

Case Report

Arteriovenous fistula: a rare complication of distal radial access for coronary angiography

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ABSTRACT

Distal radial access is an emerging alternative approach for coronary angiography, preferred for its reduced complications and time to haemostasis, and improvement of patient and operator comfort. Arteriovenous fistula formation is a very rare complication following this approach, which requires recognition but which can be managed conservatively in certain instances.

Keywords: Coronary angiography, Percutaneous coronary intervention, Complications, Arteriovenous fistula

INTRODUCTION

Distal radial access is a relatively new method of access for coronary angiography. Traditionally, coronary angiography access was through the femoral artery. However, complications of this approach were many including retroperitoneal haematoma, femoral pseudoaneurysm, arteriovenous fistula and major bleeding requiring transfusion.¹ A more recent approach has been transradial access which has led to less vascular and bleeding complications, which nevertheless can still occur including haematoma, perforation, pseudoaneurysm and arteriovenous fistula.^{1,2} Distal radial artery access has been proposed more recently as a feasible alternative to conventional radial artery access to reduce the risk of radial artery occlusion in the forearm, bleeding and vascular access site complications, reduce the time to hemostasis, as well as improving operator and patient comfort, particularly for coronary angiography through the left radial approach, with the convention of interventional cardiologists operating from the right-side.^{3,4} Distal radial access involves accessing the radial artery in the dorsum of the hand, where it emerges from the anatomical snuffbox, (Figure 1) rather than the standard approach where it is accessed more proximally,

in the distal third of the anterior side of the forearm (Figure 2).³



Figure 1: Distal radial access involves accessing the radial artery in the dorsum of the hand, where it emerges from the anatomical snuffbox.



Figure 2: Traditional radial access approach where the radial artery is accessed more proximally, in the distal third of the anterior side of the forearm.

Presenting complaint

A 79-year-old male presented in March 2020 with left arm pain at rest radiating to his jaw, relieved by glyceryl trinitrate, associated with dyspnoea, pallor, diaphoresis and hypertension to 190 mmHg systolic. The patient had coronary bypass surgery in September 1999 to treat unstable angina with grafts to his left anterior descending (LAD) obtuse marginal (OM) and left posterior descending (PDA) arteries. He was well until September 2019 when he presented with unstable angina including exertional left arm pain on minor effort. He underwent a sestamibi perfusion scan which showed lateral wall ischemia and infero-apical infarction. Coronary angiography was performed using left distal radial access which revealed patent grafts to LAD, occluded grafts to OM and left PDA and a tight stenosis in the first diagonal (D1) which was treated with a drug eluting stent. This was conducted by an operator with experience in greater than 1000 cases through transradial access, but less than 20 cases of distal radial access.

In March 2020, the patient was taken for coronary angiography using right femoral access for his presumed unstable angina with left arm pain. This showed the D1 stent to be patent, and all other vessels unchanged. His angina was presumably due to peri-infarct ischemia in the distal infero-apical wall. During this admission, the patient was noted to have a thrill over the dorsum of the left hand in the snuff box area, hence the need for femoral access. There was no ischaemic pain in his hand, and perfusion in his hand was normal.

Investigations

The patient was sent for an arterial doppler of this left dorsal hand thrill. The scan found the distal radial artery to be patent with high velocity, low resistant flow. Both radial veins were patent with high velocity pulse flow. This left dorsal hand anomaly showed connection

between the radial artery with the radial veins, that is, evidence of an arteriovenous fistula. (Figure 3-5). There was otherwise good radial artery flow with no pseudoaneurysm, no space occupying lesion, and no clot formation throughout the left arm arteries.

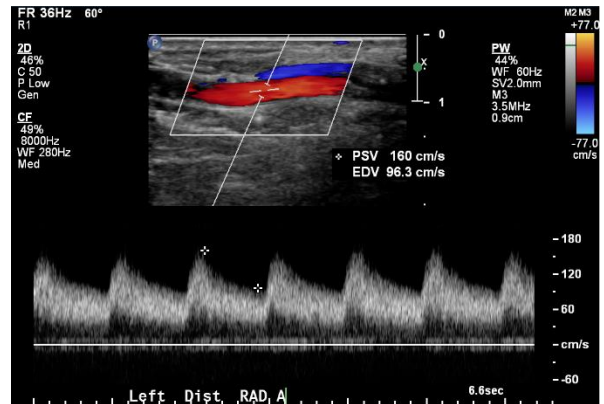


Figure 3: Doppler ultrasound showing normal arterial flow through the distal artery.

