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ORIGINAL STUDY

The use of primary total hip arthroplasty in university hospitals of the European Union

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Current practice in primary total hip replacement was investigated by postal survey in 125 university hospitals of the European Union (EU). Most hospitals (78.4%) use a hip register and implant cemented as well as uncemented stems (72.0%) and cups (68.8%). In Scandinavian & Anglo-Saxon countries, 42.9% of the departments implant cemented stems in all their patients, and 16.7% implant cemented cups in all their patients. In these countries, modern cementing techniques are commonly used and therapeutic choices are strongly influenced by hip registers. In Southern Europe, cemented cups have been abandoned in 31.1% and modern cementing techniques are less common. Benelux & Germanic countries have a practice in between.

Three cemented (Exeter, Charnley, Lubinus) and three uncemented stems (Zweymüller, ABG, Bi-contact) represent 41.9% and 25.3% of stem types in use. Most departments (70.4%) have adopted alternative bearings. Ceramic-ceramic and metal-metal are both used in almost half of the hospitals. Metal-polyethylene has been abandoned in 15.2%.

These trends are taught to new generations of surgeons in the EU and could become common practice in a near future.

INTRODUCTION

Indications for the use of cemented and uncemented primary total hip arthroplasty vary widely amongst hospitals of the same country and amongst countries themselves *(2,8,11)*. Despite the existence of several hip registers including ten thousands of implants *(4,6,7,10)* and despite an abundant literature, no consensus has been reached regarding the use of a particular type of implant in a specific situation.

In a general orthopaedic practice, implant choices and implant fixation techniques are based on literature data but are also influenced by tradition, marketing, personal preferences, experience and habits acquired during training. University orthopaedic departments, by providing teaching to future generations of orthopaedic surgeons, play an important role in future implant choices. Moreover, most of the university departments perform enough hip replacements to develop a policy regarding the use of hip implants. Such a policy will take into account an accurate interpretation of the literature, as well as patient related and economic criteria. As in a general orthopaedic practice, implant choices will also be influenced by tradition, marketing, personal preferences and experience. This survey was undertaken to better understand surgical and

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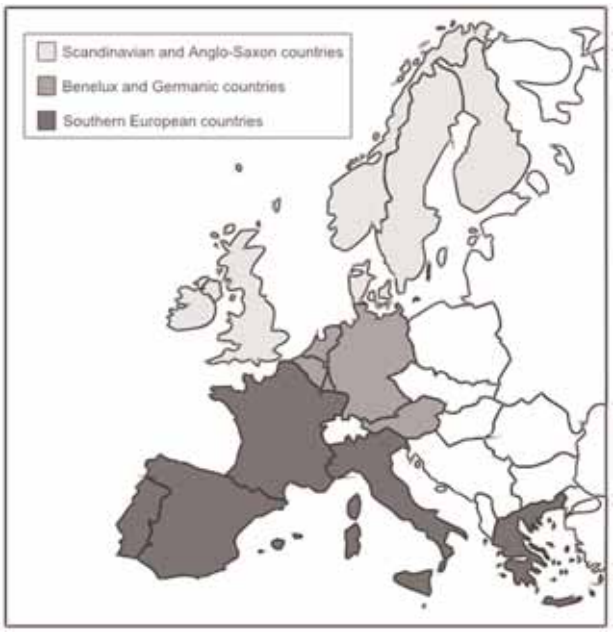

Fig. 1. — Countries of the European Union divided in three regions.

implant choices for primary elective hip arthroplasty in university hospitals in the European Union.

MATERIALS AND METHODS

Addresses of university and affiliated orthopaedic departments in the fifteen countries of the European Union were collected in collaboration with the European Association of Hospital Managers. A standardised hip arthroplasty survey form was sent to these departments during a one-year period starting in January 2002. If no answer was obtained, a second then a third reminder was sent after a few months.

The first part of the survey collected data on the organisation of the orthopaedic department. The second part analysed the use of a uniform policy and registration system for hip implants. The third part looked into the use of cemented or uncemented stems and cups as well as bearing surfaces. For each implant type in use, implant characteristics, indications and motivations for that particular choice were questioned. For cemented stems and cups, data on cementing technique were collected. For uncemented cups primary fixation techniques were analysed. If a particular type of implant was not currently in use, the reasons for this choice was questioned. Collected data were stored and analysed with software developed in Microsoft Access.

