

Peripheral Venous Malformations with a Dominant Outflow Vein: Results of Ethanol Embolization

Hadi Rokni-Yazdi¹, Mahsa Ghajarzadeh², Amir Hossein Keyvan³,
Mohammad Javad Namavar³, and Sepehr Azizi³

¹ Advanced Diagnostic and Interventional Radiology Research Center (ADIR), Imaging Medical Center, Imam Hospital, Tehran University of Medical Sciences, Tehran, Iran

² Brain and Spinal Injury Repair Research Center, Tehran University of Medical Sciences, Tehran, Iran

³ Department of Infectious Diseases, Imam Hospital, Tehran University of Medical Sciences, Tehran, Iran

Received: 11 Nov. 2013; Accepted: 29 Mar. 2014

Abstract- Venous malformations are the most common form of symptomatic vascular malformations. VMs could classify into low-flow lesions (VMs) and high-flow lesions (AVMs). For low-flow venous lesions, direct percutaneous puncture with injection of sclerosing agents (sclerotherapy) has been described as a successful therapy. In this article, we want to introduce a patient who treated with ethanol sclerotherapy for VM located in the right flank. The patients were a 35-year-old man with right flank mass, skin discoloration and hemorrhagic foci. Color Doppler ultrasonography showed low flow vascular malformation while Magnetic Resonance Imaging (MRI) showed that the mass contained fat tissue with branching tubular signal void structures inside. The draining vein was first coiled via tortuous venous malformation vessels access and then VM was embolized. Under ultrasonographic guide, direct puncture of one branches of venous malformation was performed, and contrast media were injected. The patient underwent the sclerotherapy every month for four consecutive months. The patient was followed up for a year, and clinical examination revealed 40-50% size reduction of the lesion while no bleeding was detected from the lesion during the follow-up period. Sclerotherapy with ethanol is a useful method for embolizing VMs.

© 2014 Tehran University of Medical Sciences. All rights reserved.

Acta Medica Iranica, 2014;52(11):868-871.

Keywords: Venous malformation; Sclerotherapy; Embolization; Ethanol

Introduction

Venous malformations are a subtype of vascular malformations classified in 1982 by Mulliken and Glowacki based on biological characteristics. This classification includes two major categories: Vascular tumors (hemangioma) and vascular malformations.

According to modified Hamburg classification, vascular defects could be classified into 5 groups: (arterial, venous, lymphatic, arteriovenous shunting and combined/mixed) (1).

Venous malformations are the most common form of symptomatic vascular malformations (near 80%) present with spongy, compressible soft tissue mass and skin changes such as angiokeratomas and port-wine stains (capillary venous malformations). Venous malformations can become painful and swollen during

activity, sport or because of thrombosis (2).

Symptoms may vary and include cosmetic complaints, tissue ulceration, pain, swelling and functional limitations (3).

According to anatomical and hemodynamic features, vascular malformations are classified to: low-flow lesions (VMs) and high-flow lesions (AVMs).

Although the surgery is the standard treatment for venous malformations, the best results could be observed in well-defined and localized lesions (4). On the other hand, the recurrence rate after surgery is high.

For low-flow venous lesions, direct percutaneous puncture with injection of sclerosing agents (sclerotherapy) has been described as a successful therapy (3).

Sclerotherapy involves injecting a chemical (such as ethanol) into a blood vessel to make blood vessels

Corresponding Author: H. Rokni-Yazdi

Advanced Diagnostic and Interventional Radiology Research Center (ADIR), Imaging Medical Center, Imam Hospital, Tehran University of Medical Sciences, Tehran, Iran

Tel: +98 912 4136470, Fax: +98 21 61192671, E-mail address: rokniyaz@sina.tums.ac.ir

blocked or collapsed (5). By devastating the vascular endothelium and, intima sclerosant agents cause thrombotic occlusion (6).

Before the injection of sclerosant, by means of coil or guide or manual compression, the venous outflow must be blocked if there is rapid drainage to conducting veins (6).

