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LETTER TO THE EDITOR • HIP - ARTHROPLASTY

Hemiarthroplasty for a displaced femoral neck fracture: with or without bone cement?

Hidde D. Veldman[1] · Ide C. Heyligers[1,2] · Bernd P. Grimm[3,4] · Tim A. E. J. Boymans[5]

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With great interest, we have read the paper by Kumar et al. [1]. In this paper, the authors conducted a systematic review and meta-analysis of randomized controlled trials (RCTs) comparing cemented and cementless hemiarthroplasty in the treatment of femoral neck fractures. The authors excluded RCTs which studied outdated and rarely used stems (e.g., Austin Moore and Thompson). We agree with the authors that these stems are less relevant today and might have influenced the results of previously published meta-analyses. Therefore, we conducted a comparable meta-analysis with currently relevant stems in 2017 [2].

Shortly after our publication, a relevant RCT was published by Moerman et al. [3]. This publication was identified by the systematic literature search conducted by Kumar et al., who included no other additional RCTs in the pooling of results. Furthermore, they did not include two RCTs [4, 5], which were included in our meta-analysis. Talsnes et al. [4] compared the cementless Depuy Corail and cemented Depuy Titan stem, and Santini et al. [5] studied a bipolar cemented and cementless stem. The study of Santini et al. was probably not included because publications > 10 years ago were excluded. In our opinion, these stems should be considered as current generation stems. Exclusion of these two studies means the loss of valuable data.

Generally, both meta-analyses on current generation stems revealed comparable outcomes and trends (Table 1). However, a significantly conflicting outcome between the two meta-analyses is the mortality at 1 year postoperative. Kumar et al. found a significantly higher mortality 1 year after surgery in the cemented group. The authors stated as a possible explanation that, an intraoperative change in treatment plan might have resulted in bias in the studies. Patients allocated to the cementless group might have been treated with a cemented stem due to poor bone quality or a large-sized medullary canal. Since these patients are generally physiologically older with associated comorbidities, the higher rate of mortality could be the consequence of bias. If this was the case, however, worse outcomes with regard to complications and functional measures would be expected for the cemented group as well. Additionally, most included RCTs adequately described the protocol deviations, and this did not seem to be a major issue. Therefore, we searched for another explanation. Assessment of the relevant forest plot revealed that a significantly higher 1-year mortality in the cemented group was only seen in one of the four studies (Figved et al.) [1]. However, when assessing the full text article, this did not seem correct [6]. Figved et al. reported a nonsignificant higher mortality 1 year after surgery in the cementless group (mortality: 20/108 [19%] in cemented and 30/105 [29%] in cementless fixation; $p = 0.11$). Correcting the analysis of Kumar et al. accordingly reveals that there is also overall no significant difference in mortality 1 year after surgery between cemented or cementless stem fixation in hemiarthroplasty for a femoral neck fracture (Fig. 1).

✉ Hidde D. Veldman
hidde.veldman@gmail.com

Ide C. Heyligers
id.heyligers@zuyderland.nl

Bernd P. Grimm
bp.grimm@gmail.com

Tim A. E. J. Boymans
t.boymans@mumc.nl

1 Department of Orthopaedic Surgery and Traumatology, Zuyderland Medical Center Heerlen, H. Dunantstraat 5, 6419 PC Heerlen, The Netherlands

2 School of Health Professions Education, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands

3 Musculoskeletal Research Unit, Bristol Medical School-Translational Health Sciences, University of Bristol, Beacon House, Queens Road, Bristol BS8 1QU, UK

4 Sylvia Lawry Centre, The Human Motion Institute, Hohenlindener Str. 1, 81677 Munich, Germany

5 Department of Orthopaedics, Maastricht University Medical Center, P. Debyelaan 25, 6202 AZ Maastricht, The Netherlands

Table 1 Overview of the reported synthesized results by the two most recently published meta-analyses comparing cemented and cementless hemiarthroplasty with exclusively current generation hip stems in the treatment of femoral neck fractures (i.e., Veldman et al. [2] and Kumar et al. [1])

