

Surgical Solution to an Intracorporeal Nickel Allergy

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A previously healthy 30-year-old man with a symptomatic varicocele underwent gonadal vein embolization using nickel vascular plugs. He developed a painful hypersensitivity to his nickel plugs and elected to pursue laparoscopic excision and proximal gonadal vein ligation. In the operating room, the gonadal vein was isolated from the ureter, and ligated proximal to the cephalad plug and distal to the caudal coil. His pain is completely resolved 5 months after surgery. Metal allergies are well documented in orthopedics and cardiology implants, but there are a limited number of case reports of metal allergies after varicocele embolization. Interestingly, nickel is the most common type of metal hypersensitivity.

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KEY WORDS

Metal allergy • Nickel • Coil embolization • Gonadal vein • Varicocele

Varicocele is a common condition, affecting approximately 15% of the male population.¹ Postprocedural recurrence of symptoms is reported in 5% to 10% of patients, with variation depending on surgical approach.² The most common procedural approaches to varicocele ligation include open inguinal varicocelectomy, subinguinal microscopic varicocelectomy, and percutaneous gonadal vein embolization. Choice of treatment is typically based on complication rates, cost, and surgeon and patient preference. A microsurgical approach has the lowest recurrence rate of approximately 1% to 2%, although gonadal vein embolization avoids

complications associated with inguinal dissection and general anesthesia.³

Case Report

A previously healthy 30-year-old man underwent gonadal vein embolization with two AMPLATZER™ (St. Jude Medical, St. Paul, MN) nickel vascular plugs and nitinol coils for a symptomatic varicocele in 2010. He developed significant left lower quadrant pain immediately after surgery that did not resolve over several years. Hypersensitivity testing performed at two separate institutions revealed he was highly reactive to nickel. He presented to our

Figure 1. Preoperative coronal computed tomography scan. (Top) Position of the proximal gonadal vein plug. (Bottom) Position of the distal gonadal drain plug.



clinic regarding possible excision of his nickel-based varicocele plugs (Figure 1). After extensive counseling regarding the unique nature of this issue and ambiguous etiology of his pain, the decision was made to pursue laparoscopic excision of his nickel plugs and proximal ligation of the gonadal vein.

Management and Outcome

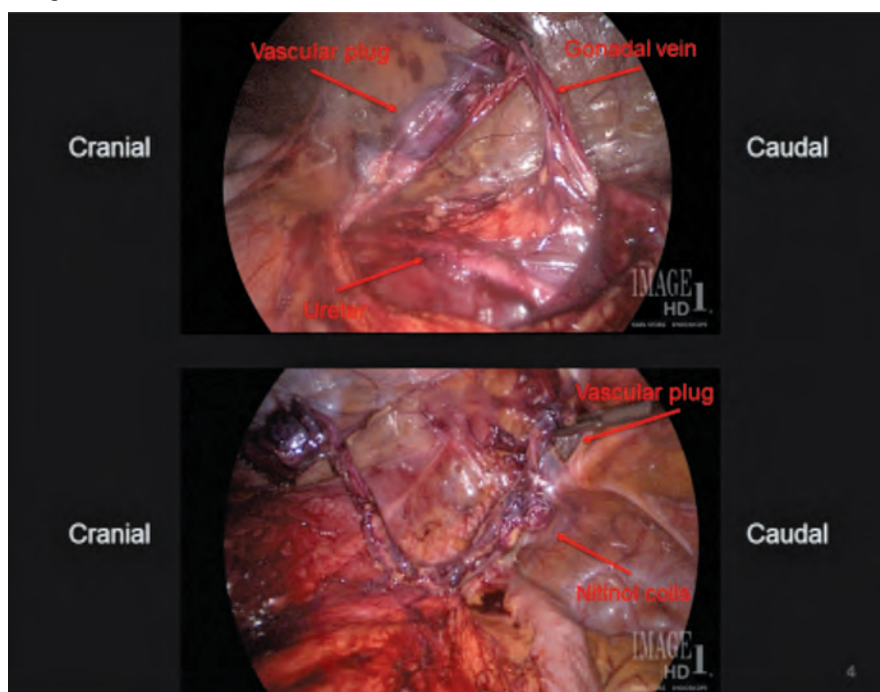
In the operating room, exposure was obtained using a four-port laparoscopic approach. The gonadal vein was easily visualized and carefully isolated from the ureter. The proximal nickel plug was identified and the vessel ligated proximal to this coil (Figure 2A). Dissecting inferiorly, the distal-most vascular plug was delivered through

