

Axillary arteriovenous fistula after axillary plexus block

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Abstract This report presents the case of a 51-year-old man who had an axillary arteriovenous fistula (AVF) as a complication of an axillary plexus block that was performed for internal fixation for a right forefinger phalanx fracture 4 years previously. While performing the axillary plexus block, a 22-gauge needle was placed inside the axillary sheath by observing the pulsations of the axillary artery. A pulsatile mass was found in the right axilla 1 day after the block was performed. Apart from this soft mass, the patient had no symptoms of vascular nerve damage. As the mass gradually increased in size, it became painful. During the past 3 months, in particular, the patient experienced repeated attacks of intermittent sharp pain and requested surgery. Digital subtraction angiography, performed 4 years after the axillary block, showed a tumor-like dilation was developing in both the right axillary artery and vein, almost simultaneously. Thus, the diagnosis of AVF was confirmed. The false aneurysm sac was excised and lateral repair of the axillary artery and vein was carried out under general anesthesia. Postoperative recovery was uneventful. The possible occurrence of an AVF after

axillary plexus block should be kept in mind, because early diagnosis and treatment are necessary to avoid development of AVF and false aneurysm.

Keywords Arteriovenous fistula · Axillary plexus block · Complication

Introduction

Brachial plexus block is a feasible and effective anesthetic technique for surgical procedures of the upper extremities, especially for surgery performed distal to the elbow. Complications of this approach include injury to the infraclavicular brachial plexus (0.2–21 %), axillary artery insufficiency, and false aneurysm formation [1–6]. Axillary arteriovenous fistula (AVF) after axillary plexus block is a rare event. To the author's knowledge, no such case has been reported in the English medical literature so far.

Case report

A 51-year-old man presented with an increasing soft mass in his right axilla after he had undergone internal fixation for a right forefinger phalanx fracture, with a right axillary plexus block, at the local hospital. Four years previously, the axillary plexus block had been accomplished by the single-needle method using a 22-gauge needle. Needle placement inside the axillary sheath had been confirmed by observing the pulsations of the axillary artery. During the course of the block, nonpulsatile blood was aspirated with the syringe on negative pressure. Therefore, the needle was slightly retracted. Local anesthetic solution, 10 ml, containing 5 ml 0.375 % ropivacaine and 5 ml 1 % lidocaine,

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was injected. The operation was finished uneventfully. However, a pulsatile mass was found in the right axilla on the next day. The diameter of the pulsatile mass was approximately 1.5 cm. Apart from the soft mass, the patient had no symptoms of vascular nerve damage, such as paleness, paralysis, paresthesia, pain, or pulselessness. However, as the mass gradually increased in size, it became painful. After considering the information that the hematoma may eventually be absorbed and that it may not result in any serious clinical manifestations, the patient was unwilling to undergo surgical treatment for 4 years. However, for the past 3 months the patient had suffered repeated attacks of intermittent sharp pain and therefore requested surgery. On admission, he presented with a soft, pulsatile, vibrative, and smooth mass with a vascular soufflé in his right axilla. The size of the mass was approximately 2 cm × 3 cm, and it had a clear boundary. On palpation, the skin temperature of the right upper limb was slightly higher than that of the left. Digital subtraction angiography showed that there was a tumor-like dilation developing nearly simultaneously in both the right axillary artery and vein (Fig. 1). Results of the blood examination were normal.

Based on the clinical signs and test results, a diagnosis of right axillary AVF was established. The patient underwent excision of the false aneurysm sac and lateral repair of the axillary artery and vein under general anesthesia. During surgery, a remarkable expansion of the right axillary vein was observed with an aneurysm of 2 cm × 3 cm located between the artery and vein. The proximal end of the arterial occlusion significantly reduced the size of the false aneurysm sac. Between the false aneurysm sac and the artery, there was a fistula with a diameter of 0.5 cm and a smaller venous fistula. Postoperative recovery was uneventful.



Fig. 1 Digital subtraction angiography of the right axillary artery and vein showing a pseudoaneurysm (arrow) developing nearly simultaneously in the artery and vein

Discussion

The occurrence of complications is lower when using the axillary approach as compared to more proximal approaches. Complications related to the axillary vasculature are rare. To date, Zipkin et al. [6] have reported only one case of false aneurysm of the axillary artery following brachial plexus block. However, there is no report showing AVF following axillary plexus block.

AVF is a rare vascular disorder resulting from congenital vascular malformations, trauma, iatrogenic causes, or neoplasms [7]. In the current patient, the cause of the axillary AVF reported was probably direct needle trauma. A plausible reason for AVF formation may be that the artery and vein were punctured simultaneously, and a hematoma then presented around the wound in the vasculature. With the passing of time, this hematoma may have formed a cystic passage throughout the artery and vein, which eventually formed an AVF.

The diagnosis of axillary AVF was not difficult given the patient's puncture history, symptoms, signs, and adjuvant tests. Color Doppler ultrasound is the primary diagnostic modality when AVF is strongly suspected, and angiography is used for confirmation. On digital subtraction angiography, the characteristic feature of AVF is a tumor-like dilation developing nearly simultaneously in the artery and vein. Because of the rapid progression of the disease, Davidovic et al. [8] suggested that treatment of posttraumatic AVF should be performed as soon as possible; however, the treatment remains a challenge. At present, traditional surgery and interventional radiologic procedures are usually used to treat AVFs.

While performing axillary plexus block, the physician must be careful, and the blood vessels should not be punctured to the greatest extent. If a vessel is punctured, the puncture site should be bandaged, especially in elderly patients with hypertension, diabetes, or valvular heart disease, and especially when anticoagulant agents are used, because these patients are prone to atherosclerosis and heal poorly after vascular perforation [9].

In conclusion, the possible occurrence of AVF after axillary plexus block should be kept in mind. Early diagnosis and treatment are necessary to avoid developing arteriovenous fistula and false aneurysm.

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