RESULTS

Characteristics of university orthopaedic departments

Between January 2002 and January 2003, a hip arthroplasty survey form was sent to 253 university and affiliated orthopaedic departments of the European Union (table I). Overall 125 forms (49.4%) could be collected and were analysed. Countries were subdivided in three regions: Scandinavian & Anglo-Saxon countries (Scan-AS), Benelux & Germanic countries (Bene-Ger) and Southern European countries (SE) (fig 1).

The size of the orthopaedic departments and the use of a hip registration system are shown in table I. Large variations in size and number of hip replacements performed per year do exist among departments of a single country and among countries. Southern European university departments tend to be smaller and perform fewer hip arthroplasties a year (average 182.3 compared to 238.3 and 321.3 in Benelux & Germanic countries and Scandinavian & Anglo-Saxon countries respectively).

Most university and affiliated departments (78.4%) use a registration system for hip implants. National registration systems are more widely used in Scandinavian & Anglo-Saxon countries, whereas departments in Southern European countries are less inclined to register any hip arthroplasty. Of those 27 departments (21.6%) that did not use a registration system, 92.6% fail to do so because no national register is available as yet, and 66.7% because of lack of financial or logistic support. Lack of interest or the fact that a register was found useless was reported by only 11.1% and 3.7% respectively of the departments failing to use any registration system.

Most university and affiliated departments (85.6%) have a general policy regarding implant choices in primary elective hip arthroplasty surgery. This was seen more frequently in Benelux & Germanic countries (94.7%) as well as in Southern European countries (93.3%) compared to Scandinavian & Anglo-Saxon countries (67.4%). The head of department or the head of the hip arthroplasty section made these choices in 68.2% of

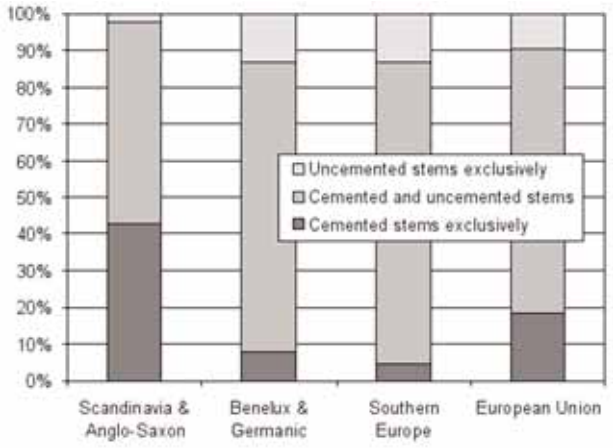

Fig. 2. — Distribution of the use of cemented and uncemented stems in university hospitals of different regions within the European Union.

cases while they were based on a consensus in 46.7%.

Stem fixation technique

Figure 2 shows the use of cemented and uncemented femoral implants in participating university hospitals of the European Union. Most centres (72.0%) use cemented as well as uncemented stems depending on the indication. Typically, cemented stems are used in an "older, less active population with poor bone quality" whereas uncemented stems are used in a "younger, more active population with good bone quality". The threshold between both groups varies widely from one hospital to the other (from > 40 up to > 80 years). Cemented stems are implanted in all indications by 18.4% of the responders, whereas 9.6% do not use them at all.

These more extreme situations are found mainly in the Scandinavian & Anglo-Saxon countries, with 42.9% using only cemented stems, and in Southern European countries with 13.3% using only uncemented stems.

