

## Reply to the Letter to the Editor: Cemented or Uncemented Hemiarthroplasty for Femoral Neck Fracture? Data from the Norwegian Hip Fracture Register

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*To the Editor,*

We thank Drs. Dahl and Pripp for their comprehensive overview of our paper [11] and the pathophysiological processes of bone cement implantation syndrome.

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We agree that the increased risk of death for both the day of operation and the first operative day after cemented hemiarthroplasty is worrying and that bone cement implantation syndrome is a feared complication when treating older patients with cemented hemiarthroplasty [19].

The authors of the letter claim that 60% of the early fatalities were directly attributed to bone cement [17], but the article they refer to is, like our article, based on data from the Norwegian Hip Fracture Registry and has no information on the direct cause of death for the patients that died in the early post-operative period. Thus, selection bias and other confounding factors prevent us from drawing definite conclusions on causality, which normally can't be shown in a register-based study. Drs. Dahl and Pripp believe inadequate surgical technique is the main reason for the increased reoperation rate found for uncemented hemiarthroplasties in our study. They, therefore, suggest that non-cemented hemiarthroplasties should be performed by experienced senior surgeons to minimize fractures and reoperations.

Our study reflects a broad sample of practice across an entire country, and we believe that the study has high generalizability and represents the results of an average surgeon at a

national level. Hemiarthroplasties are performed on a large scale, by both residents and consultant surgeons, and at all hours. Also, when performing sub-analyses including only hospitals performing either uncemented or cemented hemiarthroplasties for all patients, our study showed that the uncemented implants had higher risk for re-operation. By performing these analyses, both the risk of selection bias and the risk that differences in surgeons' experience level influenced the re-operation risk were minimized. Additionally, after THA surgery, which is usually performed by more experienced surgeons, several studies have described an increased risk of reoperation for uncemented stems in patients older than 75 years of age [10, 12].

However, we agree that proper surgical technique is an important factor to avoid periprosthetic fractures and other complications. A reoperation is a devastating complication for this population. One-year mortality is much higher for patients receiving a new operation due to prosthetic joint infection, dislocation, or periprosthetic fracture [1, 6, 9, 16, 18]. Since uncemented stems clearly have increased reoperation rates, an uncemented stem is probably not the solution for most patients [3, 13, 14]. If the frailest patients, most likely

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with the most osteoporotic bone structure and highest risk of subsequent falls and fractures, should be selected for uncemented hemiarthroplasty, this would probably lead to even higher rates of reoperations, especially due to intra-operative and post-operative fractures.

Our results concur with other studies that suggest increased peri-operative and early post-operative mortality after cemented fixation [5, 7, 15], as well as with a recent editorial published in this journal [4]. We still believe that increased mortality within one day of surgery should be addressed. Cementing techniques to decrease the rate of fat embolism have been described, such as cleaning the femoral canal with high-pressure lavage before cementation [2], using a suction catheter, and retrograde cementation [15]. However, the key to minimize the risk of severe cardiorespiratory and vascular complications is not solely in the hands of the surgeons.

As Drs. Dahl and Pripp suggest, interdisciplinary collaboration is necessary. This is also reflected in the recently published safety guidelines from the Association of Anaesthetists of Great Britain and Ireland [8], which should be followed when performing a cemented hemiarthroplasty for hip fracture. If a high-risk patient becomes unstable during anaesthesia, with a chance that he or she will not survive the cementation procedure; other treatment options should be considered. In these settings, good clinical judgement should be used, and there could be a place for an uncemented fixation or osteosynthesis, in a life-saving setting, for some very few patients.

We also agree that patients with severe medical comorbidities who have hip fractures should be treated

within an interdisciplinary collaboration, be medically improved before surgery, and followed closely post-operatively.

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