

ACUPUNCTURE-INDUCED POPLITEAL ARTERIOVENOUS FISTULA SUCCESSFULLY TREATED WITH PERCUTANEOUS ENDOVASCULAR INTERVENTION

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A 39-year-old female visited our cardiovascular outpatient department with paresthesia and soreness around the right popliteal fossa, where thrill was palpable. There was no history of trauma, apart from her having undergone acupuncture several years previously. An arteriovenous fistula (AVF) was diagnosed by vascular ultrasonography and magnetic resonance imaging. Angiography confirmed the presence of an AVF fed by the medial geniculate artery. Transarterial embolization was performed to close the AVF using coils and tissue adhesive. To the best of our knowledge, acupuncture-induced AVF has not been previously reported. We present a case demonstrating the merits of percutaneous endovascular intervention for treating this rare complication. The additional administration of a tissue adhesive can achieve complete closure of the AVF in the event of an unsatisfactory result following coil embolization. Doctors should be aware of the potential vascular complications of acupuncture, and of the management options.

Key Words: acupuncture, arteriovenous fistula, endovascular intervention
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Acupuncture is an ancient alternative medical treatment in the Far East. More complications of acupuncture have been reported in the medical literature in line with its increased popularity in recent decades [1–5]. The most frequently reported complications are traumatic pneumothorax and procedure-related infections [4,6]. Vascular complications are rarely reported following acupuncture, and most that are reported are arterial pseudoaneurysms [7]. Herein, we report a rare case of arteriovenous fistula (AVF) over the

popliteal area following acupuncture. The AVF was successfully closed using percutaneous endovascular intervention (PEI) with coils and a tissue adhesive agent. The relationship between acupuncture needling points and related complications, as well as the merits of PEI for the treatment of vascular complications are discussed.

CASE PRESENTATION

A 39-year-old female presented at our cardiovascular outpatient department with a history of paresthesia and soreness over her right knee. She had no chronic medical history and was not taking any medications. There was no history of trauma or blunt injury over her right knee, except for acupuncture performed over the



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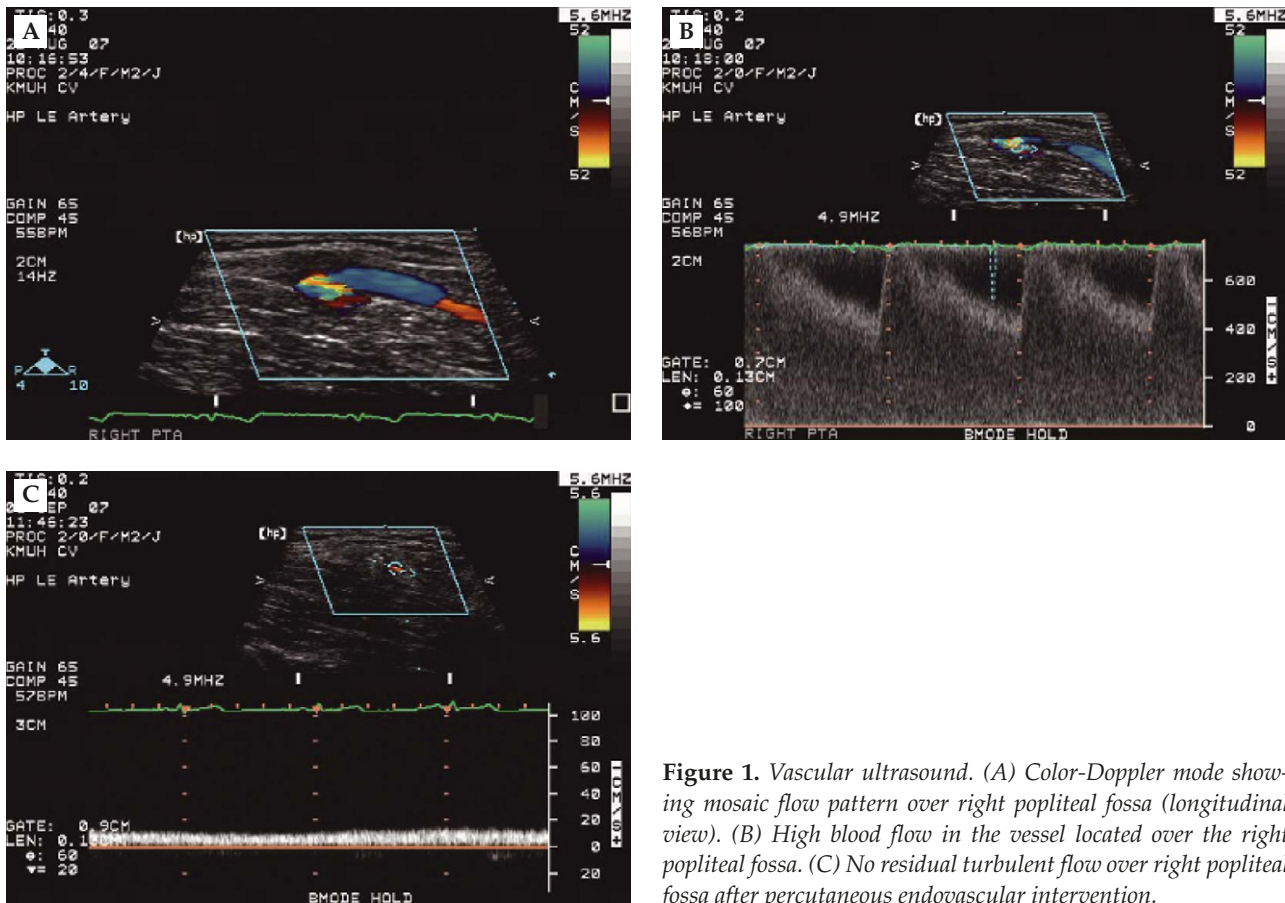