Table I. – Characteristics of the participating university and affiliated orthopaedic departments

Countries	N° of forms sent	N° of participating centres (%)	Aver. N° of beds (min-max, SD)	Aver. N° of surgeons (min-max, SD)	Aver. N° of trainees (min-max, SD)	Hip Register* n (%)
Scandinavian & Anglo-Saxon	69	42 (60.9)	69.7 (26-150, 34.5)	15.1 (4 - 40, 8.5)	10.0 (1 - 10, 5.9)	40 (95.2)
Denmark	4	4 (100.0)	76.5 (48-110, 27.9)	17.8 (12-26, 6.0)	14.8 (4-22, 7.9)	4 (100)
Finland	9	7 (77.8)	41.6 (26-46, 12.7)	7.9 (4-13, 3.6)	4.4 (1-10, 3.3)	7 (100)
Ireland	3	2 (66.7)	104.0 (103-105, 1.4)	11.5 (6-17, 7.8)	15.5 (13-18, 3.5)	2 (100)
Sweden	11	8 (72.7)	56.9 (30-96, 23.2)	24.1 (16-40, 9.7)	6.8 (3-12, 3.5)	8 (100)
United Kingdom	42	21 (50.0)	80.9 (26-150, 39.5)	14.3 (5-31, 7.2)	11.5 (5-24, 5.3)	19 (90.5)
Benelux & Germanic	47	38 (80.9)	80.8 (20-285, 63.7)	9.3 (2-20, 4.8)	10.6 (1-30, 6.9)	28 (73.7
Austria	5	5 (100.0)	70.2 (50-94, 18.1)	8.4 (5-13, 3.1)	8.0 (3-4, 4.1)	4 (80.0)
Belgium	12	11 (91.7)	55.2 (30-127, 29.0)	7.2 (2-17, 4.4)	6.2 (1-18, 5.7)	8 (72.7)
Germany	22	14 (63.6)	131.6 (60-285, 75.2)	12.3 (4-20, 5.4)	16.5 (7-30, 6.7)	8 (57.1)
Luxemburg	No university Hospital		-	-	-	-
The Netherlands	8	8 (100.0)	32.6 (20-48, 10.1)	7.4 (5-12, 2.2)	7.5 (6-10, 1.5)	8 (100)
Southern European	137	45 (32.8)	53.5 (10-186, 40.4)	12.9 (3-52, 10.6)	10.9 (0-40, 7.7)	30 (66.7)
France	32	5 (15.6)	67.0 (30-120, 34.9)	5.2 (3-8, 2.2)	5.8 (2-11, 3.7)	4 (80.0)
Greece	5	2 (40.0)	45.0 (30-60, 21.2)	11.0 (8-14, 4.2)	12.5 (7-18, 7.8)	2 (100)
Italy	53	24 (47.2)	41.2 (12-120, 35.2)	11.5 (3-52, 10.3)	13.1 (1-40, 9.4)	16 (66.7)
Portugal	7	1 (14.3)	186	46	11	0 (0.0)
Spain	40	13 (32.5)	62.2 (10-130, 34.9)	16.0 (4-32, 8.8)	8.8 (0-15, 4.5)	8 (61.5)
TOTAL	**253**	**125 (49.4)**	**67.1 (10-285, 48.4)**	**12.5 (2 - 52, 8.7)**	**10.4 (0 - 40, 6.9)**	**98 (78.4)**

*Any hip register : national, regional (including several hospitals), single hospital, single surgeon.

Table II A. – Reasons for using a particular stem fixation technique in university hospitals of the European Union. N represents the number of times a particular reason for using cemented or uncemented stems was mentioned. (%) = N x 100 / (total number of cemented or uncemented stems in use in a region).

	Scan-AS	Benelux & Germanic	Southern Europe	**European Union**
Reasons for using a particular stem fixation technique	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)
Evidence from literature	46 (59.0) / 26 (66.7)	26 (59.1) / 30 (55.6)	43 (75.4) / 61 (71.8)	115 (64.3) / 117 (65.7)
Good personal experience	35 (44.9) / 22 (56.4)	25 (56.8) / 32 (59.3)	32 (56.1) / 52 (61.2)	92 (51.4) / 106 (59.6
Theoretical advantages	34 (43.6) / 18 (46.2)	21 (47.7) / 31 (57.4)	31 (54.4) / 59 (69.4)	86 (48.0) / 108 (60.7)
Evidence from a hip register	47 (60.3) / 20 (51.3)	17 (38.6) / 8 (14.8)	13 (22.8) / 10 (11.8)	77 (43.0) / 38 (21.4)
Good Cost / Quality ratio	23 (29.5) / 4 (10.3)	14 (31.8) / 9 (16.7)	29 (50.9) / 14 (16.5)	66 (36.9) / 27 (15.2)
Part of a clinical or other trial	12 (15.4) / 12 (30.8)	11 (25.0) / 21 (38.9)	25 (43.9) / 40 (47.1)	48 (26.9) / 73 (41.0)
Good instrumentation	11 (14.1) / 5 (12.8)	13 (29.6) / 18 (33.3)	22 (38.6) / 34 (40.0)	46 (25.7) / 57 (32.0)
Good technical support	16 (20.5) / 5 (12.8)	9 (20.5) / 16 (29.6)	21 (36.8) / 34 (40.0)	46 (25.7) / 55 (30.9)
Other	1 (1.3) / 1 (2.6)	1 (2.3) / 4 (7.4)	1 (1.8) / 1 (1.2)	3 (1.7) / 6 (3.4)
Total number of cemented / uncemented stems in use	78 (100) / 39 (100)	44 (100) / 54 (100)	57 (100) / 85 (100)	179 (100) / 178 (100)

