

Complications Associated with the Treatment of Tribocorrosion in Patients with Metal on Polyethylene THA

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ABSTRACT

From March 2004 and July 2015 the author performed 3502 primary THAs with MoP bearings. As of June 2018, 92 of these patients (94 hips) have presented with hip complaints, were found by serum testing and MARS-MRI to have tribocorrosion and associated ALTR, and were treated with head and liner exchange. Four hips had abductor tendon damage and had constrained liners placed at the revision.

Postop all patients had normalization of serum cobalt levels, but many did not have return of Harris Hip Scores to pre-corrosion levels. Complications included 5 dislocations (2 recurrent requiring constrained liners), 2 trochanteric fractures and 2 deep infections.

Although revision for tribocorrosion is effective and the recovery generally rapid, patients should be counseled regarding the complicated risks.

BACKGROUND

Adverse local tissue reaction (ALTR) due to tribocorrosion with metal-on-polyethylene (MoP) bearings is being reported more commonly. In 2017 we first shared our experience with serum cobalt level testing, confirming its value in the evaluation of the painful THA. In the course of treating nearly 100 of our own patients with this condition, we have noted some consistent themes of presentation, surgical findings and postoperative course that could serve to improve patient counseling and outcomes of revision surgery.

OBJECTIVE

To report our results regarding the incidence of ALTR with MoP bearings, the results of treatment, and the expected complications.

MATERIALS AND METHODS

Step One: Identify at-risk patients

- Complaint-driven serum cobalt testing
- If cobalt is elevated → MARS-MRI
- Symptoms + Elevated serum cobalt + imaging confirmation → revision offered

Step Two: Address the Problem

- Open hip exploration
- Debride pseudotumor if present
- Exchange metal head for ceramic ± titanium taper sleeve
- Constrained liner for hips with significant damage to abductors

Step Three: Monitor Recovery

- Warn patients about dislocation
- Recheck serum cobalt at 6 and 12 wks
- Treat complications as they occur

RESULTS - I

Patients at Risk

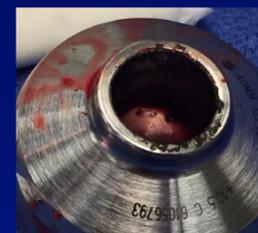
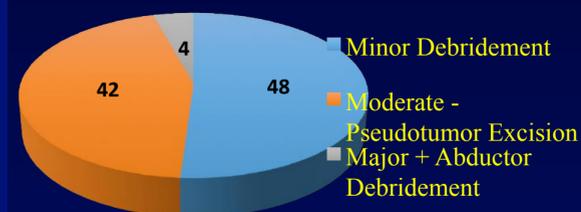
- **264** patients had serum metals tested
- **97** patients (37%) had elevated cobalt levels (mean 9.3 ppb, range 2.7-45.7 ppb).
- **93** patients had MARS-MRI scans
 - Pseudotumor in 48 (52%)
 - Peritrochanteric fluid in 36 (39%)
 - Thickened capsule only in 8 (9%)

RESULTS - II

The Problem Addressed

- **96** hips revised (posterior approach)
- **94/96** with confirmed ALTR
- 2 loose stems without tribocorrosion
- 0 shell revisions – 5 locking rings damaged and replaced

Distribution of Procedures



Recovery Phase

- **100%** had normal serum tests after 3-6 months
- Mean Harris Hip Score reduced from peak of 97 to 93 points at one year post revision (p=N.S.)
- **10% (9/96)** had complications
 - 5 dislocations
 - 2 anterior
 - 2 required constrained liners
 - 2 trochanteric fractures
 - 2 deep infections

DISCUSSION

Comparison of ALTR cases with entire population of MoP primary THAs implanted 3/1/04 -7/1/2015

	All Primary THAs	Confirmed ALTR
Number of Hips	3502	94
Mean Age at DOS	67	63
Mean BMI	27	28
% Female	55	50
% 40mm heads	46	50
% 36mm heads	23	22
% 32mm heads	30	28
% ≥ +7mm neck	19	25

Differences did not meet statistical significance

- Study Strength - Single surgeon performed all of the primary and revision procedures.
- Study Weakness – Symptoms required to trigger serum cobalt screen. Many patients may be asymptomatic and thus have not been screened.

CONCLUSION

- Tribocorrosion is one of the most common causes of pain in the hip arthroplasty patient.
- One third of patients with THA symptoms had elevated serum cobalt levels and abnormal MARS-MRI
- Surgery resulted in normalization of serum metal levels but not always pain relief
- Complication rate is 10%
- Surgeon familiarity with the specific polyethylene liner-locking mechanism can minimize need for shell revisions
- Patients facing this seemingly innocuous procedure should be counseled accordingly.