

Could We Prevent Displacing the Undisplaced Fracture Neck of Femur?

Anoop C. Dhamangaonkar, MD

Lokmanya Tilak Municipal Medical College and Lokmanya Tilak Municipal General Hospital, Sion, Mumbai, India

To the Editor:

I have read the article "Progression of a fracture site impaction as a prognostic indicator of impacted femoral neck fracture treated with multiple pinning" by Yoon et al.¹⁾ in the current issue of your esteemed journal and congratulate the authors. Yet, I would like to elaborate on a few important relevant concepts in the same regard.

The authors have not considered the other vector in the femoral neck collapse. The articulo-trochanteric distance (ATD) in the article and also in the 'capital impaction index' by Shimizu et al.,²⁾ is only the 'vertical' vector of the femoral neck collapse force. This vector only indicates the 'shear' and not the 'impaction' at the fracture site, as is indicated in the title. The true impaction at the fracture site will be determined by the 'horizontal' ATD, that is from the medial most point of head articular surface to the tangent drawn along the lateral most part of the greater trochanter. Hence, more the impaction, greater the decrease in the 'horizontal' ATD and lesser the change in the 'vertical' ATD. Like-wise, greater the shear at the fracture site, greater the decrease in the 'vertical' ATD than 'horizontal' ATD.

With this background, it is stated in this article that there was a greater decrease in the 'vertical' ATD index in the unsuccessful patients i.e., 36% at 3 months (as compared to 7% in successful patients). A decrease in the 'vertical' ATD indicates a shear which means a higher type Pauwel's angle (type III). It would have been very useful if the Pauwel's fracture configuration in the unsuccessful patients would have been stated in the article. Now the trend in osteosynthesis is towards using an angle stable implant in Pauwel's type III neck femur fractures rather than pins or screws^{3,4)} to counter the shear. Some even prefer a valgus osteotomy with screws to convert shear into compression.

At this point, I would want to know, if a preoperative CT scan be useful to determine the Pauwel's angle in an undisplaced neck femur fracture⁵⁾ and then embark on the operative plan rather than waiting for the decrease in

'vertical' ATD in the postoperative period. If the angle is high, a fixed angle implant be preferred over pins at the primary fixation itself.

The age range of participants is 28 to 86 years. Osteomalacia is very common among patients with neck femur fracture.⁶⁾ The authors have not mentioned the mode of trauma and have not screened any patients, especially with undisplaced neck femur fracture, for osteomalacia. The authors have also not mentioned about any perioperative and postoperative calcium and vitamin D supplementation which affects healing and collapse. Some papers discount the value of vitamin D levels in elderly but calcium supplementation is advisable.

I also wish to suggest the use of AO 6.5 partially threaded cannulated cancellous screws be better than using Knowles pins with sharp pointed tips in osteoporotic bone. The possibility of joint penetration in Fig. 4 in the article could have been possibly averted.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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Pil Whan Yoon, Young Ho Shin, Jeong Joon Yoo, Kang Sup Yoon, Hee Joong Kim Reply:

We would like to thank Dr. Dhamangaonkar for his interest in our article and valuable comments.

We do agree with you on your description about the difference in compression and shear forces at the fracture site depending on Pauwels' angle in femur neck fractures. The weak point of the Pauwels' classification is the inaccuracy or inconsistency of the measured fracture angle because of the limb rotation.^{1,2)} Even with CT scan, the rotation might not be controlled well. All the cases of our series were impacted femoral neck fractures with an impaction of the fracture laterally (valgus impacted) or medially (varus impacted). Fracture line becomes more horizontal in valgus impacted fractures and more vertical in varus impacted fractures. Therefore, fixed angle implant might be considered for varus impacted fractures.

Although we did not mention the mode of trauma of our patients, all fractures occurred from low-energy trauma, such as falls from a standing height. No patients had metabolic disease worsening bone quality except for osteoporosis. Perioperatively bone density was checked in all patients and a proper pharmacologic treatment was applied when indicated.

We believe that AO 6.5 partially threaded cannulated cancellous screw is good fixation device for osteopo-

Correspondence to: Anoop C. Dhamangaonkar, MD
Lokmanya Tilak Municipal Medical College and Lokmanya Tilak Municipal General Hospital, 2/28 Madhavi Soc., Mogal Lane, Matunga (W), Mumbai 400016, India
Tel: +91-22-24228305, E-mail: anoopd_7@yahoo.com

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rotic fractures. We have fixed femoral neck fractures using Knowles pins with comparable outcomes simply because we are familiar with this device.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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Correspondence to: Pil Whan Yoon, MD
Department of Orthopedic Surgery, Seoul National University College of Medicine, 101 Daehak-ro, Jongno-gu, Seoul 110-744, Korea
Tel: +82-2-2072-2362, Fax: +82-2-764-2718, E-mail: oskim@snu.ac.kr

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