVISION – Sulzer	47	0.6
Other	366	4.8
TOTAL	7695	100

plications are deep venous thrombosis, hematoma, peripheral nerve lesions, prosthesis dislocation and infection. General post-operative complications include embolism, heart attack, gastrointestinal problems (Table 7).

The duration of hospitalization provides the index of improvement in the hospital program. Nowadays pre-surgery hospitalization is shorter, which enables a marked saving. The time to discharge is generally about 8–10 days, unless there

are postoperative complications (Table 8).

Discussion

This paper reports the experience of a single Institute where a hip joint register was set up in 1990 and has been maintained up to now.

The number of operations registered since 1990 is quite high, and it is going to increase dramati-

Table 7. Complications occurring during hospitalization for total hip arthroplasty

Complications	n	%
Intra-surgery		
Primary	58	0.75
Revision	37	2.0
Local post-surgery		
Primary	226	2.9
Revision	111	5.9
General post-surgery		
Primary	209	2.7
Revision	56	3.0
Death		
Primary	18	0.2
Revision	3	0.2

cally in the next years, as the database will serve the entire Emilia-Romagna region, with 4 million inhabitants, a figure almost similar to the population of Norway, Denmark, or Sweden (4.5, 5.3 and 8.8 respectively).

The median age at primary surgery is lower than in Scandinavian registers (66 vs 68–70), possibly due to the higher rate of operations performed to treat sequelae of congenital diseases, such as hip dysplasia (17.1%) (8.6% in Norway, 3.4% in Denmark, and 1.1% in Sweden). With regards to this, it must be pointed out that Rizzoli Institute has many cases of congenital dysplasia of the hip both because there is a high rate of newborns affected by this disease in the region (8/1000 in Emilia-Romagna, 1/1000 in Italy), and because the Institute is highly specialized in this field.

Male/female ratio is 36.5:63.5 in our register, whilst it is 41:59 in Denmark, 40:60 in Sweden and 31:69 in Norway.

The reason for the revision of one or both components is aseptic loosening in 86% cases (75.7% in Sweden, 61.8 % in Denmark).

Concerning the fixation of the prosthesis, it is interesting to note that the number of uncemented prostheses is especially high in our register, nearly double that of the Swedish register for the same period and similar to that of the Norwegian register. The peculiarity of the choice adopted at our institute enables interesting comparisons with other major databases. Finally, the high percentage of total hip replacements with ceramic on ceramic coupling is especially interesting; in this case the

Table 8. Mean days (range) of hospitalization per type of surgery

Type of surgery	Total hospital.	Preoperative hospital.	Postoperative hospital.
Primary	17 (3–58)	5 (0–42)	11 (0–55)
Revision	22 (6–58)	8 (0–37)	13 (0–51)
Total	18 (3–58)	6 (0–42)	12 (0–55)

comparison with north European registers is not feasible.

Major problems in the management of RIPO are quality of data and costs, which are partially connected to each other. Maintaining a detailed database is a costly proposition; the cost of this database is in great part related to the completeness and accuracy of data considered acceptable. Up to now cost of the R.I.P.O. has been covered by funds of the Institute and public grants; each registered operation roughly costs 13 (19 in Norway).

In our opinion the expense is well compensated by the fact that by monitoring the failures of surgical techniques and implants, which can only be done by a systematic register, it is possible to make savings, not only in economic terms, on the number of revisions. Many patients receive artificial joints each year, so even a small decrease in the risk of revision would avoid a large number of unnecessary operations (Persson et al. 1999, Fumes et al. 1996).

Lost to follow-up represents another major problem of local registers (Berry 1997, Fender 2000, Toni 2001), which we aim to solve by checks and statistical analysis.

Finally, it should be remembered that the register is an essential legal medical tool that enables correct communication with the patient and a continuous check of the choices made by each surgeon.

Acknowledgments

The Emilia-Romagna Department of Health has partially funded the regional register.

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