CASE REPORT

An unusual presentation of thoracoacromial artery pseudoaneurysm following shoulder arthroplasty

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SUMMARY

Pseudoaneurysms of peripheral arteries are not an uncommon condition presenting to vascular surgeons. Perioperative injury and infection are two of the commonest causes. We describe a case of an 82-year-old lady, who presented 10 years following right shoulder joint replacement, with a sharply marginated erythematous cutaneous eruption over the right shoulder. Subsequent angiography revealed a pseudoaneurysm of the acromial branch of the thoracoacromial artery. Planned intervention was superseded by a further embolic episode, which prompted immediate percutaneous transluminal embolisation of the aneurysm. The aetiology of a pseudoaneurysm 10 years following shoulder arthroplasty is discussed.

BACKGROUND

Pseudoaneurysms of peripheral arteries as a consequence of interventional procedures requiring arterial access commonly present to vascular surgeons while those encountered in orthopaedic practice are usually associated with joint replacement procedures.^{1–3} Aneurysms of the thoracoacromial artery, a branch of the second part of the axillary artery are extremely rare; the only published cases have been mycotic in nature.⁴ Spontaneous haemorrhage from the non-aneurysmal thoracoacromial artery has also been described⁵ in addition to haemorrhage from a pseudoaneurysm of the acromial plexus.⁶ The untoward consequences of delayed recognition of pseudoaneurysms of the axillary artery and its branches after shoulder arthroplasty or trauma emphasise the importance of timely diagnosis.⁷ We present a case of thoracoacromial artery pseudoaneurysm following shoulder arthroplasty.

CASE PRESENTATION

An 82-year-old woman presented to her general practitioner with swelling and a sharply marginated erythematous cutaneous eruption over the right shoulder and upper chest wall (figure 1). She had undergone a Copeland total shoulder arthroplasty for osteoarthritis 9 years previously but subsequently had developed increasing pain and limited range of movement of the shoulder. The initial episode which resolved spontaneously was followed by several further episodes managed conservatively by the general practitioner and dermatologist over the course of a year, until suspicion of a vascular aetiology prompted referral for vascular assessment.

INVESTIGATIONS

Duplex scans of the right axillary artery and vein were normal. MR angiography was performed but the images were obliterated by signal void from the joint replacement. As multidetector CT angiography was not available at the time of presentation conventional retrograde transbrachial angiography was performed which revealed a bilobulated pseudoaneurysm of the acromial branch of the thoracoacromial artery, lying between the right acromion and the shoulder prosthesis (figure 2). The aneurysm was presumed to have been the source of cutaneous microemboli, deposited throughout the acromial arterial network. A further embolic episode prompted percutaneous transluminal embolisation of the proximal aneurysm.

TREATMENT

Retrograde puncture of the right brachial artery was performed with superselective catheterisation of the acromial branch of the thoracoacromial trunk using a Progreat microcatheter (Terumo). Four 3 mm diameter by 3 cm length and one 2 mm by 2 cm Hilal (Cook) microcoils were deployed within the more proximal pseudoaneurysm component and the acromial artery (figure 3). It proved

Figure 1 Distribution of the cutaneous eruption.

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Figure 2 Subtracted digital selective arteriogram of the right axillary artery. The aneurysm shows a biloculated appearance and is interposed between the clavicle and the humeral head prosthesis.

impossible to negotiate a microguidewire into the distal aspect of the biloculated sac to allow deposition of coils within it. Nonetheless, haemostasis with ablation of flow in the acromial artery was achieved without complications.

OUTCOME AND FOLLOW-UP

Two years after the initial episode of cutaneous microembolisation loosening of the Copeland prosthesis was confirmed, X-rays revealed a sunken humeral component and a retracted glenoid component. Joint aspiration and blood cultures revealed no significant growth.

Figure 3 Subtracted postembolisation arteriogram in the late arterial phase of contrast enhancement. The majority of the acromial artery and the aneurysm sac are occluded.

While awaiting shoulder revision surgery, she experienced a further minor embolic episode within the same cutaneous distribution. Repeat angiography was cancelled when she fractured her femur. She subsequently declined to undergo joint revision surgery on the basis of the risks posed by her coexistent medical conditions.