Reasons for using or not using a particular stem fixation technique are shown in table II. As some departments use several different types of cemented or uncemented stems for a variety of reasons, results are presented as a percentage of the number of stems in use. Cemented as well as uncemented stems are used mainly because of “evidence from literature”, “good personal experience” and “theoretical advantages”. Beside these arguments, cemented stems are used generally because of “evidence from hip registers” and uncemented stems as “part of a clinical or other trial”. In Scandinavia & Anglo-Saxon countries, over half the departments mentioned “evidence from a hip register” as an argument for using cemented as well as uncemented stems. In the other parts of the European Union, hip register data have a much smaller influence on femoral implant choices especially for the use of uncemented stems. Arguments for not using cemented stems include mainly “lack of theoretical advantages” and “lack of evidence from literature”. On the other hand, arguments for not using uncemented stems mainly include “lack of evidence from literature” and “lack of evidence from hip registers”.

Cementing techniques used in the university and affiliated hospitals of the European Union are shown in table III. In Scandinavian & Anglo-Saxon

Table II B. – Reasons for NOT using a particular stem fixation technique in university hospitals of the European Union. N represents the number of times a particular reason for NOT using cemented or uncemented stems was mentioned. (%) = N x 100 / (total number of centres NOT using cemented or uncemented stems in a region).

	Scan-AS.	Benelux & Germanic	Southern Europe	**European Union**
Reasons for NOT using a particular stem fixation technique	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)
Not enough theoretical advantages	1 (100) / 10 (55.6)	4 (80.0) / 1 (33.3)	6 (100) / 1 (50.0)	11 (91.7) / 12 (52.2)
Not enough evidence from literature	0 (0.0) / 16 (88.9)	3 (60.0) / 3 (100)	4 (66.7) / 1 (50.0)	7 (58.3) / 20 (87.0)
Other	0 (0.0) / 3 (16.7)	4 (80.0) / 0 (0.0)	1 (16.7) / 1 (50.0)	5 (41.7) / 4 (17.4)
Bad experience from own department	1 (100) / 2 (11.1)	0 (0.0) / 0 (0.0)	3 (50.0) / 1 (50.0)	4 (33.3) / 3 (13.0)
Not enough evidence from hip register	0 (0.0) / 15 (83.3)	1 (20.0) / 1 (33.3)	0 (0.0) / 0 (0.0)	1 (8.3) / 16 (69.6)
Total number of centres NOT using cemented / uncemented stems	1 (100) / 18 (100)	5 (100) / 3 (100)	6 (100) / 2 (100)	12 (100) / 23 (100)

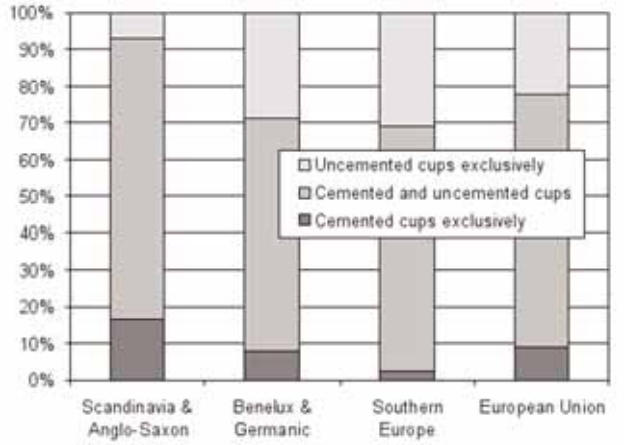

Fig. 3. — Distribution of the use of cemented and uncemented cups in university hospitals of different regions within the European Union.

countries all centres use pressure lavage and cement pressurisation together with retrograde or antegrade cement injection. In other regions, over 2/3 of the participating centres use pressure lavage and cement pressurisation together with retrograde or antegrade cement injection. Only two centres are still using finger packing exclusively.