Figure 1. Vascular ultrasound. (A) Color-Doppler mode showing mosaic flow pattern over right popliteal fossa (longitudinal view). (B) High blood flow in the vessel located over the right popliteal fossa. (C) No residual turbulent flow over right popliteal fossa after percutaneous endovascular intervention.

right popliteal fossa several years ago. Neurological examination revealed intact motor and sensory neural functions of the extremities. Physical examination revealed thrills and bruits over the right popliteal fossa. A vascular lesion was tentatively diagnosed on this basis. Peripheral vascular ultrasonography was performed as an initial, non-invasive screening test. This demonstrated a mosaic flow pattern on color-Doppler mode and increased blood flow (>600 cm/s) on Doppler mode, which were compatible with the presence of an AVF over the right popliteal fossa (Figures 1A and 1B). Magnetic resonance imaging further confirmed the presence of an AVF over the right popliteal fossa fed via the right medial superior geniculate artery (Figure 2).

Diagnostic angiography was performed to provide a more detailed study. The rapid flow of contrast medium running directly from the right popliteal artery into the right popliteal vein confirmed the previous suspicion of AVF over the right popliteal fossa (Figure 3A). PEI using a total of eight mini-coils was used to close the AVF. Postembolization angiography

revealed tiny residual feeding arteries from the distal geniculate branch of the popliteal artery. N-butyl-2-cyanoacrylate (NBCA) tissue adhesive agent was injected to occlude the AVF. Final angiography and follow-up vascular ultrasonography revealed complete closure of the AVF (Figures 3B and 1C). The patient tolerated the procedure well and no complications were noted. She was discharged uneventfully and received follow-up at our cardiovascular clinic.

DISCUSSION

Acupuncture points consist of 14 meridians. These meridians are anatomic points through which the “Qi” or energy flows. When treating patients, therapists use fine needles to penetrate these points at different meridians to “enflow” the “Qi”, which is thought to cause disease by stagnating in the meridians. Precautions are observed at several meridian points to avoid traumatic complications while needling [8,9]. There are several acupuncture points in the knee region that



Figure 2. Arteriovenous fistula over right popliteal fossa in magnetic resonance imaging (coronal view).

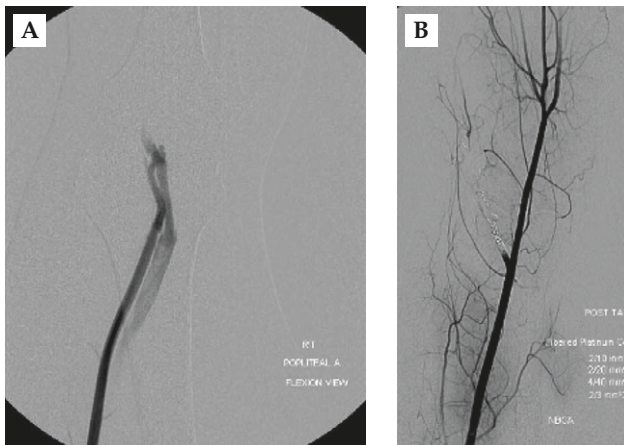


Figure 3. Angiography showing the arteriovenous fistula (A) before and (B) after percutaneous endovascular intervention.