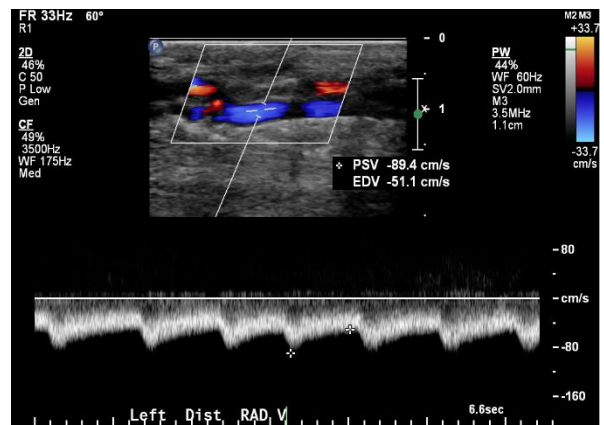


Figure 4: Doppler ultrasound showing blood flow through the distal radial vein with increased pressure.

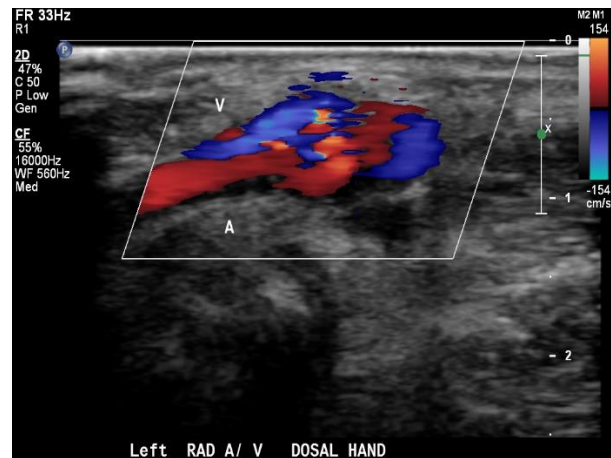


Figure 5: Evidence of distal arteriovenous fistula formation with anastomosis between the distal radial artery and vein.

Management, outcome and follow-up

The patient was referred to a vascular surgeon for review and management of the arteriovenous fistula. It was decided to treat the iatrogenic arteriovenous fistula conservatively as the patient was asymptomatic and his left arm pain was unrelated. The plan was to re-assess management if the fistula were to increase in size or become painful. At four months the patient was not complaining of any pain or progression in size of the fistula.

DISCUSSION

Arteriovenous fistula is a rare complication of distal radial arterial angiography with only one other reported case which was also treated conservatively.⁵ Arteriovenous fistula formation is also a rare complication of classic radial artery angiography but out of four cases reported by Tatli et al three had to be treated with mechanical compression and one with surgery. Regueiro et al report a case of arteriovenous fistula formation which failed conservative management, but was successfully treated with deployment of 2 stents in the radial artery.⁶ Dutton et al document another case of an arteriovenous fistula, which needed operative management with an engorged mass removed and primary microvascular re-anastomosis of the radial artery and ligation of veins required.⁷ Others have reported arteriovenous fistula with classic radial artery approach treated conservatively.⁸

Any potential treatment is driven by the impact of the lesion on the patient's quality of life versus the potential risk of complications secondary to intervention. In general, management of high flow lesions requires complete occlusion of the fistula whether by sclerotherapy or transarterial embolisation. Sclerotherapy has not been shown to be effective in treating high-flow lesions, with a case-by-case multidisciplinary approach advised to direct management.⁹

CONCLUSION

Although arteriovenous fistula formation occurs as a complication of distal radial artery access, it is a rare complication which, in our case was managed conservatively. More time is needed. as use of this technique increases, to establish the true prevalence of this complication and to explore potential strategies of management.

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Ethical approval: Not required

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