***CORR* Insights®: Adverse Local Tissue Reaction Associated With a Modular Hip Hemiarthroplasty**

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Where Are We Now?

An inherent problem in joint arthroplasty surgery is the generation of wear debris. Long-term studies of hip implant survival demonstrate that wear debris can remain below a threshold that is well-tolerated by patients. New materials (cross-linked polyethylene, ceramic bearing surfaces) have been developed to improve wear characteristics of the articulation. However, as we are now unfortunately aware, some new implant designs have produced more wear and corrosion debris than traditional implants. Hemiarthroplasties generally were believed to be unlikely to

cause these kinds of problems. However, even a unipolar hemiarthroplasty may have a modular connection (the trunnion), and this connection may be the source of corrosion that can cause a biologically important tissue reaction.

Where Do We Need to Go?

Modular junctions are an integral design feature in hip arthroplasty, allowing the surgeon to modify and optimize leg length and offset. Larger femoral heads can improve ROM and decrease dislocation. It is worrisome that we are now beginning to see significant problems from wear and debris at modular junctions resulting in serious local damage to the surrounding soft tissues and even systemic problems from elevated serum cobalt and chromium. Implant breakage also can occur at modular junctions.

This case report by Whitehouse and colleagues highlights corrosion occurring in a large-diameter head (hemiarthroplasty) on a narrow neck and taper. The authors postulate several contributing factors, including metal mismatch (titanium to cobalt-chromium-molybdenum [Co-Cr-Mo] alloys), low rigidity of the neck, and mechanical forces of a large head on a narrow neck taper. This scenario produced crevice corrosion, metallic debris, tissue damage, and pseudotumor formation.

What we do not know, but need to find out, is the frequency with which this occurs in patients who have hemiarthroplasties, and perhaps more importantly, how often it occurs in patients with THA whose implants have different taper designs and head sizes. We also need to find out whether there are certain patient factors that make it more likely for these reactions to take place.

This CORR Insights® is a commentary on the article “Adverse Local Tissue Reaction Associated With a Modular Hip Hemiarthroplasty” by Whitehouse and colleagues available at: DOI: [10.1007/s11999-013-3133-1](https://doi.org/10.1007/s11999-013-3133-1).

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How Do We Get There?

Many, if not most, of us do not want to give up modularity or even large femoral heads for hip arthroplasty. For hemiarthroplasty, especially in heavy, active patients, I believe a bipolar design may be a better choice. In total hip replacement, if large heads are to be used, I believe that ceramic 36 mm heads may be preferable to Co-Cr heads when using a titanium femoral stem. This minimizes the likelihood of corrosion taking place between the larger head and a relatively narrower taper.

There is little doubt in my mind that the testing and standards of modular junctions, especially new designs, need to be reexamined. To maximize modular junctions, the junction design and materials are critical factors, but little is known about the assembly and impaction techniques that may affect the integrity of the junction. This could be an important factor leading to failure. Finally, in order to provide the best care for our patients, any new design requires early, mid- and long-term clinical surveillance.