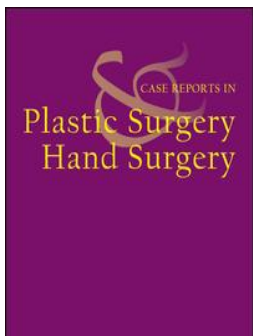




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CASE REPORT

A case of combined soft tissue and intraosseous venous malformation of the thumb treated with sclerotherapy using a bone marrow aspiration needle

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Abstract

Vascular malformations of bone are complex lesions that can cause deformity and pain. A combined soft tissue and intraosseous venous malformation of the left thumb in a girl was treated with two sessions of ethanol sclerotherapy using a bone marrow aspiration needle under fluoroscopic guidance.

Keywords:

Ethanol, fluoroscopy, hand, intraosseous infusions, sclerosing solutions, sclerotherapy, vascular malformations

History

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Introduction

Venous malformations (VM) are the most common vascular malformations caused by faulty development during vascular morphogenesis [1]. Although most VM are located in the skin and subcutaneous tissues, they also involve underlying muscles, joints and bones [2]. Intraosseous VM of an extremity can cause structural weakening of the bone and chronic pain. Treatment of VM includes conservative treatment, sclerotherapy, and surgical resection [2]. However, recurrence and deformity requiring amputation are common problems. We present a patient with combined soft tissue and intraosseous VM of the thumb, treated with sclerotherapy using a bone marrow aspiration needle under fluoroscopic guidance.

Case report

A 16-year-old, right-handed female patient presented with a congenital bluish swelling in the pulp of the left thumb (Figure 1). On clinical examination, the swelling was soft, painful and non-pulsatile. On Doppler ultrasonography, the swelling was composed of anechoic channels with low velocity flow. A plain radiograph showed radiolucent lesions

in the distal phalanx of the left thumb (Figure 2). Magnetic resonance imaging (MRI) showed lesions in the palmar soft tissue and the distal phalanx of the left thumb (Figure 3). The interphalangeal joint of the left thumb was also involved. The lesions were hypointense on T1-weighted images, hyperintense on T2-weighted images, and enhanced after administration of contrast material. Based on the MRI findings, a diagnosis of combined soft tissue and intraosseous VM was made. Sclerotherapy using polidocanol or absolute ethanol had been performed seven times for the soft tissue lesion of the left thumb since the age of 5 years at another hospital.

We performed two sessions of sclerotherapy under general anesthesia with the interval of 10 months for the relief of pain. Without a tourniquet, direct puncture of the intraosseous lesion was performed with a bone marrow aspiration needle, then water-soluble contrast material was injected under fluoroscopic guidance to confirm the absence of any dangerous venous drainage (Figure 4). Subsequently, a sclerosing solution mixture of absolute ethanol with contrast material at a 4:1 ratio was injected into the lesion, 0.5 ml at a time. The total volume of sclerosing solution used per treatment session was 7 ml and 5.5 ml, respectively. Five months after the first sclerotherapy, MRI showed reduced volume of the soft tissue



Figure 1. Palmar view of the left thumb before sclerotherapy at the age of 16.

lesion of the left thumb. Nine months after the first sclerotherapy, a plain radiograph showed reduced radiolucent lesions in the distal phalanx of the left thumb (Figure 5). Two years after the last sclerotherapy, the patient had neither swelling nor pain of the left thumb, with no postoperative



Figure 2. A plain radiograph obtained before sclerotherapy shows radiolucent lesions in the distal phalanx of the left thumb.



Figure 3. Coronal contrast-enhanced fat-suppressed T1-weighted MRI image obtained before sclerotherapy shows homogenous hyperintense lesions in the palmar soft tissue and distal phalanx of the left thumb. Abbreviation: MRI = Magnetic resonance imaging.

complications (Figure 6). There was no limitation of growth or joint motion of the left thumb compared to the normal side.



Figure 4. An intraprocedural contrast radiograph shows the flow through intraosseous and soft tissue lesions of the left thumb.



Figure 5. A plain radiograph at 9 months after the first sclerotherapy shows reduced radiolucent lesions in the distal phalanx of the left thumb.



Figure 6. Palmar view of the left thumb at 2 years after the last sclerotherapy.

Discussion

The management of VM in hands is particularly difficult because of problems related to function, potential damage to the blood supply as well as aesthetic concerns. Distal lesions

of upper extremity are likely to be deeper, infiltrating muscle and bone. Sclerotherapy for distal lesions is not recommended because of the high risk of terminal ischemic necrosis [3]. Radical resection of VM may result, however, in an extensive anatomic and functional defect [4]. Hill *et al.* [5], reported a 47% recurrence rate even after radical resection and patients had to undergo further surgery. Carlsen and Jones [4] treated a massive VM of the thumb by radical resection and reconstruction with a toe transfer after four attempts at sclerotherapy.

In the treatment of aneurysmal bone cysts, Rastogi *et al.* [6], reported the efficacy of percutaneous sclerotherapy using a bone marrow aspiration needle under fluoroscopic guidance. Our case demonstrated the feasibility of percutaneous sclerotherapy for combined soft tissue and intraosseous VM by using the bone marrow aspiration needle. Sclerotherapy can obliterate the intraosseous vascular lesions and lead to new bone formation [7]. Although complete resolution of the lesion is unlikely, sclerotherapy often provides enough improvement in pain and function to forestall the morbidity of radical resection on a long-term basis [8]. We believe sclerotherapy is a reasonable option for initial treatment of symptomatic combined soft tissue and intraosseous VM, even for distal lesions of extremities. However, since sclerotherapy on the palmar surface of the hand can complicate later operative intervention [9], the benefits and risks must be weighed accordingly.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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