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Case Report

Axillary and Brachial Artery Thrombosis after Left Radial Access for Coronary Angiography

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Abstract

One case of brachial artery occlusion and no cases of axillary artery occlusions have been reported in the literature. Here we describe a case of a 50 years old female who presented for diagnostic coronary angiogram after having a positive stress test who developed a brachial, axillary and radial artery thrombosis after left transradial access.

Keywords: thrombosis; electrocardiography; hydrophilic

Introduction

Summary: Radial artery occlusion is one of the most commonly reported complications of transradial access. One case of brachial artery occlusion and no cases of axillary artery occlusions have been reported in the literature. Here we describe a case of a 50 years old female who presented for diagnostic coronary angiogram after having a positive stress test who developed a brachial, axillary and radial artery thrombosis after left transradial access.

Background

In the last decade, more operators have transitioned to a radial access approach as opposed to femoral access for coronary angiography due to lower bleeding rates, less vascular complications, earlier ambulation and comfort for the patient [1,2]. Radial artery thrombosis occurs in 5-10% of patients undergoing radial access for coronary angiography but its incidence may be underestimated due to the lack of patient symptoms [3]. While radial artery occlusion is fairly common, thrombosis of more proximal arteries after radial access is rare. We present what we believe is the first reported case of axillary thrombosis complicating transradial diagnostic cardiac catheterization.

Case Presentation

A 50-year-old female with prior right wrist arthroscopy and residual impairment of supination of the right arm presented with resting chest pain. Electrocardiography was normal. She had no history of peripheral arterial disease or any predisposing condition to thromboembolic events. Exercise stress echocardiography produced exercise-induced chest pain and showed exercise-induced wall motion abnormalities suggesting ischemia in the mid anterior wall.

Investigations

Coronary angiogram was performed using left radial access because of her prior right wrist surgery. The modified Seldinger technique with a 21g needle was used to access the left radial artery and a 6 French 25 cm Glidesheath hydrophilic coated sheath (Terumo, Elkton, MD) was placed without difficulty. Heparin 5000u IV (equivalent to 62 IU/kg) was given. Judkins Left 3.5 and right 4 5 French catheters were used to engage the coronary arteries, all of which were angiographically normal. Procedure time was 32 minutes and fluoroscopy time was 6.5 minutes. No radial artery spasm was noted throughout the procedure. Post procedure patent hemostasis was achieved using the TR band.

Differential Diagnosis

The differential diagnosis included coronary artery disease, false positive stress test, prinzmetal's angina, non-cardiac chest pain such as stress or anxiety induced, costochondritis, GERD.

Treatment

Within an hour post coronary angiography, she developed left arm pain not relieved with Tylenol and ibuprofen. Examination showed the hand was warm and well-perfused and the radial pulse was intact. She was admitted overnight for observation and pain control. At discharge the next day she had mild swelling and tenderness to palpation proximal to radial access site with no hematoma. The arm was noted to be warm and well-perfused, but pulses were not recorded and duplex ultrasound was not performed.

Four days after discharge, she returned with left arm pain and her hand was cold to touch. An upper extremity arterial duplex ultrasound showed thrombosed axillary, brachial, radial arteries with patent ulnar and subclavian arteries (Figures 1,2). Computed tomographic angiography of the chest and

upper extremity showed long segment left brachial artery and radial artery occlusions. There was preserved flow to the hand through the ulnar artery and collaterals. She was started on intravenous heparin and on the next day, she underwent successful left axillary, brachial, and radial artery surgical thrombectomy. She was discharged home on warfarin with target INR of 2-3 and aspirin 81mg daily. At that time, she had palpable brachial, radial and ulnar pulses and intact sensation.