	Veldman et al. [2]							Kumar et al. [1]				
	Published values		Values according to the methods of Kumar et al. for comparisons‡									
	OR/WMD	95% CI	OR/WMD	95% CI	Favours	Studies	Patients CLH:CH	OR/WMD	95% CI	Favours	Studies	Patients CLH:CH
Postoperative hip function	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.45*	0.29 to 0.67	CH	4	275:292
Residual pain	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.89	0.53 to 1.51	CH	3	161:196
Mortality												
1-Year postoperatively	0.82	0.61 to 1.09	0.82	0.61 to 1.09	CH	5	477:473	1.61*	1.10 to 2.36	CLH	4	340:319
2-Years postoperatively	0.91	0.60 to 1.38	0.91	0.59 to 1.38	CH	2	188:192	N/A	N/A	N/A	N/A	N/A
Number of complications												
All	1.61*	1.12 to 2.31	0.62*	0.43 to 0.90	CH	4	305:311	N/A	N/A	N/A	N/A	N/A
Implant related	3.15*	1.55 to 6.41	0.35*	0.17 to 0.73	CH	3	241:245	0.24*	0.14 to 0.41	CH	4	343:368
Cardiovascular	0.54	0.24 to 1.20	1.75	0.77 to 3.97	CLH	4	305:311	N/A	N/A	N/A	N/A	N/A
Local	0.71	0.27 to 1.86	1.30	0.47 to 3.58	CLH	4	305:311	1.30	0.69 to 2.45	CLH	4	343:368
General	1.09	0.62 to 1.91	0.90	0.51 to 1.59	CH	4	305:311	0.26*	0.16 to 0.41	CH	4	343:368
Reoperations	1.24	0.53 to 2.88	0.80	0.34 to 1.89	CH	3	252:258	0.85	0.41 to 1.76	CH	4	343:368
Length of hospital stay [days]	0.36	− 1.13 to 1.85	0.36	− 1.13 to 1.85	CH	3	241:245	N/A	N/A	N/A	N/A	N/A
Intraoperative blood loss [ml]	− 36.19†	− 89.45 to 17.07	34.82*	12.31 to 57.34	CLH	4	424:420	5.89	− 18.88 to 30.65	CLH	4	343:367
Operating time [min]	− 9.96*	− 12.93 to − 6.98	9.96*	6.98 to 12.93	CLH	5	477:473	6.40*	3.40 to 9.41	CLH	4	343:368

*OR or WMD for CLH versus CH is considered statistically significant ($p < 0.05$)

†Data pooled according to the random effects model by Veldman et al. due to moderate or high heterogeneity ($I^2 \geq 50\%$), all other data is pooled according to the fixed effects model

‡Converted values are obtained via the same comparisons as Kumar et al. and are accordingly pooled with the use of inverse variance and according to the fixed effects model

OR, odds ratio (for dichotomous outcomes); *WMD*, weighted mean difference (for continuous outcomes); *CI*, confidence interval; CLH, cementless hemiarthroplasty; *CH*, cemented hemiarthroplasty; *N/A*, not applicable

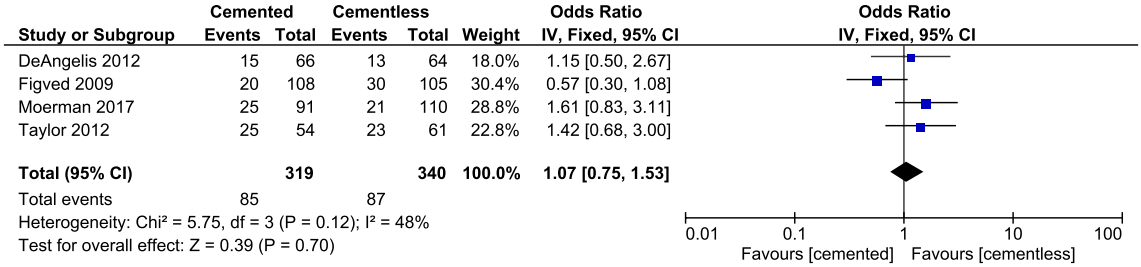

Fig. 1 Forest plot of the mortality after cemented versus cementless hemiarthroplasty at 1 year after surgery. This adjusted figure from Kumar et al. [1, Fig. 9] contains the correct data derived from Figved et al. [6]

In conclusion, the results in both meta-analyses are comparable and their conclusions overall remain valid.

Compliance with ethical standards

Conflict of interest The author(s) declare that they have no competing interests.

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