DISCUSSION

We present, to our knowledge, the only reported case of a thoracoacromial artery pseudoaneurysm following shoulder joint replacement. Disruption of the thoracoacromial artery during shoulder arthroplasty specifically has been reported infrequently while cases of mycotic thoracoacromial artery pseudoaneurysms and spontaneous bleeding from the thoracoacromial artery have been identified.^{4 5}

The acromial branch of the thoracoacromial artery runs laterally to terminate between the acromion and overlying skin in an arterial network (the rete acromialis) formed by branches from the suprascapular, thoracoacromial and posterior circumflex humeral arteries. The sharply margined appearance of the cutaneous eruption in a clearly demarcated distribution could be explained by a shower of microemboli passing through the rete acromialis.

The association between the development of the pseudoaneurysm and the joint replacement remains hypothetical. The pseudoaneurysm may have arisen spontaneously or as a consequence of repeated compression of the acromioclavicular artery between the loose components of the arthroplasty over a protracted period. A similar mechanism of axillary artery injury secondary to shoulder dislocation has been described in the literature,⁸ where tension on the axillary artery due to dislocation and the artery being relatively fixed at the lateral margin causes the pectoralis minor to act as a fulcrum over which the

artery is deformed. Cases of axillary artery pseudoaneurysm as a consequence of anterior dislocation of the shoulder have been described; these again emphasise the importance of early diagnosis of pseudoaneurysms to prevent the risk of long-term vascular and neurological sequelae.^{9 10}

The pseudoaneurysm may have been infected at its inception or become infected secondarily as negative joint aspiration and blood cultures do not always exclude the presence of aneurysm infection.

The aetiology of the recurrent episode of microembolisation following coiling of the pseudoaneurysm could be explained by revascularisation of the aneurysm sac via collateral retrograde flow into the distal sac component, which thereby became the source of recurrent distal embolisation.

The case highlights the need for vigilance in the assessment of patients who may harbour uncommon arterial injuries with delayed presentation following joint replacement surgery.

Learning points

- ▶ Physicians must be aware of atypical presentation of arterial injury.
- ▶ Pseudoaneurysms are not uncommon and may arise as a consequence of interventional procedures requiring arterial access. In orthopaedic practice, they are usually associated with joint replacement procedures.¹
- ▶ The aetiology of such a delayed presentation following shoulder arthroplasty remains hypothetical but important differentials to consider loosening and/or infection of the prosthesis.

Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Mureebe L, Gahtan V, Kahn MB, *et al*. Popliteal artery injury after total knee arthroplasty. *Am Surg* 1996;62:366–8.
- 2 Chervu A, Quinones-Baldrich WJ. Vascular complications in orthopedic surgery. *Clin Orthop* 1988;235:275–88.
- 3 Maxwell-Armstrong CA, Taylor AM, Majkowski RS, *et al*. False aneurysm of the anterior tibial artery following removal of tibial plate. *Eur J Vasc Endovasc Surg* 1995;10:505–6.
- 4 Lee WK, Mossop PJ, Little AF, *et al*. Infected (mycotic) aneurysms: spectrum of imaging appearances and management. *Radiographics* 2008; 28:1853–68.
- 5 Tombesi P, Di Vece F, Salviato E, *et al*. Spontaneous active bleeding in thoracoacromial artery diagnoses by contrast-enhanced ultrasound—a case report. *Ultraschall Med* 2012;33:E355–6.
- 6 Kang H, Baron M, Glikstein R. Shoulder haemarthrosis due to a bleeding pseudoaneurysm. *Clin Rheumatol* 2005;24:305–7.
- 7 John G, Donald W, Cantelmo N, *et al*. Traumatic pseudoaneurysm of the axillary artery: report of three cases and literature review. *J Trauma Injury Infection Crit Care* 1984;24:287–368.
- 8 Blomberg JR, Zych GA. Chapter 32 Complications of Dislocations. In: Cohn SM, Dolich MO. *Complications in Surgery and Trauma*. 2nd ed. Boca Raton, FL: CRC Press; 2014:343–4.
- 9 Palacau L, Gouicem D, Dufranc J, *et al*. Delayed axillary artery pseudoaneurysm as an isolated consequence to anterior dislocation of the shoulder. *Ann Vasc Surg* 2012;26:279.
- 10 Whittam K, Hardy M. A case study of an axillary artery pseudoaneurysm following anterior dislocation of the glenohumeral joint: a rare presentation on plain film radiographs. *Radiography* 2007;13:221–8.

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