

### **Serum Nickel And Titanium Levels After Transcatheter Closure Of Atrial Septal Defects With Amplatzer Septal Occluder**

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**Introduction:** The Amplatzer septal occluder (AGA Medical Corporation, Golden Valley, USA) is one of the most frequently used device for transcatheter closure of secundum-type atrial septal defects (ASDs). The Amplatzer septal occluder consists of nitinol wire mesh. Nitinol, an alloy composed of 55% nickel and 45% titanium. It has made ASDs closure safe, easy and successful. However, there is a concern about release of nickel and titanium after implantation of nitinol devices.

**Objective:** To evaluate serum nickel and titanium levels after transcatheter closure of ASDs with Amplatzer septal occluder.

**Methods:** The study registered 38 pediatric patients with ASDs and no history of nickel sensitivity have undergone percutaneous closure of ASDs with the Amplatzer septal occluder. Blood samples were drawn 24 hours before and 24 hours, 1, 3, 6 and 12 months after occluder implantation. The serum nickel and titanium concentrations were measured in each sample by atomic absorption spectrophotometry. Serum levels of nickel  $\leq 2$  ng/mL were considered to be normal.

**Results:** the mean patient age was  $6.7 \pm 3.72$  years and weight  $23.24 \pm 13.37$  kg. The mean size of the implanted occluder was  $14.0 \pm 4.66$  mm. Before occluder implantation, these levels were 0.56 ng/mL. They increased to 1.28 ng/mL 24 hours after implantation and reached maximum levels one month after implantation, with a mean of 1.96 ng/mL. There was a decline to a mean of 1.75 ng/mL 3 months after implantation, to 1.22 ng/mL 6 months after implantation and to 0.66 ng/mL 12 months after implantation. Statistical evaluation with the Wilcoxon test showed that the rise in serum levels of nickel 24 hours, 1 and 3 months after implantation was significant. No allergic or toxic reactions were observed during follow-up. No patients showed a detectable serum titanium level.

**Discussion:** Our study shows that nickel is released from the Amplatzer septal occluder in the first few months after implantation. Conversely of this, no patients showed a detectable serum titanium level. Although nickel may cause toxic and allergic responses in patients who have nickel allergy, nitinol devices such as Amplatzer septal occluder can be use for transcatheter closure of ASDs.