Cup fixation technique

The use of cemented and uncemented acetabular components in participating university hospitals of the European Union is shown in figure 3. Most centres (68.8%) used cemented as well as uncemented cups depending on the indication. Cemented cups are typically used in an "older, less active population with poorer bone quality" compared to uncemented cups. The threshold between both groups varies widely from one hospital to the other (from > 40 up to > 80 years). Cemented cups are implanted in all indications by 8.8% of the responders, whereas 22.4% do not use them at all. These more extreme situations are found mainly in the Scandinavian & Anglo-Saxon countries, with 16.7% using only cemented cups, and in Southern European countries with 31.1% using only uncemented cups.

Reasons for using or not using a particular cup fixation technique are shown in table IV. As some departments use several different types of cemented or uncemented cups for a variety of reasons, results are presented as a percentage of the number of cups in use. Cemented and uncemented cups are both used mainly because of "good personal experience" and "evidence from literature". Beside these arguments, cemented cups are used because of "evidence from a hip register" and a "favourable cost/effectiveness ratio". On the other hand, uncemented cups are also selected because of their "theoretical advantages" and as "part of a clinical or other trial". In Scandinavian & Anglo-Saxon countries, data from hip registers have supported the use of cemented cups in over 2/3 of the departments. This is not the case in other parts of the European Union, especially in Southern Europe where economic factors seem more important. "Good technical support" is the most important argument for using uncemented cups in Southern Europe. This argument is less important in the rest of the European Union especially in Scandinavian & Anglo-Saxon countries. "Lack of theoretical advantages" is one of the main reasons for not using cemented as well as uncemented cups. This argument is followed by "bad experience from own department" for cemented cups and by "lack of evidence from literature" for uncemented cups.

Table III. – Femoral cementing technique in university hospitals of different regions of the European Union (some departments use a combination of techniques).

	Scan-AS. n (%) of users	Benelux & Germanic n (%) of users	Southern Europe n (%) of users	**European Union** n (%) of users
Finger packing alone	0 (0.0)	1 (3.0)	1 (2.6)	2 (1.8)
Antegrade cement injection	3 (7.3)	8 (24.2)	7 (17.9)	18 (15.9)
Retrograde cement injection	31 (75.6)	22 (66.7)	23 (59.0)	76 (67.3)
Unknown	7 (17.1)	3 (9.1)	10 (25.6)	20 (17.7)
Pressure lavage and pressurisation	41 (100.0)	25 (75.8)	25 (64.1)	91 (80.5)

Table IV A. – Reasons for using a particular cup fixation technique in university hospitals of the European Union. N represents the number of times a particular reason for using cemented or uncemented cups was mentioned. (%) = N x 100 / (total number of cemented or uncemented cups in use in a region)

