

Cementless Acetabular Cups in Total Hip Arthroplasty: a comparison of two generations at mid-term radiographic review

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Introduction

Early versions of cementless acetabular cups in total hip arthroplasty (THA) led to peri-acetabular osteolysis from back-side wear of the polyethylene liner. This unforeseen problem contradicted benefits of using cementless components in younger patients. Subsequent generations of components were designed to reduce this problem and its negative effect on the survival of the THA.

Methods

We compared the incidence of radiographic changes in a cohort of second-generation cementless acetabular components (EPF cups, Smith&Nephew), with a matched cohort of an earlier design (Harris-Galante) at mid-term (6-11 years).

Cohorts were matched by age, gender, co-morbidities, smoking status and time from primary surgery.

Presence of radiolucencies or osteolysis was recorded by zone around acetabular components on AP pelvis and iliac oblique lateral views, and the proportion of changes were statistically compared (Chi square test).

Results

There were 20 patients in each cohort, treated by five resident orthopaedic surgeons in a district general hospital, with mean age 75 years (60 to 82), 40 % female, Exeter femoral stems in 37 patients (CPS Plus, Smith&Nephew, in 3 THA).

Table 1. Demographics of matched cohorts

Number	Age	Gender	Smoker	Co morbidities	Time of review
1	77	Male	Yes	HTN, Bronchitis/Asthma	8
2	69	Female	No	Back Pain	7
3	73	Male	Ex smoker	HTN, DVT, AF	11
4	56	Male	No	HTN	9
5	68	Male	Yes	HTN, CA Prostate	9
6	69	Female	No	HTN, DM, Hypothyroid	10
7	70	Female	No	OA	10
8	70	Male	Ex smoker	NIDDM	11
9	69	Male	Yes	NIDDM	9
10	77	Male	No	None	9
11	75	Female	No	HTN	11
12	70	Female	No	HTN, Ca Breast	8
13	71	Female	No	Ca Breast	7
14	74	Male	Ex smoker	None	11
15	67	Female	No	HTN	11
16	66	Male	No	Ca Prostate	8
17	68	Male	No	HTN, Ca Prostate	10
18	75	Male	No	None	7
19	77	Female	Ex smoker	HTN, IDDM	10
20	66	Female	Yes	None	8

Results 2

The changes observed behind cementless acetabular components were grouped into two categories. Change 1 included no changes or radiolucency of <2 mm. Change 2 included radiolucency progression or radiolucency of >2mm, osteolysis or the presence of a granuloma.

A greater proportion of changes were seen behind the Harris-Galante cup in De Lee and Charnley zones 2, 4 and 5.

Table 2. Number of observed radiographic changes behind cementless acetabular components at mid-term review

Acetabular zone	Harris Galante cups No. of cups with change		EPF cups No. of cups with change		Chi square
	Change 1	Change 2	Change 1	Change 2	P value
I	12	8	15	5	0.311
II	5	15	15	5	0.002
III	17	3	19	1	0.605f
IV	11	9	18	2	0.013
V	8	12	18	2	0.001
VI	14	6	19	1	0.091f

f= Fisher's exact test as some cells had less than 5 in expected count.

Discussion

In this small, matched cohort study, we have shown that, in our district general hospital, the newer second-generation cementless acetabular components lead to less peri-acetabular radiographic changes than their first generation counterparts at mid-term radiographic review.

These results have implications for follow-up of THA patients.

Take Home Messages

- The incidence and progression of radiographic changes differed between two generations of cementless acetabular cup.
- Prosthesis type should inform the timing of a review for a clinically effective surveillance service to benefit patients.