



## Letter to the Editor

## Letter to the editor on “Titanium neck-titanium stem corrosion in a modular neck stem”

I read with interest the paper entitled by Shah, et al. [1], and I would like to congratulate the authors on a report that deals with the challenging problems of stem, neck, and head modularity.

In my review of the case, I feel confident that the adverse local tissue reaction (ALTR) (and likely the patient's symptoms) was absolutely caused by corrosion of the cobalt-chromium alloy head and titanium (Ti) alloy trunnion. The serum Co of 4.8 ppb is certainly consistent with this diagnosis, as is the lack of an elevation in serum Ti. The authors seem to think that the ALTR may have been caused by the Ti-Ti stem and neck junction in this paper, but I believe that this would be misleading to the journal readers. As Jacobs et al have pointed out, ALTR associated with Ti fretting and corrosion products on a submicron scale has not been described [1]. Cobalt submicron particles, on the other hand, have been shown conclusively to cause ALTR [2,3].

If the authors believe that the Ti alloy femoral neck-femoral stem modular junction was the main reason for this type of failure, they should consider analyzing the specimens with energy-dispersive X-ray or another method to evaluate material distribution in the corrosion products from the adverse reaction. Or, they should analyze the implants' locking mechanisms/tapers. I recommend that the authors use a more sophisticated methodology if they believe that the titanium alloy junction was the problem and one of the reasons for ALTR in this patient.

In the “Discussion” section of the case report, the authors noted that “this is the first case of neck-stem taper discoloration in this Ti alloy stem and only the third case of ALTR with this stem in MoP THA.” The other two cases were not identified in the article; these were the cases presented in the studies by Cooper, et al [4] and Matsen Ko, et al [5]. The authors described “avoiding the routine use of this stem, particularly given its vulnerability to corrosion,” but I do not feel that this recommendation is appropriate based only on their case. Using a non-cobalt-alloy head would, in my opinion, eliminate the rare risk of MACC (mechanically assisted

crevice corrosion) at the head neck junction, and associated ALTR and symptoms.

I agree that corrosion and/or fretting at the neck-stem junction is worth reporting, deserves more thorough investigation, and should be followed up. On the other hand, I think that this discoloration may not lead to clinical ramifications. In the presented case of a “low demand” patient, I may have considered revising the neck and converting to a ceramic head, without revising the well-fixed stem.

## References

- [1] Shah R, Talmo C, Nandi S. Titanium neck-titanium stem corrosion taper corrosion in a modular neck stem. *Arthroplasty Today* 2019;5(2):145.
- [2] Jacobs JJ, Cooper HJ, Urban RM, Wixson RL, Della Valle CJ. What do we know about taper corrosion in total hip arthroplasty? *J Arthroplasty* 2014;29:668.
- [3] Wyles CC, Paradise CR, Masters TL, et al. Cobalt and chromium ion release in metal-on-polyethylene and ceramic-on-polyethylene THA: a simulator study with cellular and microbiological correlations. *J Arthroplasty* 2019. <https://doi.org/10.1016/j.arth.2019.11.031>. [Epub ahead of print].
- [4] Cooper HJ, Della Valle CJ, Berger RA, et al. Corrosion at the head-neck taper as a cause for adverse local tissue reactions after total hip arthroplasty? *J Bone Joint Surg Am* 2012;94(18):1655.
- [5] Matsen Ko L, Coleman JJ, Stas V, Duwelius PJ. Iliopsoas irritation as presentation of head-neck corrosion after total hip arthroplasty: a case series. *Orthop Clin North Am* 2015;26:461.

Kazuo Hirakawa, MD\*

Director, Adult Reconstruction Hip and Knee Service  
Shonan Kamakura Joint Reconstruction Center  
Kamakura, Japan

\* Corresponding author. Shonan Kamakura Joint Reconstruction Center, Kamakura, 247-0061 Japan. Tel.: +81-467-47-2377.  
E-mail address: [hirakawa-k1@skjrc.jp](mailto:hirakawa-k1@skjrc.jp).

11 December 2019

Available online 29 February 2020

DOI of original article: <https://doi.org/10.1016/j.artd.2020.01.005>.

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to <https://doi.org/10.1016/j.artd.2020.01.007>.

<https://doi.org/10.1016/j.artd.2020.01.007>

2352-3441/© 2020 The Authors. Published by Elsevier Inc. on behalf of The American Association of Hip and Knee Surgeons. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).