

IMAGING CASE

Sublingual Nitroglycerin Administration to Relieve Radial Artery Vasospasm and Retrieve Wedged Catheter: A Consideration in Neuroangiography

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BACKGROUND: Radial artery spasm is a common hinderance during transradial approaches for neuroangiography. Ways of alleviation have been described, including patient sedation, local lidocaine, or even prophylactic administration of intra-arterial vasodilators.

METHODS: We present a case of a wedged catheter attributable to radial artery spasm, which failed all conventional methods to relieve spasm.

RESULTS: The catheter was ultimately removed after administration of sublingual nitroglycerin.

CONCLUSION: To our knowledge, this is the first time sublingual nitroglycerin has been reported as an effective means to alleviate radial artery spasm during a transradial approach for neuroangiography.

A 62-year-old man was found to have an incidental 5-mm broad-based left ophthalmic artery aneurysm. A transradial approach for diagnostic cerebral angiography was elected. The patient was brought to the operating room and underwent monitored anesthesia care with midazolam. The right radial artery was visualized under ultrasonography. The 1% lidocaine was infiltrated in the subcutaneous space, and the artery was accessed with a micropuncture device under ultrasound visualization. A 5F radial artery sheath was inserted into the artery. Verapamil (5 mg) and nitroglycerin (200 μ g) were administered through the sheath. A total of 8000 units of heparin was delivered systemically. A 5F pigtail catheter was then advanced over a Glidewire. There was noted resistance of the catheter at the level of the forearm in the right radial artery (Figure 1). The Glidewire was trapped near the axilla. Attempts were made to remove the Glidewire and pigtail catheter, without success. The patient was furthered

sedated with fentanyl and midazolam without resolution of vasospasm. Topical nitroglycerin paste was administered over the site of the tip of the catheter and allowed to induce transdermally to allow for vasodilation. The catheter remained trapped. The patient was then given 0.4 mg of sublingual nitroglycerin. There was a significant reduction in systolic blood pressure from 147 to 120 mm Hg with simultaneous peripheral vasodilation, and the catheter and Glidewire were retracted with ease. The patient remained hemodynamically stable. The case was converted to transfemoral access. The patient tolerated the procedure well otherwise and was discharged the same day.

DISCUSSION

Transradial approach (TRA) for endovascular therapy is a mainstay for coronary and peripheral procedures, and more recently has become more common for many

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[Correction added on 13th May 2022, after online publication: The copyright line is changed].

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Nonstandard Acronym and Abbreviation**TRA** transradial approach

neurovascular procedures. Benefits of the TRA over the historically used transfemoral approach include reduction in complications, decrease in all-cause mortality, immediate patient ambulation postoperatively, reduced postoperative nursing care, reduced hospital stay, and patient preference.¹

There remains limitations to TRA, including the smaller caliber of a radial artery that can preclude accessing the vessel, vasospasm that can impede advancing or withdrawing the catheter, and anatomic variations of the radial artery, which can impede performing the procedure. Radial-specific devices have been more focused to coronary arteriograms, and therefore optimal devices for maneuvering through the aortic arch and neurovasculature are required. Literature also suggests that radial approach may have a steeper learning curve.²

Radial artery spasm is a well-documented complication during the TRA. Radial artery spasm tends to

CLINICAL PERSPECTIVE

- Sublingual nitroglycerin has not been described as a salvage method for wedged catheter in a spastic radial artery during transradial approach for neuroangiography.
- Sublingual nitroglycerin proved to be a safe and effective method of alleviating radial artery vasospasm and can be trialed if all else fails to remove a wedged catheter.

happen at the beginning of the case while obtaining access and may preclude catheterization. Means of alleviating spasm include adequate intravenous sedation and local anesthetic. Prophylactic vasodilation with verapamil and nitroglycerin through the vascular sheath after placement are also used.²

Spasm during the case or toward the end of the procedure can lead to difficulty with catheter removal, and even sometimes, arterial rupture.³ Some methods to alleviate this obstacle include administrating spasmolytics either through the guide sheath or locally in

