Letter to the Editor

Nickel Allergy, Amplatzer Atrial Septal Occluder Device, and the Risk of Kounis Syndrome

Rabkin DG, Whitehead KJ, Michaels AD, Powell DL, Karwande SV. *Clin Cardiol* 2009;32:E55–57.

To the editor:

In a very interesting report published in this journal[1] concerning a 52-year-old woman with an Amplatzer atrial septal occluder device implantation, the authors reported that the patient experienced repeated attacks of severe, burning left-sided chest pain which disappeared following explantation of the device. The Amplatzer occluder device is made from nitinol which is a nickel-titanium alloy. Although the electrocardiographic findings during the chest pain attacks have not been given, the patient's chest pain is characteristic for Kounis hypersensitivity coronary syndrome.[2]

It is known that hypersensitivity reactions to nickel occur in up to 17.2% of the population and are the most frequent cause of allergic contact dermatitis.[3] In patients undergoing percutaneous atrial septal defect and patent foramen ovale closure, nickel allergy can be the cause of systemic reactions such as chest discomfort, palpitation, and migraine headache with or without aura.[4] Local nickel allergy from intracardiac devices and subsequent systemic allergic reactions confirmed by patch tests as an allergy to nitinol have necessitated the removal of these devices.[5]

Reports concerning hypersensitivity reactions to various metals used in orthodontics have also been published and nickel was the metal provoking the most severe responses.[6] Delayed hypersensitivity reactions to nickel and molybdenum might be part of the inflammatory process and one of the triggering factors for development of in-stent restenosis.[7] The rate of nickel allergy following initial stent implantation has been estimated to be 9.2%.[8]

Skin clips containing nickel, chromium, molybdenum, cobalt, and titanium can induce allergic reactions and may be the cause of delayed wound healing.[9] It is known that the metal strut in coronary stents is made from 316L stainless steel containing nickel, chromium, manganese, titanium, and molybdenum.

Based on the above clinical observations, we believe that nickel allergy history should be ascertained in all patients prior to undergoing Amplatzer device or coronary stent implantation. Indeed, newer stent devices (eg, Endeavor with zotarolimus (Medtronic, Minneapolis, MN) and Xience V with everolimus eluting drugs (Abbott Laboratories, Abbott Park, IL)), avoid nickel struts and use cobalt-chromium struts which are less allergenic, thus following our recommendations.[10] The same should be applied in the newer Amplatzer atrial septal occluder devices.

GC Almpanis MD; GG Tsigkas MD; GN Kounis MD MSc; NG Kounis MD, PhD
Department of Cardiology, University of Patras Medical School, Patras, Greece

References

1. Rabkin DG, Whitehead KJ, Michaels AD, et al. Unusual presentation of nickel allergy requiring explantation of an Amplatzer atrial septal occluder device. *Clin Cardiol*. 2009;32:E55–57.
2. Kounis NG. Kounis syndrome (allergic angina and allergic myocardial infarction): a natural paradigm? *Int J Cardiol*. 2006; 110:7–14.
3. Oppei T, Schnuch A. The most frequent allergens in allergic contact dermatitis. *Dtsch Med Wochennschr*. 2006;131:1584–1589.
4. Fukahara K, Minami K, Reiss N, Fassbender D, Koerfer R. Systemic allergic reactions to the percutaneous patent foramen ovale closure. *J Thoracic Cardiovasc Surg*. 2003;125:213–214.
5. Dasika UK, Kanter KR, Vincent R. Nickel allergy to percutaneous patent foramen ovale occluder and subsequent systemic nickel allergy. *J Thoracic Cardiovasc Surg*. 2003;125:2112–2113.
6. Menezes LM, Campos LC, Quintao CC, et al. Hypersensitivity to metals in orthodontics. *Am J Orthod Dentofacial Orthop*. 2004;126:58–64.
7. Koster R, Vieluf D, Kiehn M, et al. Nickel and molybdenum contact allergies in patients with coronary in-stent restenosis. *Lancet*. 2000;356:1895–1897.
8. Iijima R, Ikari Y, Amiya E, et al. The impact of metallic allergy on stent implantation. Metal allergy and recurrence of in-stent thrombosis. *Int J Cardiol*. 2005;104:319–325.
9. Lhotka CG, Szekeres T, Fritzer-Szekeres M, et al. Are allergic reactions to skin clips associated with delayed wound healing? *Am J Surg*. 1998;176:320–323.
10. Kounis NG, Kounis GN, Kouni SN, et al. Allergic reactions following implantation of drug-eluting stents: a manifestation of Kounis syndrome? *J Am Coll Cardiol*. 2006;48:592–593.

Received: December 5, 2009
Accepted: December 11, 2009

Published online in Wiley InterScience. (www.interscience.wiley.com)
DOI:10.1002/clc.20735 © 2010 Wiley Periodicals, Inc.