	Scan-AS.	Benelux & Germanic	Southern Europe	**European Union**
Reasons for using a particular cup fixation technique	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)
Good personal experience	45 (67.2) / 32 (59.3)	21 (61.7) / 35 (63.6)	28 (70.0) / 56 (65.1)	94 (66. 7) / 123 (63.1)
Evidence from literature	48 (71.6) / 30 (55.6)	19 (55.9) / 28 (50.9)	21 (52.5) / 54 (62.8)	88 (62.4) / 112 (57.4)
Evidence from a hip register	45 (67.2) / 21 (38.9)	9 (26.5) / 7 (12.7)	4 (10.0) / 8 (9.3)	58 (41.1) / 36 (18.5)
Good Price / Quality ratio	20 (29.9) / 5 (9.3)	16 (47.1) / 6 (10.9)	22 (55.0) / 18 (20.9)	58 (41.1) / 29 (14.9)
Theoretical advantages	19 (28.4) / 33 (61.1)	13 (38.2) / 36 (65.5)	21 (52.5) / 18 (20.9)	53 (37.6) / 130 (66.7)
Good technical support	11 (16.4) / 9 (16.7)	6 (17.7) / 17 (30.9)	13 (32.5) / 61 (70.9)	30 (21.3) / 56 (28.7)
Good instrumentation	7 (10.5) / 3 (5.6)	8 (23.5) / 17 (30.9)	9 (22.5) / 30 (34.9)	24 (17.0) / 49 (25.1)
Part of a clinical or other trial	4 (6.0) / 19 (35.2)	7 (20.6) / 13 (23.6)	11 (27.5) / 40 (46.5)	22 (15.6) / 72 (36.9)
Other	0 (0.0) / 1 (1.9)	1 (2.9) / 2 (3.6)	0 (0.0) / 1 (1.2)	1 (0.7) / 4 (2.1)
Total number of cemented / uncemented cups in use	67 (100) / 54 (100)	34 (100) / 55 (100)	40 (100) / 86 (100)	141 (100) / 195 (100)

The use of acetabular cementing techniques and the use of uncemented cup fixation techniques are shown in table V. At least 63.4% of the participating centres using cemented cups pressurise cement before cup insertion, while at least 14.0% do not. Large variations regarding the use of acetabular cement pressurisation do exist among different regions. In Scandinavian & Anglo-Saxon countries cement pressurisation at the acetabulum is used in at least 82.5% of the departments, in Benelux and Germanic countries in 58.6% and in Southern European countries in 37.5%. For uncemented cups, press fit with or without additional screws is by far the most accepted fixation technique in university hospitals of all regions of the European Union.

Most frequently used femoral implants

The top three cemented and uncemented stems in use in participating university hospitals of the European Union are shown in table VI. Overall, three cemented femoral implant types (Exeter, Charnley and Lubinus) and three uncemented types (Zweymüller, ABG and Bi-metric) represent 41.9% and 25.3% of the cemented and uncemented stem types in use.

Bearing surfaces

Table VII shows the use of different bearing surfaces in participating university hospitals of the European Union. Not surprisingly, metal-polyethylene is still in use in most centres but it has been

Table IV B. – Reasons for NOT using a particular cup fixation technique in university hospitals of the European Union. N represents the number of times a particular reason for NOT using cemented or uncemented cups was mentioned. (%) = N x 100 / (total number of centres NOT using cemented or uncemented cups in a region)

	Scan-AS.	Benelux & Germanic	Southern Europe	**European Union**
Reasons for NOT using a particular cup fixation technique	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)	Cement n (%) / Cementless n (%)
Not enough theoretical advantages	1 (33.3) / 4 (57.2)	6 (54.6) / 3 (100)	12 (85.7) / 1 (100)	19 (67.9) / 8 (72.7)
Bad experience from own department	1 (33.3) / 1 (14.3)	5 (45.6) / 0 (0.0)	8 (57.1) / 1 (100)	14 (50.0) / 2 (18.2)
Other	0 (0.0) / 3 (42.9)	6 (54.6) / 1 (33.3)	3 (21.4) / 0 (0.0)	9 (32.1) / 4 (36.4)
Not enough evidence from hip register	1 (33.3) / 2 (28.6)	3 (27.3) / 0 (0.0)	2 (14.3) / 0 (0.0)	6 (21.4) / 2 (18.2)
Not enough evidence from literature	0 (0.0) / 5 (71.4)	0 (0.0) / 2 (66.7)	0 (0.0) / 1 (100)	0 (0.0) / 8 (72.7)
Total number of centres NOT using cemented / uncemented cups	3 (100) / 7 (100)	11 (100) / 3 (100)	14 (100) / 1 (100)	28 (100) / 11 (100)

Table V. – Surgical technique for acetabular fixation in university hospitals of different regions of the European Union

