



Exercise Caution when Switching Bone Cement: How a Hospital-Instituted Change Impacted Rates of Endoprosthetic Implant Failure

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INTRODUCTION

While surgeons have historically had the power to choose their surgical instruments and implants, there has been an economically driven shift in recent years that has transferred much of this power into the hands of hospital administrators.

In July 2014, the authors' institution switched bone cement from cement X to cement Y. After noting several uncharacteristic early failures, surgeons prompted the hospital to switch back to cement X.

OBJECTIVES

- To examine whether implants placed during the period of a hospital instituted cement change experience an increased incidence of early aseptic loosening (AL)
- To determine whether a change in bone cement disproportionately affected revision endoprostheses placed using a cement-in-cement (CiC) technique

HYPOTHESIS

Implants placed using cement Y will experience an increased incidence of AL compared to implants placed using cement X both before and after the cement change.

METHODS

A retrospective review of 207 consecutive cemented stem endoprostheses performed at UCLA between January 2010 and December 2019 was performed.

Implants were divided into 3 cohorts based on the date of surgery; before, during, and after the institutional cement change.

Outcome of interest: AL requiring revision of the stemmed components; defined based on intraoperative stress and confirmed negative OR cultures.

RESULTS

Table 1: Incidence of Aseptic Loosening

Implant Type	Incidence of Aseptic Loosening (N)			P-Value
	01/2010–01/2014 Cement X	01/2014–09/2016 Cement Y	09/2016–12/2019 Cement X	
Primary (N=129)	0.0% (0/10)	9.4% (3/32)	0.0% (0/87)	0.04
Revision (N=78)	7.1% (1/14)	20.7% (6/29)	0.0% (0/35)	0.01
CiC* Revision (N=28)	0.0% (0/5)	30.8% (4/13)	0.0% (0/10)	0.10
Total (N=207)	4.2% (1/24)	14.8% (9/61)	0.0% (0/122)	<0.001

Both primary and revision implants placed during the period of cement Y use were found to have a significantly higher incidence of AL compared with implants placed with cement X both before and after this period.

The incidence of AL was highest for revision implants placed with cement Y using a CiC technique in which the original cement was cement X (30.8%).

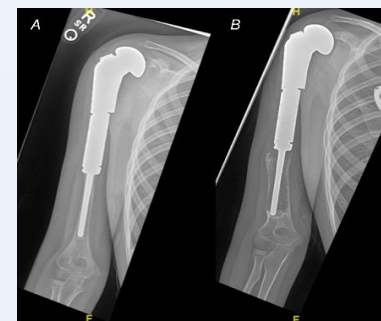
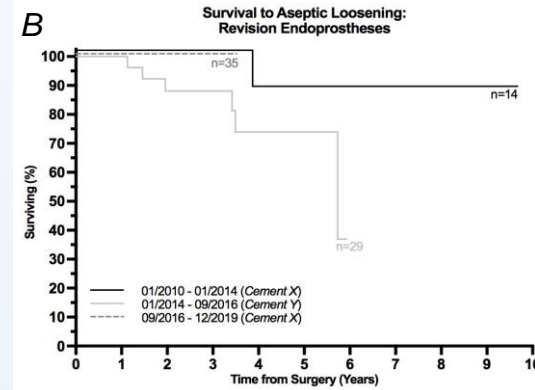
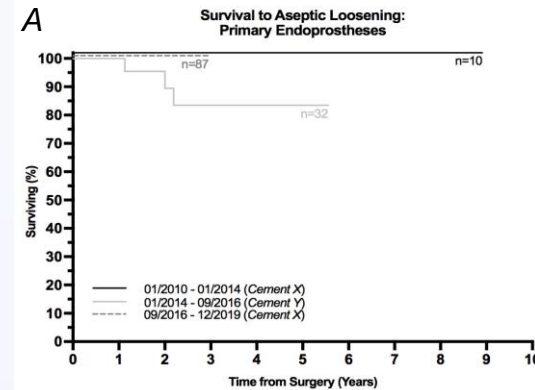
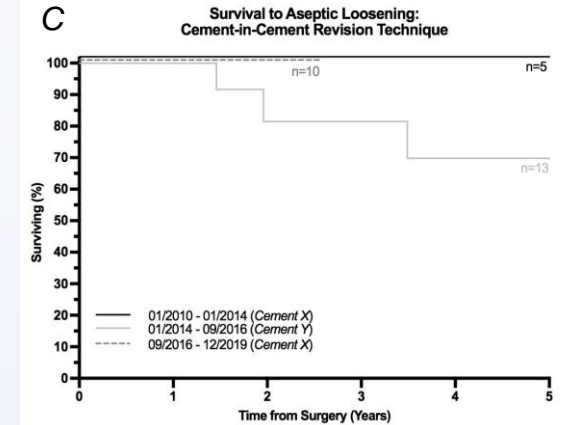


Figure 2: Representative radiographs immediately following (A) and 2 years postoperatively (B) demonstrating early AL of a cemented proximal humerus replacement placed using cement Y.

Figure 1A-C: Kaplan-Meier curves representing survival to AL of cemented endoprostheses. Both primary (Figure 1A, left) and revision (figure 1B, left) implants placed during the period of cement Y use (01/2014 – 09/2016) had decreased survival at 2, 3, and 5 (01/2010 – 01/2014 only) years versus implants placed before (01/2010 – 01/2014) and after (09/2016 – 12/2019) this period. This was especially true for implants placed used a CiC revision technique (Figure 1C, below).



CONCLUSIONS

- Cement Y was associated with an increased incidence of and decreased survival to AL
- CiC revision surgery using two different cements results in the highest incidence of and the lowest survival to AL

Clinical Relevance: Caution should be exercised when changing bone cement, particularly when performing cement-in-cement revision techniques. Special attention should be paid to identify uncharacteristic patient outcomes following hospital- or surgeon-instituted supply changes.