Metal Hypersensitivity After Spinal Instrumentation: When to Suspect and How to Treat

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Disclosures

None
Metal hypersensitivity is a rare complication after spinal instrumentation placement but is related to significant clinical challenges including implant failure and poor wound healing.

The incidence is likely underreported secondary to challenges with diagnosis and retreatment options.

There is limited definitive diagnostic guidelines or retreatment options and timelines reported in spine literature.

We present a case of a 41 year old woman with metal hypersensitivity status post Anterior Lumbar Interbody Fusion (ALIF) after a previously failed revision procedure who presented with low back pain and various systemic symptoms.
Methods

A meticulous review of outside medical records and discussion with the patient and family was performed to report accurate case details.

Report of current in hospital and clinic medical records were reviewed for present details of the patient’s history, surgery and recovery.

Review of the literature was performed for discussion of related cases, using PubMed and the key words: lumbar spine, metal hypersensitivity, metal allergy, anterior lumbar interbody fusion.
A 41 year old female presented with metal hypersensitivity status post Anterior Lumbar Interbody Fusion (ALIF) after a previously failed revision procedure with persistent low back pain and various systemic symptoms.

Diagnostics revealed presacral fluid collection which was negative for infection. A detailed work-up ruled out other possible differential diagnoses and confirmed hypersensitivity to Nickel.

Intraoperatively, the interbody was loose but difficult to remove secondary to scar tissue.

Ultimately, it was successfully replaced with a PEEK interbody, which did not contain nickel.
Timeline of Case

May 2012
L5-S1 ALIF
• Improvement of discogenic LBP, 3 mos postop developed progressive abdominal pain
• August 2012: Crohn’s Diagnosis
• 2016: onset of insidious lumbar pain

Nevro Spinal Cord Stimulator Placement
• Peri-incisional dermatitis, poor wound healing
• Antibiotic trial

June 2016
Wound Washout
• Primary wound closure obtained, notable peri-incisional dermatitis
• Dermatology Referral

May 2016
Revision Surgery
• Left common iliac vein densely adherent to anterior aspect of hardware, intraoperative vascular injury with significant bleeding, implant explantation aborted

May 2018
Explantation of Nevro SCS
• Partial improvement in symptoms
• Consideration of explantation of interbody

Aug. 2019
Additional Surgery
• Posterior percutaneous pedicle screw instrumentation (Medtronic)

Nov. 2018
Revision Surgery
• Iliac artery and vein adherent to vertebral bodies, original interbody was loose but adhered with scar tissue
• Original interbody replaced with Medtronic Sovereign Cage (PEEK material)

Nov. 2017
Left common iliac vein densely adherent to anterior aspect of hardware, intraoperative vascular injury with significant bleeding, implant explantation aborted
1 Mos Post Op Radiographs

Diagnostic Imaging
### Suspect Spine Implant Metal Allergy

#### History/Presentation

- History of cutaneous metal sensitivity
- Delayed onset of postoperative pain
- Peri-incisional skin reaction

#### Diagnostics

- Rule out Infection and Differential Diagnoses
- Lab Work: ESR, CRP, CBC
- Imaging: rule out mechanical factors, hardware positioning, hematoma
- Patch Testing: implant elements, cement/bone graft material, antibiotics
- Peri-Implant Tissue: histology and immuno-histochemistry

#### Retreatment Options

- Consider revision surgery with implant explantation when:
  - 1. Patch test is positive for implant material
  - 2. Peri-implant tissue analysis confirms hypersensitivity reaction

#### Additional Retreatment Considerations

- Replace allergenic implant with hypoallergenic material, such as titanium or carbon
- Decision for additional revision or fixation should be based on a case by case basis and patient/surgeon preference
We postulate a diagnostic workflow with retreatment considerations, which is a summary of evidences available in literature.

In a patient where implant allergy is suspected, appropriate work up involves detailed history and physical examination. There should be no delay in further diagnostic work up which aims to rule out infection and other differentials or confounding conditions and confirm a hypersensitivity reaction as the cause of presenting symptoms.

- **Lab work** can confirm absence of infectious processes
- **Imaging** is essential to assess for mechanical factors.
- **Patch testing** and peri-implant tissue analysis will confirm hypersensitivity reaction.

When diagnostic workup confirms metal hypersensitivity reaction without infectious process, we recommend prompt discussion of retreatment options to avoid prolonged symptomatology.

Definitive treatment is commonly explantation of the offending implant, which can be considered following conclusive diagnostics. However, retreatment options should be discussed with the patient as additional considerations in regards to type of revision procedure and need for additional fixation may be variable and must be considered on a case by case basis.
Metal hypersensitivity is likely an **underreported complication** in spine literature that is **associated with poor outcomes**.

Further research to **create evidence based guidelines** on diagnosis and retreatment options will facilitate diagnosis, reduce time to revision surgery and **ultimately decrease patient suffering**.