are commonly used by therapists, i.e. Bladder Meridian point 39 (B39), point 40 (B40), Kidney Meridian point 10 (K10), and Gallbladder Meridian point 34 (G34) [8]. In the posterior view of the popliteal fossa, B39 correlates to the common fibular nerve, and B40 correlates to the tibial nerve and popliteal vessels. The common fibular nerve is also correlated with G34 in a lateral view around the lateral condyle of the knee. Needling of these points is frequently used by therapists for patients who suffer from backache or lower-back soreness.

There are few reports concerning popliteal vascular complications following acupuncture. Lord et al reported a 3-cm diameter false aneurysm that developed

after acupuncture needling in the region of the popliteal artery [9]. Several weeks later, the patient came for medical help owing to rupture of the aneurysm, which was repaired by patch angioplasty. Kao et al reported a 10-cm diameter popliteal arterial pseudoaneurysm located at the lower thigh after acupuncture in the same region [10]. The pseudoaneurysm was closed by direct surgical repair. Nakanishi et al reported a third case of popliteal arterial pseudoaneurysm following acupuncture [11]. This pseudoaneurysm was located on the right calf and presented with symptoms including swelling and intermittent claudication. The lesion was successfully closed by stent-graft deployment.

In this paper, we report the first case of acupuncture-induced AVF over the popliteal fossa, possibly caused by needling of B39, B40, or G34.

Surgical repair/resection is still the main treatment for vascular complications, though PEI provides an alternative means of dealing with these complications. Endovascular intervention offers the advantages of: (1) small wound; (2) rapid recovery period; (3) short procedural time; (4) short hospital stay; (5) good tolerance and acceptance; and (6) no risk of general anesthesia.

In this patient, we initially tried to deploy a stent-graft, but failed because the artery feeding the AVF came from a small branch of the geniculate artery, resulting in difficulties advancing the guidewire, and problems with engaging the catheter. We thus decided to use coil embolization to close the AVF. Tiny residual feeding arteries/arterioles were then completely closed using NBCA tissue adhesive. Endovascular coil embolization is frequently used to treat various kinds of AVFs in daily practice. In cases of failed embolization, surgical repair may be the only choice for closure of the fistula. NBCA tissue adhesive can also be used to close the AVF, though it is difficult to use in high-flow AVFs because it may pass through the AVF before being polymerized, resulting in efferent vascular embolization. The synergistic combination of coil embolization and NBCA tissue adhesive provides the advantages of both methods. Coil embolization can be delivered precisely to the AVF, and repeated delivery can provide complete occlusion over the target feeding arteries. Coils can slow the flow rate and therefore create suitable conditions for trapping the tissue glue, so allowing it to be safely polymerized inside the fistula.

In conclusion, acupuncture is thought to be associated with a low prevalence of major complications. However, potential regional complications should be borne in mind following acupuncture. These complications may be associated with local anatomic structures, which also provide hints for the rapid and accurate diagnosis of the complications. As shown in the present case, PEI with coil embolization offers an alternative method for treating vascular complications with no associated operative or postoperative risks. Together with the use of a tissue adhesive, PEI may offer a more successful rate of AVF closure. To the best of our knowledge, this is the first case report of the successful treatment of acupuncture-induced AVF using PEI.

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經皮血管內介入術成功治療因針灸而引起的動靜脈瘻管

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一位 39 歲的女性因為右膝膕窩酸痛以及感覺異常至門診求診，經觸診後發現有震顫情形。病患否認在患處有任何外傷史，但曾經在幾年前接受過針灸治療。血管超音波以及核磁共振影像懷疑該處產生動靜脈瘻管。血管攝影更進一步確認該瘻管連接右內側膝動脈與膕靜脈。我們利用了經動脈線圈置入術以及組織膠的施打成功地關閉該動靜脈瘻管。根據我們的回顧，因為針灸治療而引起的動靜脈瘻管尚未在醫學文獻中報告過。我們同時也顯示了經皮血管內介入術對於治療動靜脈瘻管的優點。對於無法用線圈完全關閉的瘻管，額外施打組織膠可以進一步將其完全關閉。我們建議臨床醫師應該對於接受針灸治療後的血管併發症以及其處理方式有所認識。

關鍵詞：針灸，動靜脈瘻管，血管內介入術
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