		Scan-AS. n (%) of users	Benelux & Germanic n (%) of users	Southern Europe n (%) of users	**European Union** n (%) of users
Uncemented cup :	Press fit only	23 (65.7)	21 (60.0)	30 (68.2)	74 (64.9)
	Press fit + Spikes	8 (22.9)	3 (8.6)	6 (13.6)	17 (14.9)
	Press fit + Screws	25 (71.4)	18 (51.4)	26 (59.1)	69 (60.5)
	Screws, NO Press fit	0 (0.0)	1 (2.9)	3 (6.8)	4 (3.5)
	Screw Cup	1 (2.9)	8 (22.9)	1 (2.3)	10 (8.8)
Cemented cup :	Cement pressurisation	33 (84.6)	17 (58.6)	9 (37.5)	59 (64.1)
	No cement pressurisation	2 (5.1)	3 (10.3)	8 (33.3)	13 (14.1)
	Unknown	4 (10.3)	9 (31.0)	7 (29.2)	20 (21.7)

Table VI. – Top three of cemented and uncemented stems implanted in university hospitals of different regions of the European Union

	Scan-AS. n (%) of stems in use	Benelux & Germanic n (%) of stems in use	Southern Europe n (%) of stems in use	**European Union** n (%) of stems in use
Cemented stems	Exeter 23 (29.5) Charnley 12 (15.4) Lubinus 7 (9.0)	Exeter 6 (13.6) Lubinus 6 (13.6) Bicontact 4 (9.1)	Exeter 10 (17.5) Lubinus 7 (12.3) Versys 6 (10.5)	Exeter 39 (21.8) Lubinus 20 (11.2) Charnley 16 (8.9)
Uncemented stems	Bimetric 10 (25.6) ABG 8 (20.5) Corail 3 (7.7)	Zweymüller 6 (11.1) Bicontact 6 (11.1) Spotorno 4 (7.4) Omnifit 4 (7.4)	Zweymüller 13 (15.3) ABG 7 (8.2) Versys 6 (7.1)	Zweymüller 20 (11.2) ABG 15 (8.4) Bimetric 10 (5.6)

completely abandoned in 15.2% (in Benelux and Germanic countries, in at least 26.3%). Those centres that do not use metal on polyethylene anymore have moved to ceramic on polyethylene instead. Only one of the participating centres has given up polyethylene completely.

Alternative bearing surfaces are gaining in popularity as only 12.8% of universities use metal-polyethylene in all their patients and only 29.6% use polyethylene cups exclusively. Ceramic heads, either in combination with polyethylene or ceramic cups, are used by 72.8% of the participating departments (Scan-AS : 65.8%, Bene-Ger : 78.6%, SE : 73.3%). Metal-metal bearing surfaces are used in about half the European universities. However, 30.0% of metal-metal users use this combination exclusively in resurfacing arthroplasties (Scan-AS : 47.6%, Bene-Ger : 33.3%, SE : 12.5%).

DISCUSSION

Although many university departments have been questioned, this survey represents only a limited analysis of the European situation. Despite a total of three questionnaires being sent to non-responders, the overall response rate was rather poor, especially in Southern Europe. Possible explanations include : errors in the available address list, a language barrier in some countries, differences in mentality or limited interest in a survey regarding hip arthroplasty.

Large variations in department sizes do exist within each country and between countries. Moreover a number of trainees will move from one teaching hospital to the other and may also be trained in smaller local hospitals. For this reason the impact of each department on trainees and implant choices is difficult to analyse. However, in

Table VII. – Bearing surfaces in use in university hospitals of different regions of the European Union

		Scan-AS. n (%)	Benelux & Germanic n (%)	Southern Europe n (%)	**European Union** n (%)
Metal-polyethylene	in use	40 (95.2)	27 (71.1)	34 (75.6)	101 (80.8)
	not in use	0 (0.0)	10 (26.3)	9 (20.0)	19 (15.2)
Ceramic-polyethylene	in use	21 (50.0)	29 (76.3)	28 (62.2)	78 (62.4)
	not in use	19 (45.2)	8 (21.1)	15 (33.3)	42 (33.6)
Ceramic-ceramic	in use	10 (23.8)	22 (57.9)	21 (46.7)	53 (42.4)
	not in use	30 (71.4)	15 (39.5)	22 (48.9)	67 (53.6)
Metal-metal	in use	21-10* (50.0-23.8*)	15-5* (39.5-13.2*)	24-3* (53.3-6.7*	60-18* (48.0-14.4*)
	not in use	19 (45.2)	23 (60.5)	19 (42.2)	61 (48.8)

N.B.: In five cases not all data on bearing surfaces were available.
* Metal-metal bearing surface only in use for resurfacing arthroplasty.

a region where most university departments use a particular technique or implant, the impact on future generations of surgeons is expected to be significant.

