Implant Dermatitis
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F028 – Advanced Patch Testing: Pearls from the ACDS

The most common types of implants that require evaluation in patch test clinics are orthopedic, cardiac and dental devices.

Review of patch testing for hypersensitivity to implanted metal devices:

Pre-implant testing:
• Routine testing not recommended
• Self-reported history of intolerance to jewelry not adequate screen
• 2 screening questions for nickel:
  • Are you sensitive, hyper-sensitive, or allergic to nickel? PPV 59%
  • Do you get a rash from metal buttons, jewelry, or other metal items that come in direct contact with your skin? PPV 60%
• If patient strongly believes allergic, consider patch testing

Post-implant testing:
Major and minor criteria for metal hypersensitivity reaction after implantation:

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<th>Major</th>
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<tr>
<td>Eruption overlying the metal implant</td>
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<td>Positive patch test reaction to a metal used in the implant</td>
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<td>Complete recovery after removal of the offending implant</td>
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<td>Chronic dermatitis beginning weeks to months after metallic implantation</td>
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<table>
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<th>Minor</th>
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<td>Unexplained pain and/or failure of the offending implant</td>
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<td>Dermatitis reaction is resistant to therapy</td>
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<td>Morphology consistent with dermatitis (erythema, induration, papules, vesicles)</td>
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<td>Systemic allergic dermatitis reaction</td>
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<tr>
<td>Histology consistent with allergic contact dermatitis</td>
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<td>Positive in vitro test to metals (eg, the LTT)</td>
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Adapted from Schalock and Thyssen.96

Implant Patch Test Panels:
• Commercially available “Metal Implants” Panel
• NACDG screening series
• Orthopedic
  • Contact Dermatitis 2011; 66: 4–19
  • Dermatitis 2011; 22: 65–79
  • Archives of Dermatology 2012; 148: 687-693
• Cardiac
  • Contact Dermatitis 2008; 59: 7–22
• Dental
  • Dental Screening Panels
Orthopedic Implants
Materials to consider:
• Metals: vitallium, stainless steel, titanium, nitinol, oxinium
• Bone cement and other additives

Types of reactions:
• Localized dermatitis
• Generalized dermatitis
• Noncutaneous complications


Cardiac Implants:
Stents:
• There is a correlation between gold stents and increased risk of in-stent restenosis.
• There is not an increased risk of in-stent restenosis with nickel or chromium.

Pacemakers and defibrillators:
• Reactions to Titanium, Nickel, Cobalt, Chromium, Mercury, Epoxy, Polychloroparaxylene (parylene), Polyurethane, Polysulfone beige, Thiuram mix and Silicone adhesive have been reported.
• Clinical presentations include Localized erythema, Concern for infection, Device Extrusion, Pain, Pruritus.
• Patients may present with bilateral scars on chest from multiple device extractions.
• Device companies can custom-build devices; polytetrafluoroethylene (PTFE) coatings have had some success.

Dental Implants:
• Clinical presentations include Lichen planus, stomatitis, Periodontitis, Cheilitis, Aphthous ulcers, Glossodynia, Burning mouth/tongue, Gingivitis. Most common are lichen planus and stomatitis.
• In one study, 22% of patients who presented with stomatitis and 14% of patients who presented with lichen planus had a possible contact allergy.

Oral lichen planus:
• Common allergens include Gold, Amalgam (mercury), Palladium, Copper, Silver, Acrylates
• 8 of 13 patients with lichen planus and positive patch test to metals had implant removed and were asymptomatic at 1 year.
• Patients with pos patch to mercury compounds and lesions adjacent to and up to 1cm away from implant had implant removed and most improved or were clear. If lesions were further away, likelihood of pos patch was lower and patients also less likely to improve with removal of implant.

Contact stomatitis:
• The term stomatitis represents different types of clinical oral presentations of allergic contact dermatitis
• Has been reported with acrylates, metals and with different types of implants (crowns, orthodontics, prostheses, fillings)

Select References:
Dermatitis 2016;27(5):241-47
Dermatitis 2013;24(6):313-320
Dermatitis 2013;24(4):183-185
Dermatitis 2011;22:65-79
Contact Dermatitis 2011;64:138-41
Contact Dermatitis 2010;62:289-293
Contact Dermatitis 2009;60:158-164
Contact Dermatitis 2009: 60: 339–343
Contact Dermatitis 2008;59:7-22
Contact Dermatitis 2003; 49: 264-265
PACE 1997;20:372-373
J Artificial Organs 2014;17:285–287
Arch Dermatol. 2004;140:1434-1438
Implant patch test publications listed above