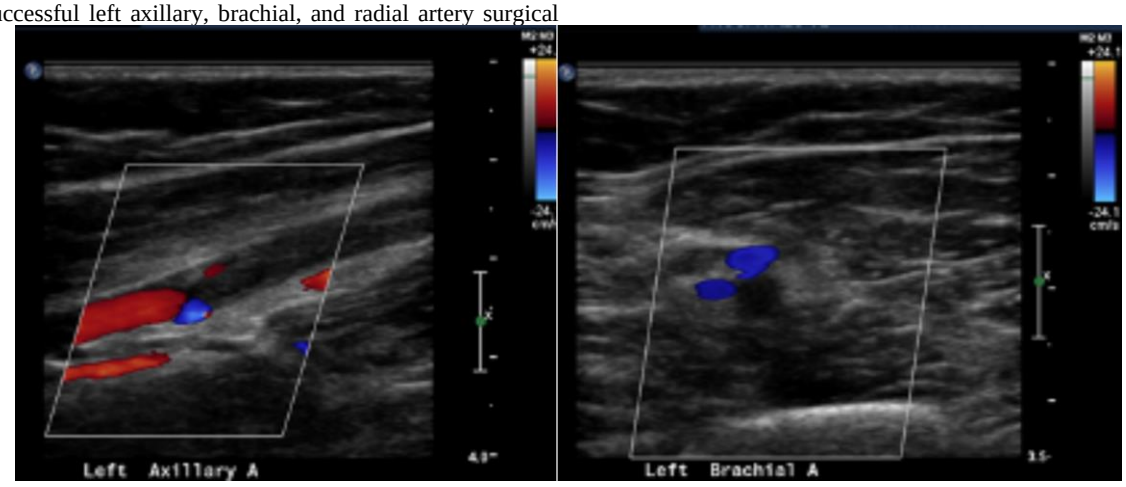

Figure 1: This image demonstrates the axillary and brachial artery thrombosis.

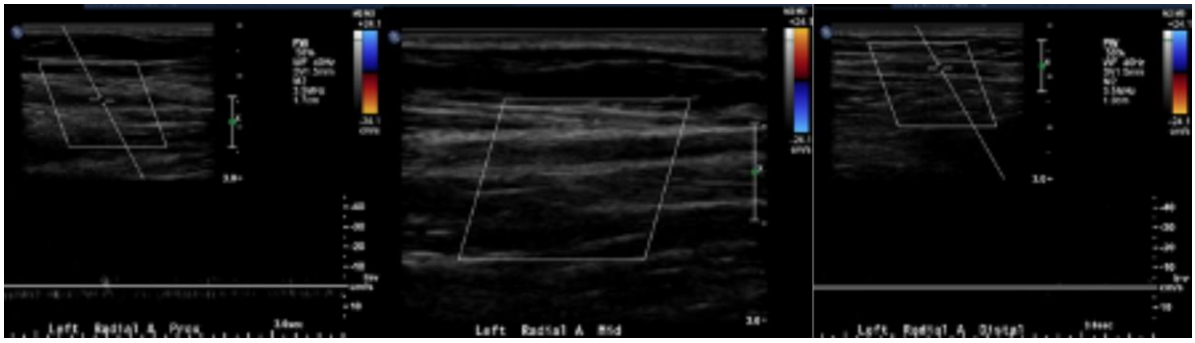

Figure 2: This image shows the radial artery thrombosis from the proximal to distal artery.

Outcome and Follow-up

At a clinic visit 1 week later, the left hand was noted to be warm and well-perfused with good ulnar and brachial pulses. Upper extremity arterial duplex ultrasound showed thrombosed mid-distal radial artery with other arteries patent. Upper extremity arterial duplex ultrasound at 1- and 3-months post-procedure showed left mid-distal radial artery occlusion and widely patent left subclavian, axillar, brachial and ulnar arteries. Warfarin was discontinued 6 weeks after surgery and she was maintained on aspirin. Three months after the surgery she had some tenderness to palpation of her upper arm and forearm with palpable brachial and ulnar pulses and non-palpable radial pulse. Residual diffuse arm discomfort was attributed by the vascular surgeon to ischemic nerve damage.

Discussion

To our knowledge this is the first reported case of axillary thrombosis after transradial access. Only 1 case of brachial thrombosis after radial access has been reported [3].

Radial artery occlusion is usually caused by thrombus formation from intimal injury. Risk factors for radial artery occlusion include prolonged cannulation times, repeated cannulations, larger introducer sheath size, decreased ratio of arterial diameter to sheath, lower heparin doses, radial artery spasm, and prolonged occlusive hemostasis [3].

