

Embolisation of a Leaking Pseudoaneurysm of the Main Artery Supplying a Replanted Arm: A Case Report

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Abstract

A 51-year-old patient suffered a near amputation of the right arm. Replant of the arm was performed and the brachial artery was grafted with a vein. A week later, there was severe bleeding from a leaking pseudoaneurysm at the proximal junction of the grafted artery. This was managed with embolisation using coils and resulted in successful obliteration of the pseudoaneurysm without necrosis of the replanted arm.

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Key words: False aneurysm, Severe bleeding

Introduction

Pseudoaneurysms are conventionally treated by surgery. In recent years, non-surgical methods are being considered, including embolisation with wires, coils or gelfoam and anticoagulation. Success has been reported when these methods were used in pseudoaneurysms of iliac, splanchnic and internal carotid arteries.¹⁻³ We report a case whereby leaking occurred 1 week after replant from a pseudoaneurysm at the proximal junction of a grafted brachial artery, the only arterial supply of a replanted arm. It was successfully embolised with cessation of bleeding and no necrosis of the replanted arm.

Case Report

A 51-year-old man was involved in a fishing boat collision. His right arm was caught by the propeller and resulted in near amputation of the arm at the supracondylar region of the humerus. The brachial artery was transected proximal to its bifurcation. The radial nerve was cut. The biceps, triceps, brachioradialis, flexor and extensor origins of the forearm muscles were all cut. The humerus was fractured at the supracondylar region. The distal and proximal parts of the arm were connected by contused median and ulnar nerves.

Thorough wound debridement was performed. The humerus was shortened by 6 cm and fixed with 2 reconstruction plates. Arterial repair was performed with a 4-cm saphenous vein graft from the right leg. The radial nerve was repaired. The wound was closed by tagging the muscles and skin loosely together.

A week later, there was severe arterial bleeding from the wound, resulting in hypotension. A pulsatile mass was palpable. Following resuscitation, angiography was performed and showed a patent vein graft. A pseudoaneurysm, 1.5 cm in diameter, with a narrow neck, was seen at the proximal junction with leakage of dye (Fig. 1a). Embolisation was performed with coils and the bleeding stopped (Fig. 1b). Anticoagulation with heparin for a week, followed by 6 weeks of aspirin and persantine was carried out to prevent thrombosis of the vessel. The patient was closely monitored clinically with examination of his radial and ulnar pulses. There was no necrosis of the replanted arm 1-year post-embolisation.

Discussion

A pseudoaneurysm occurs as a sequelae of vascular injury. Trauma involving all layers of the arterial wall results in a haematoma. The central part of the haematoma liquefies and allows blood to flow through and communicate with the parent vessel. The peripheral part clots and forms the wall, thus the term pseudoaneurysm or "false" aneurysm. Iatrogenic pseudoaneurysms have been known to occur after various surgical procedures.

Pseudoaneurysms can lead to acute complications such as rupture, embolisation or thrombosis. Chronic complications include compression on surrounding structures and formation of arteriovenous fistulae.¹

Traditional teaching instructs allowing small pseudoaneurysms (<3 cm) to thrombose spontaneously

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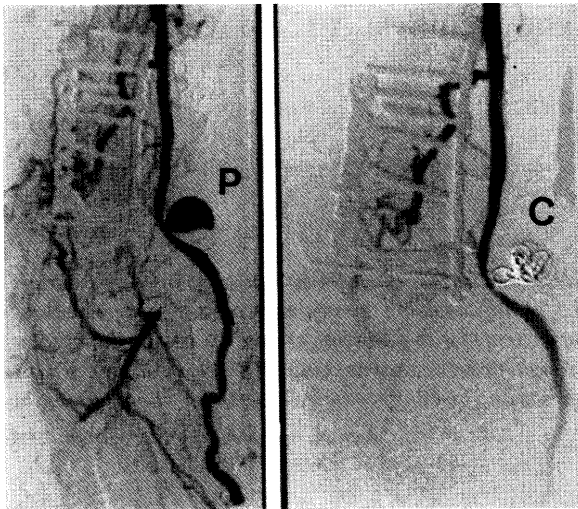


Fig. 1a. Angiogram showing a leaking pseudoaneurysm (P) at the proximal junction of the grafted artery.

Fig. 1b. Angiogram showing successful obliteration of the pseudoaneurysm using coils (C) with the main vessel remaining patent.

and for larger lesions, surgical resection with end to end anastomosis or interposition grafting. More recent articles¹⁻² advocate non-surgical measures such as transcatheter embolisation and anticoagulation. Some authors claim that small pseudoaneurysms may be treated with anticoagulation alone.¹ Embolisation has been recommended recently for the treatment of visceral pseudoaneurysms such as those of the splenic, hepatic and gastroduodenal arteries.^{2,4,5} Dimitri et al⁶ reported a successful obliteration of leaking false aneurysm of the saphenous vein graft to the right coronary artery after aortocoronary bypass. Embolisation of pseudoaneurysms is advantageous in that it spares the patient surgery and all its attendant risks. In patients who are not fit for surgery or in whom conventional surgery is not possible, this technique can even be life saving.³ However, this method is not without its risks. Complications reported include bowel infarction and ischaemia, prolapsing of the embolic coil into the main vascular trunk and rupture of the aneurysm.² Onohara et al⁷ reported a patient with an anastomotic pseudoaneurysm of the coeliac artery, after treatment of a thoracoabdominal aortic aneurysm, was treated by coil embolisation. One year later, the embolised pseudoaneurysm ruptured into the stomach and total gastrectomy and aneurysmorrhaphy was necessary.

There are two options for treatment of leaking pseudoaneurysm after major limb replant. First option is to resuscitate the patient adequately for surgical intervention. Second option is non-surgical intervention using embolisation. In our patient, the pseudoaneurysm formed at the proximal junction of the grafted artery. There was severe bleeding from the pseudoaneurysm resulting in hypotension. The patient was clinically too ill for surgical intervention. In addition, it occurred a week after replant and there was concern that the tissues

would be too friable for surgical repair. The choice of embolisation was advantageous in that it could circumvent both of the above. The leakage was sealed off by embolisation. Post-embolisation, the main vessel was patent and the pseudoaneurysm was obliterated. However, the main risk was thrombosis of the vessel, which would lead to necrosis of the replanted arm. This was prevented by anticoagulation. The patient was monitored clinically using his radial and ulnar pulses. There was no sequelae to the embolisation of the pseudoaneurysm and he was well at one year follow-up.

The main advantage of embolisation for leaking pseudoaneurysm is its use as a non-surgical option especially in critically ill patients. However, the surgeon must be prepared to treat potential complications such as failure to control bleeding, occlusion of vessel, delayed rupture of pseudoaneurysm and misplacement of coils as the consequences of these complications are significant. For example, failure of the attempted embolisation can delay the surgical intervention and increase the ischaemia time and compromise viability of the limb.

Conclusion

Embolisation of pseudoaneurysms is a relatively minor procedure which is performed percutaneously by using coils or gelfoam.² It offers an alternative to conservative management and surgery, especially in cases where surgery is contraindicated or risky. Conventional surgery was not recommended for our patient, who was ill and had friable tissues 1 week after replant. Thrombosis was circumvented by anticoagulation post-embolisation with concurrent close clinical monitoring. The pseudoaneurysm was successfully obliterated by embolisation without compromising the vascular supply to the replanted arm.

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