

RELATIONSHIPS BETWEEN TOTAL HIP REPLACEMENT CHARACTERISTICS AND THREE-YEAR PROSTHETIC SURVIVORSHIP IN 100 191 PATIENTS: A POPULATION-BASED STUDY

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BACKGROUND

Total hip replacement (THR) is successful in treating hip arthritis. Prosthetic survivorship may depend on characteristics of the implant, notably THR fixation technique and bearing surface type.

OBJECTIVES

To compare THR short-term survivorship according to cement type and bearing surface.

METHODS

1. Patients selection

The eligible population comprised patients aged 40 or over who had a first unilateral primary THR for osteoarthritis between April 2010 and December 2011(20 months). Not included were patients who: had a first primary THR for trauma or bone cancer; had bilateral THR or underwent prosthetic revision prior to the inclusion period; or did not receive medical reimbursement after the index THR.

The study cohort comprised 107,382 patients.

THR characteristics were missing for 7,191 who were excluded from subsequent analyses leaving 100,191 patients.

2. Outcome

Revision, including any surgical re-intervention in which the implant or any of its components was changed or removed.

3. Exposures

Antibiotic-free cemented THRs and antibiotic impregnated cemented THRs were compared to uncemented THRs. Ceramic on ceramic (CoC), ceramic on polyethylene (CoP), and metal on metal (MoM) THRs were compared to metal on polyethylene (MoP) THRs.

4. Covariates

Comorbidities and medications collected at baseline were: diabetes, morbid obesity, benzodiazepines, antidepressants, antihypertensive agents, osteoporosis treatments, lipid-lowering agents and oral corticosteroids. The characteristics of implantation hospital stay were also collected.

RESULTS

1) Descriptive

Patients

- Mean age: 70 years (+/- 11 years)
- Women: 57%, older than men

Treatments at baseline

- Benzodiazepines: 37%
- Antidepressants: 15%
- Antihypertensives: 9%
- Oral corticosteroids: 14%

Hospital stay of implantation

- Private hospital: 66%
- «High activity» center: 71%

THRs

- CoC: 41%
- MoP: 34%
- CoP: 21%
- MoM: 4%
- Uncemented: 75%
- Antibiotic-free cemented: 4%
- Antibiotic-impregnated cemented: 21%

Revisions

3,142 in 33 months follow-up.

RESULTS - CONTINUE

Table 1. Baseline characteristics according to cement type

		N	Uncemented (%) N=74,917	Antibiotic-free cement (%) N=3,807	Antibiotic-impregnated cement (%) N=21,467	P chisq
Gender	Men	43,450	79.7	2.9	17.3	***
	Women	56,741	71.0	4.5	24.6	
Age category (years)	[40-60[18,934	83.9	2.2	13.9	***
	[60-75[44,805	78.6	3.3	18.0	
	≥75	36,452	65.3	5.2	29.5	
Diabetes	No	89,152	74.9	3.8	21.2	***
	Yes	11,039	73.5	3.6	23.0	
Morbid obesity	No	99,978	74.8	3.8	21.4	NS
	Yes	213	77.5	2.3	20.2	
THR Bearing Surface	CoC	41,000	88.7	3.2	8.1	***
	CoP	20,827	72.0	3.5	24.5	
	MoM	4,381	74.7	2.5	22.7	
	MoP	33,983	59.7	4.9	35.4	

Association p (Chi2): ***: p<0.001 / **: 0.001<p<0.01 / *: 0.01<p<0.05 / NS = not significant

2) Associations with THR revision

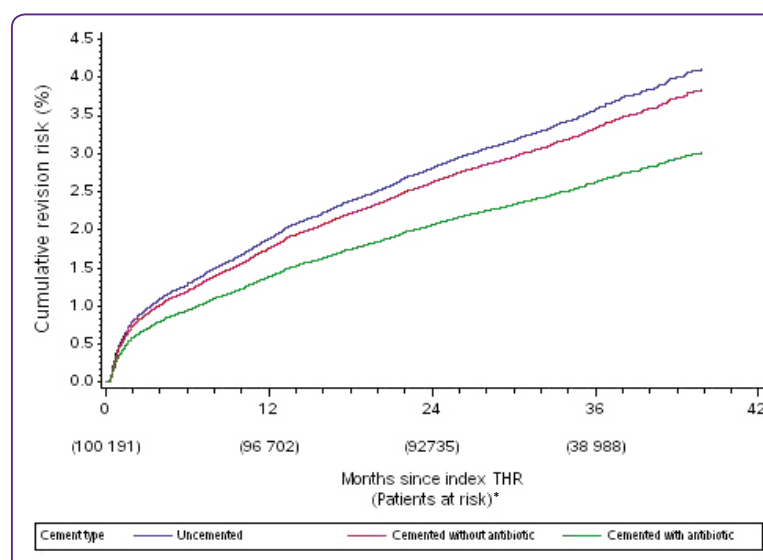


Figure 1. Cumulative revision risk, according to cement type (*at 44 months, N= 5,378)

Revision risk was higher in men than in women (HR=1.10 [1.03-1.19]). It was higher in younger patients and lower in older patients (HR=1.25 [1.14-1.36] vs 0.89 [0.82-0.96]), compared to middle aged.

Revision risk was higher in medicated patients (apart from antihypertensive and antiosteoporotic drugs).

THRs performed in high activity centers had better prognosis.

Table 2. Association between THR characteristics and prosthetic survivorship

		N	Univariate Analysis		Analysis of prosthetic survival Cox models (n=100,191)			
			Revised THRs %	PChi2	Univariate		Multivariate	
					HR (95%CI)	PWald	aHR (95%CI)	PWald
Fixation technique	Uncemented	74,917	3.3	<.001	1 ref.	***	1 ref.	***
	Antibiotic-free Cement	3,807	3.1		0.95 [0.79-1.14]		0.98 [0.81-1.18]	
	Antibiotic-impregnated Cement	21,467	2.4		0.74 [0.67-0.81]		0.77 [0.70-0.85]	
Bearing surface	CoC	41,000	3.3	.03	1.11 [1.03-1.21]	**	1.01 [0.92-1.12]	NS
	CoP	20,827	3.0		1.03 [0.93-1.14]		1.01 [0.91-1.12]	
	MoM	4,381	3.8		1.32 [1.12-1.56]		1.20 [1.01-1.43]	
	MoP	33,983	2.9		1 ref.		1 ref.	

***: p<0.001 / **: 0.001<p<0.01 / *: 0.01<p<0.05 / NS = not significant

HR : Hazard Ratio ; aHR : adjusted Hazard Ratio, complete model (adjusted for patient characteristics, and all the covariates).

DISCUSSION AND CONCLUSION

Strengths were the large number of patients and study of prosthetic survivorship according to cement type and bearing surface using a multivariate model with adjustment for known prosthetic revision risk factors, in the survival analysis. The possible residual confounding due to factors not collected in our study (THR brand, femoral head diameter, stem length or surgical approach) can not be ruled out.

THR characteristics are related to early implant survivorship. After 33 months of follow-up, antibiotic-impregnated cemented THRs have a better prognosis. MoM THRs have a slightly worse prognosis. These findings are useful for helping surgeons choose the appropriate THR fixation technique for their patients.