In this article we want to introduce a patient who treated with ethanol sclerotherapy for VM located in right flank with an enlarged draining vein (iliolumbar vein) with direct communication to distal right common iliac vein, the draining vein was first coiled via tortuous venous malformation vessels access and then VM was embolized.

Case Report

A 35-year-old man with right flank mass, skin discoloration and hemorrhagic foci (Figure 1) was referred to interventional radiology department of Imam Hospital.



Figure 1. Photograph of a 35 YO male with hemorrhagic right flank mass

In Magnetic Resonance Imaging (MRI) evaluation, the mass contained fat tissue with branching tubular signal void structures inside (Figure 2). DSA (Digital subtraction angiogram) and selective lumbar branches angiography were normal (Figure 3). Color Doppler ultrasonography showed low flow vascular malformation in this area. Then, under ultrasonographic guide, direct puncture of one branches of venous malformation was performed, and contrast media were injected. Direct venogram showed a large venous malformation with a prominent draining vein (iliolumbar vein) which drained to distal right common iliac vein (Figure 4). According to large diameter of VM branches, we decided to embolize the prominent

draining vein via these branches, not from the common iliac vein.

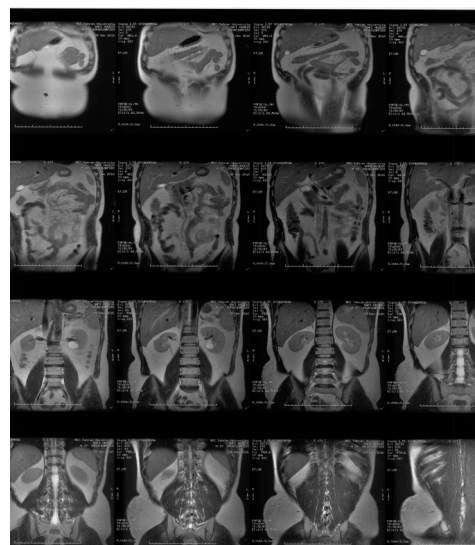


Figure 2. T2 Weighted coronal MRI of the patient shows fat signal mass in the right flank with multiple high and signal void tubular structures that seem to coalesce to a single signal void structure toward para vertebral areas (iliolumbar vein)



Figure 3. Digital subtraction aortogram and selective lumbar branch angiography show no hyper vascular mass although right iliolumbar branch is larger than the left side

Under road map, the hydrophilic guide inserted to the venous malformation and then a 4 french multipurpose A1 catheter (*Cordis, Johnson and Johnson Medical, USA*) inserted and manipulated to the draining vein (Figure 5). Then two 8*10 Nester coils inserted to this vein (*Cook Medical Inc.USA*). Direct venography after these procedures showed complete occlusion of the draining vein (fig 6). Then Eight mL ethanol 99 degrees (*Merck pharmaceuticals, Germany*) was injected to the

Peripheral venous malformations and dominant outflow vein

channels. Venogram 10 minutes after alcohol injection showed thrombosis in most of the branches (Figure 7). The patient underwent the sclerotherapy every month for four consecutive months. After each session patient received a single dose of 8 mg intramuscular dexamethasone, and 500mg cephalexin and ibuprofen QID (*quarter in die*) for 5 days.



Figure 4. Direct digital subtraction venography from the lesion under ultrasonography guide shows branching venous malformation draining via iliolumbar vein to distal right common iliac vein



Figure 5. Under road mapping, glide guide inserted to the IVC from the dilated branches access and then a 4 french multipurpose catheter manipulated to iliolumbar vein

After each session, the patient complained of pain and had itching in the site of venous malformation after first embolization session which was controlled by NSAIDs (nonsteroidal antiinflammatory drugs) and antihistamine medications.

The patient was followed up for a year and clinical examination revealed 40-50% size reduction of the lesion while no bleeding was detected from the lesion during the follow-up period (Figure 8).



