Ultrasound-Guided Ganglion Cyst Aspiration

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Introduction

Soft tissue ganglia can occur around multiple joints throughout the musculoskeletal system. These can present clinically as slowly enlarging masses, which may or may not be painful. Cross-sectional imaging can be helpful in both diagnosis and treatment of these lesions. The diagnostic ability of sonography and magnetic resonance imaging (MRI) to define the internal characteristics of periarticular lesions as cystic or solid is invaluable to diagnosis. They can also meticulously outline the regional anatomy, identifying regional neurovascular structures that could potentially pose a problem if surgical excision is considered.

We describe a case of a soft-tissue ganglion of the foot, localized immediately deep to a first order branch of the dorsalis pedis artery, diagnosed with magnetic resonance imaging and treated with sonographic-guided aspiration.

Case report

This is a case of a 42-year-old woman with swelling in the mid-foot, which started the previous summer from wearing flip-flops. The pain never subsided and the patient had persistent swelling.

Magnetic resonance imaging examination of the mid-foot demonstrated a focal internally homogeneous cystic mass along the medial mid-foot, localized along the medial aspect of the medial cuneiform, apparently arising from the first tarsometatarsal joint (Fig. 1). The cyst, of note, was immediately deep to the first order branch of the dorsalis pedis artery (Fig. 2) and the medial branch of the deep peroneal nerve.

The patient underwent an ultrasound-guided aspiration and drainage of the cyst. Preliminary scanning over the medial mid-foot demonstrated the focal hypoechoic cyst immediately deep to the artery (Figs. 3 and 4). At the time

of injection, power Doppler imaging demonstrated the artery to be immediately adjacent to the cyst (Fig. 5). Appropriate positioning of the transducer yielded a window to place the needle into the cyst, under the artery (Fig. 6) with subsequent decompression of the cyst (Fig. 7). The patient was lost to further clinical follow-up.

Fig. 1. Coronal (to the plane of the foot) fast inversion recovery image of the foot demonstrates a focal, round, hyperintense mass along the medial mid-foot consistent with a ganglion cyst (arrow)

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Fig. 2. Axial fast spin echo MR image demonstrates the cyst (*thick white arrow*) immediate deep to the regional neurovascular structures (*thin arrow*)

Fig. 3. Longitudinal ultrasound image of the medial midfoot demonstrates the artery (*thin arrows*) draped over the cyst (*thick white arrow*)

Fig. 5. Short axis (transverse) ultrasound image with power Doppler demonstrates the artery immediately adjacent to the cyst (*arrow*)

Fig. 6. Short axis view during real time ultrasound-guided aspiration and drainage of the cyst demonstrates the needle tip to be accurately within the cyst (*thick white arrow*). Note the artery immediately superiorly (*thin arrow*)

Fig. 4. Power Doppler aids in clearly identifying blood vessels, outlining the regional artery immediate superficial to the ganglion cyst

Fig. 7. Short axis view with power Doppler after the cyst has been drained demonstrates the needle to be within a nearly completely collapsed cyst cavity (arrow)

Discussion

Soft-tissue ganglia are most commonly encountered about the wrist; however, they can be seen through the musculoskeletal system with a 0.4% prevalence reported in the foot based on magnetic resonance imaging data [1]. Of these, the most common location is usually the tarsal sinus or tarsal canal, with the second most common location about the Lisfranc joint [1].

Soft-tissue ganglia in the foot usually occur in women most usually in the fifth and sixth decades of life [2]. Excision of soft tissue ganglia can be performed surgically; however, this procedure is not without risks including potential cutaneous nerve injury [3].

Soft-tissue ganglia can be readily identified on cross-sectional imaging studies such as ultrasound and MRI [4, 5]. Because these collections usually contain fairly inter-

nally homogeneous fluid or mucinous material, they yield a characteristic appearance on these imaging studies.

An advantage of ultrasound is its ability to provide a non-operative method of treating these lesions. By directly identifying the needle enter the cyst for injection and decompression, the radiologist can be sure that the cyst was reliably treated. With the advent of new higher resolution ultrasound transducers, small structures such as cutaneous nerves can be identified and thus avoided by the needle trajectory. In addition, power Doppler can clearly identify regional vascular structures, even those closed apposed to the lesion being addressed for injection.

In conclusion, ultrasound and MRI can be used to reliably diagnose soft-tissue ganglia. Ultrasound, with its real-time dynamic capabilities, additionally can be used to accurately guide for therapeutic aspiration and drainage of these cysts, avoiding potential nearby neurovascular structures.

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