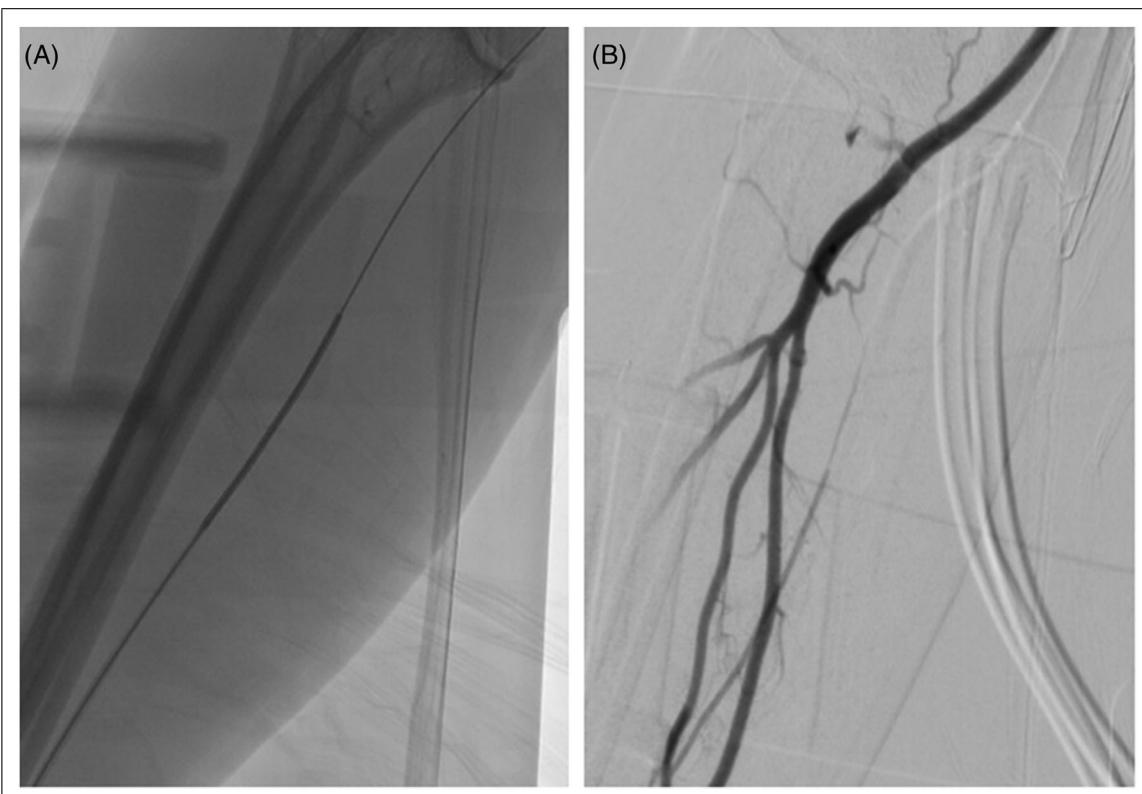


Figure 1. Fluoroscopy images of right arm. A, Single fluoroscopy shot of catheter and guide wire trapped in the right radial artery. **B,** Contrast injection of radial artery. There were normal findings with no vascular damage.

the periarterial space, patient sedation to reduce catecholamine response, warm compress, and ulnar artery compression.⁴

Nitrate compounds have been described as methods to prevent radial artery spasm in the cardiac literature.⁵ Herein, we present a case of a transradial diagnostic cerebral angiography complicated by severe spasm, resulting in complete inability to pass or remove the catheter. Despite using most of the recommendations published to date, the catheter remained immobile. Vasospasm finally resolved, and the catheter was subsequently removed after administration of sublingual nitroglycerin.

Once the artery is accessed, important considerations include sheath size and catheter manipulation. If the artery spasms during or toward the end of the case, catheter retrieval and sheath removal can become cumbersome, and risk arterial rupture. After attempts at well-known methods of relieving spasm, we were able to remove the catheter using sublingual nitroglycerin, which allowed for vasodilation without hemodynamic instability in a patient with several comorbidities. Although intravenous nitrates have been used for relieving spasm or vasodilation in the TRA, sublingual nitroglycerin has the benefit of less hemodynamic intolerance and postadministration headache, and can also be administered repeatedly in a short time course.⁶ Still, practitioners should be aware of drug-drug interactions with sublingual nitroglycerin, as well as common adverse effects, such as headache, postural hypotension, and reflex cardiac sympathetic activation. It is contraindicated in patients with hypertrophic cardiomyopathy and those allergic to nitrates.⁷ Our technique allows for a quick, painless, and safe method of vasodilation for removal of the catheter.

ARTICLE INFORMATION

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