The overall interest in hip arthroplasty registers in university hospitals is obvious and encouraging. Even in countries where no national register is available, most departments use a regional or local register. Absence of registration is generally explained by insufficient financial or logistic support rather than by lack of interest. In our opinion, this evolution is favourable as large-scale hip arthroplasty registration, performed by independent and scientifically sound instances, is an excellent way to evaluate new implants or new techniques, to advise on their indications and to provide positive feedback. This strategy has proven effective in Sweden *(5)*.

The choice of an implant fixation technique in a particular indication varies widely from one region to the other and even within a single country. The choice of a particular implant (cup or stem, cemented or uncemented) is generally based on evidence from literature including hip register data and "theoretical advantages". Uncemented implants (cups and stems) seem to be more often used as part of a clinical trial. In contrast, cemented implants (especially cups) are more often selected for their favourable cost/effectiveness ratio.

Most participants agree that there is a place for both cemented as well as uncemented femoral and acetabular implants. Furthermore, most centres agree that cemented hips should be used in an older, less active population with osteoporotic bone. However, there is no consensus regarding an age limit or other well-defined parameter to orient a choice. In Scandinavian & Anglo-Saxon countries the use of cemented stems in all indications is a more common practice compared to the other regions. Hip register data seem to have influenced this choice strongly. Almost one-third of the participating university departments in Benelux and Germanic countries as well as in Southern European countries have discarded cemented cups. This is somewhat worrying since cemented cups are cheap and effective in well-selected cases *(7,9)*. Failing to teach proper cup cementing might contribute to the further abandoning of this technique in community hospitals in some regions *(11)*. For this reason, and as long as a particular technique has not been proven superior, it is important to continue to teach them properly to future generations of orthopaedic surgeons. In some regions this might include creating opportunities for trainees to move from one teaching hospital to another to get a pluralistic training.

In the past, the use of poor cementing technique has been reported in English and German community hospitals *(1,3)*. In Scandinavian & Anglo-Saxon university departments, modern cementing techniques including pressure lavage, retro- or antegrade femoral cement injection and cement pressurisation both in the acetabulum and the femoral shaft, are now almost standard procedure.

This could, in the near future, contribute to further generalised adoption of modern cementing techniques in community hospitals. This tendency has been recently confirmed by Scott *et al (12)* for hemiarthroplasties. In other parts of the European Union, the use of modern cementing techniques in university hospitals is less common. In Southern Europe, acetabular cement pressurisation is even uncommon and about one-third of the participating departments have abandoned cemented cups. This choice has been motivated by "bad previous experience" in half the cases. We suggest that poor cup cementing in Southern Europe, leading to inferior results, might have contributed to a decreased use of cemented cups.

All but one participating centres use polyethylene cups in combination with metal or ceramic heads. However, 15.2% have completely abandoned the classical metal on polyethylene bearing surface. Over two-thirds of European university hospitals have moved to alternative bearings in particular indications. Overall, ceramic on ceramic is as popular as metal on metal. However, the use of ceramic on ceramic is less common in Scandinavian & Anglo-Saxon countries and metal on metal is less common in Benelux and Germanic countries. In Scandinavian & Anglo-Saxon countries, resurfacing arthroplasty has a large impact on the use of a metal-metal bearing surface as almost half the users do so exclusively in that indication.

Many aspects of hip arthroplasty practice in university hospitals vary widely among different regions of the European Union. Lack of consensus for the use of a particular technique in a specific indication as well as variations in tradition, culture, training and health care organisation can explain these differences. In Scandinavian & Anglo-Saxon countries, data from national hip registers seem to have a major impact on implant choices and surgical techniques at least in university hospitals. These literature data are often put forward to justify the use of cemented total hip arthroplasties and could have contributed significantly to the widespread use of modern cementing techniques in that region. Such initiatives to promote uniform use of successful strategies in hip replacement should be encouraged and could reduce the large discrepancies in surgical practice in the European Union.

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