Our patient was relatively healthy and had no predisposing factors for arterial thrombosis other than relatively smaller arteries in women compared to men. Left radial access by itself is not associated with a higher incidence of complications [5]. Factors that may have contributed to thrombosis of the radial, brachial and axillary arteries in this patient include [1] use of a 6 French sheath in a female since females have smaller arteries, and smaller arteries with an artery:sheath ratio of < 1 are associated with radial occlusion, [2] use of mid-range heparin 5000 units rather than the higher dose of 100IU/kg as was used in the SPIRIT of ARTEMIS study [7], [3] lack of adherence to the patent hemostasis protocol during the post-operative period [8,9], (4) failure to check for radial occlusion after the wrist band was removed (since radial occlusion can in some cases be mitigated by immediate ulnar occlusion)[1]. If duplex ultrasound had been performed after the procedure and had shown thrombosis extending beyond the radial artery, immediate anti-coagulation might have prevented clinical brachial and axillary thrombosis. Other factors which might have adversely affected this patient's outcome, even though they have not been associated with radial artery occlusion, are use of longer sheaths and failure to use a spasmolytic cocktail.

Radial artery occlusion, when detected immediately after the procedure, can be treated with ulnar artery compression to force flow back into the radial artery [10]. Low molecular weight heparin for 4 weeks increases artery patency up to 86% after 4 weeks of treatment. For patients with hand ischemia a surgical consultation is necessary for surgical thombectomy or transcather thrombolysis [3].

Learning Points/Take Home Messages

- To discuss the complications of transradial access in coronary angiography.
- To determine different methods to prevent radial, brachial and axillary artery occlusions in coronary angiography.
- To recognize risk factors for radial artery occlusion with transradial access.

Disclosures: The authors have no disclosures or conflicts of interest relevant to this paper.

References

1. Mason P, Shah B, Tamis-Holland J, et al(2018). An Update on Radial Artery Access and Best Practices for Transradial Coronary Angiography and Intervention in Acute Coronary Syndrome: A Scientific Statement From the American Heart Association. Circulation cardiovascular interventions.11(9):e000035.
2. Riangwiwat T, Mumtaz T, Blankenship JC(2019). Barriers to use of radial access for percutaneous coronary intervention. Catheterization and cardiovascular interventions: official journal of the society for cardiac angiography & interventions..
3. Zankl AR, Andrassy M, Volz C, et al(2010). Radial artery thrombosis following transradial coronary angiography: incidence and rationale for treatment of symptomatic patients with low-molecular-weight heparins. Clinical research in cardiology: official journal of the German cardiac society;99(12):841-7.
4. Sang Z, Jin H, Liu Z(2013). A case of acute brachial artery occlusion after transradial coronary intervention. Advances in interventional cardiology.9,2(37):184-186.
5. Shah R, Patel D, Abbate A, Cowley M, Jovin J(2016). Comparison of transradial coronary procedures via right radial versus left radial artery approach: A meta-analysis. Catheterization & cardiovascular interventions. 88(7):1027-1133.
6. Dahal K, Sharma S, Yousuf A, et al(2018). A comparison of standard versus low dose heparin on access-related complications after coronary angiography through radial access: A meta-analysis of randomized controlled trials. Cardiovascular revascularization medicine. 19:575-589.
7. Hahalis GN, Leopoulou M, Tsigkas G, et al(2018). Multicenter randomized evaluation of high versus standard heparin dose on incident radial arterial occlusion after transradial coronary angiography: the SPIRIT OF ARTEMIS study. *JACC: Cardiovascular interventions*. Nov 26;11(22):2241-2350.
8. Edmundson A, Mann T(2005). Nonocclusive radial artery injury resulting from transradial coronary interventions: radial artery IVUS. *The Journal of invasive cardiology*.17(10):528-631.
9. Schroff A, Gulati R, Drachman D, et al(2020). SCAI expert consensus statement update on best practices for transradial angiography and intervention. Catheterization & cardiovascular interventions.95:245–252.
10. Bernat I, Bertrand OF, Rokyta R, et al(2011). Efficacy and safety of transient ulnar artery compression to recanalize acute radial artery occlusion after transradial catheterization. *The American journal of cardiology*.107(11):1698-2701.

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