the internal inguinal ring, taking meticulous care to avoid the vas deferens (Figure 2B). The gonadal vein was then ligated distal to the plug and the specimen delivered en bloc. The patient tolerated the procedure well and was sent home the same day. His pain is completely resolved at postoperative month 5 with notable quality-of-life improvement.

Discussion

The treatment approach to varicocele varies by region, provider, and patient preference.⁴ When a percutaneous approach is chosen, options for vein occlusion typically include vascular plugs, coils, or sclerotherapy with glue. The latter is the cheapest option, but carries a higher rate of recurrence compared with coils or plugs. There are a variety of options for vascular plugs including platinum, nickel, and steel plugs. Vascular plug selection is mostly institution dependent, but nickel is the cheapest option. Nickel

Figure 2. Intraoperative exposure of gonadal vein and vascular plugs. (A) The gonadal vein was easily visualized and carefully isolated from the ureter. The proximal nickel plug was identified and the vessel ligated proximal to the caudal coil. (B) The distal-most vascular plug was delivered through the internal inguinal ring, taking meticulous care to avoid the vas deferens.



is also well established as the most common type of metal hypersensitivity.⁵ Here we present a rare complication of failure of nickel plug embolization due to an allergenic pain response.

Given the unusual nature of this complication, there is a high likelihood of delay or lack of appropriate

plug was eventually explanted and the PFO repaired primarily. Her symptoms subsequently resolved. Although there have been limited instances of vascular plug allergies in the literature, explantation thus far has been the most definitive treatment. We should consider this in our differential diagnosis of

responses will likely require a large cohort study of metal implants across multiple specialties, such as orthopedics, cardiology, neurosurgery, and interventional radiology. Many varicocele patients are not offered a microsurgical approach. Referral to a urologist trained in this approach should be considered in initial evaluation of these patients. ■

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diagnosis. In this patient, the critical portion of the workup to obtain a diagnosis was formal allergy testing. Metal allergies are well documented in orthopedics and cardiology implants, but there are a limited number of case reports of metal allergies after varicocele embolization. There is one case report of a platinum allergy to varicocele coils, which presented with postprocedure urticaria and paresthesia.⁶ These symptoms resolved after explant, like the case presented here.

Additionally, there is a case report of an allergic response after use of this same nickel plug in a patent foramen ovale repair (PFO).⁵ Similarly, the patient presented with persistent long-term pain. The

these patients, particularly when nickel devices have been implanted.

Areas for future study include the role of pre-embolization allergy testing, large patient cohort analysis of metal implant allergies, and

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development of a model for access to a microsurgical specialist. It is unclear which patients, if any, should undergo metal allergy testing before implantation. A cost analysis could be of benefit to determine if this is worthwhile, given the rare nature of this complication. Detecting such allergic

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MAIN POINTS

- When a percutaneous approach is chosen to treat a varicocele, options for vein occlusion include vascular plugs, coils, or sclerotherapy with glue. The latter is the cheapest option, but carries a higher rate of recurrence compared with coils or plugs.
- There are a variety of options for vascular plugs including platinum, nickel, and steel plugs. Vascular plug selection is mostly institution dependent, but nickel is the cheapest option. Nickel is also well established as the most common type of metal hypersensitivity.
- Areas for future study include the role of pre-embolization allergy testing, large patient cohort analysis of metal implant allergies, and development of a model for access to a microsurgical specialist if desired. It is unclear which patients, if any, should undergo metal allergy testing before implantation.