Figure 6. Two 8*10 coils inserted to the iliolumbar vein to prevent subsequent alcohol leakage to the IVC



Figure 7. Venography 10 minute after 8 cc alcohol injection shows thrombosis in most of the venous malformation branches with complete obstruction of iliolumbar branch by coils



Figure 8. Photograph after 1 years follow-up shows reduced size of the right flank venous malformation, no hemorrhagic foci are noted

Discussion

Venous malformations (VMs) are the common symptomatic vascular malformations (7).

They could be asymptomatic but could become painful when thrombophlebitis or muscular, articular or nerve involvement occur (8). Our case referred with right flank mass, skin discoloration and hemorrhagic foci. VMs are clinically present at birth and are slow growing during life. They mostly could present in the head and neck (40%), extremities (40%), and trunk (20%) (11). Diagnosis is based on history, physical examination and imaging. The best imaging modality is MRI (magnetic resonance imaging).

On T2- weighted or inversion-recovery sequences, they present with hyperintense channels or septation containing areas. Also, low signal foci as the characteristic of phleboliths could be observed. Homogeneous or heterogeneous enhancement is seen after contrast injection T1-weighted post-contrast imaging (9). In Magnetic Resonance Imaging (MRI) evaluation, we found the mass contained fat tissue with branching tubular signal void structures inside in our patient (fig 2).

The important issue in managing VMs is selecting the best treatment.

Surgical excision is considered as the best treatment option, but cosmetic disfigurement, incomplete removal and inaccessibility are among surgery complications. Surgery is recommended for localized symptomatic cases (1).

Due to less invasiveness and effectiveness for regression of VMs, sclerotherapy becomes the choice of treatment in many cases. Polidocanol, ethanolamine oleate and ethanol are among sclerosing agents used for sclerotherapy (10).

Ethanol is used more common than other agents as it is more effective and has low recurrence rate (10).

One of the main differences of our method in embolizing the main vein was embolizing the main vein through peripheral branches by means of the coil. We did not use coil or guide or manual compression for blocking venous outflow before sclerosant injection.

Our patient underwent the sclerotherapy every month for four consecutive months and followed up for a year. Clinical examination revealed 40-50% size reduction of the lesion and patient was symptom free in follow up.

We also observed no complication of sclerotherapy with ethanol such as pulmonary hypertension or skin necrosis.

Conclusion: Ethanol Embolization could be effective in venous malformation treatment.

References

1. Gulsen F, Cantasdemir M, Solak S, et al. Percutaneous sclerotherapy of peripheral venous malformations in pediatric patients. *Pediatr Surg Int* 2011;27(12):1283-7.
2. Rimon U, Garniek A, Galili Y, et al. Ethanol sclerotherapy of peripheral venous malformations. *Eur J Radiol* 2004;52(3):283-7.
3. van der Linden E, Pattynama PM, Heeres BC, et al. Long-term patient satisfaction after percutaneous treatment of peripheral vascular malformations. *Radiology* 2009;251(3):926-32.
4. Jin Y, Lin X, Li W, et al. Sclerotherapy after embolization of draining vein: A safe treatment method for venous malformations. *J Vasc Surg* 2008;47(6):1292-9.
5. Dubois J, Soulez G, Oliva VL, et al. Soft-tissue venous malformations in adult patients: imaging and therapeutic issues. *Radiographics* 2001;21(6):1519-31.
6. Burrows PE. Endovascular treatment of slow-flow vascular malformations. *Tech Vasc Interv Radiol* 2013;16(1):12-21.
7. Loose DA. Surgical management of venous malformations. *Phlebology* 2007;22(6):276-82.
8. Raymond-Martimbeau P. Advanced sclerotherapy treatment of varicose veins with duplex ultrasonographic guidance. *Semin Dermatol* 1993;12(2):123-8.
9. Orlando JL, Caldas JG, Campos HG, et al. Ethanol sclerotherapy of superficial venous malformation: a new procedure. *Dermatology* 2010;220(4):376-80.
10. Uehara S, Osuga K, Yoneda A, et al. Intralesional sclerotherapy for subcutaneous venous malformations in children. *Pediatr Surg Int* 2009;25(8):709-13.