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Milk of calcium fluid collections in juvenile dermatomyositis: MR characteristics

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Abstract Children with dermatomyositis may have extensive subcutaneous and intermuscular calcium-laden fluid collections referred to as "milk of calcium." The distinctive MR appearance of such collections in an upper extremity of a 16-year-old girl is presented. MR can differentiate these collections from abscesses and guide appropriate therapy.

Introduction

Juvenile dermatomyositis is an inflammatory myopathy of unknown origin affecting children between the ages of 2 and 15 years. The diagnosis is usually based on a combination of physical findings, including proximal symmetric muscle weakness, heliotropic rash, and Gottron's papules, and laboratory abnormalities such as elevated creatine phosphokinase, EMG changes, and dystrophic calcifications on plain X-rays [1]. MRI has proven useful in demonstrating the muscle edema of dermatomyositis, thus aiding diagnosis and guiding biopsy when the diagnosis remains in doubt [2]. To our knowledge, the MR appearance of the milk of calcium collections has not been previously described.

Case report

A 16-year-old girl with an 8-year history of biopsy-proven juvenile dermatomyositis was referred to a plastic surgeon for correction of left-hand flexion contracture. Physical examination revealed limited extension of all the digits and soft-tissue thickening of the palm and forearm. Plain films showed deep linear calcifications

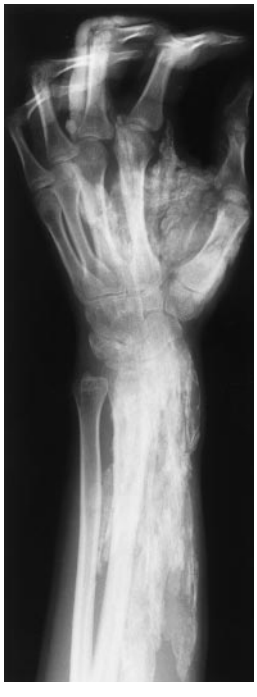

Fig. 1 Oblique X-ray of the left hand and forearm shows extensive deep and superficial linear soft-tissue calcifications

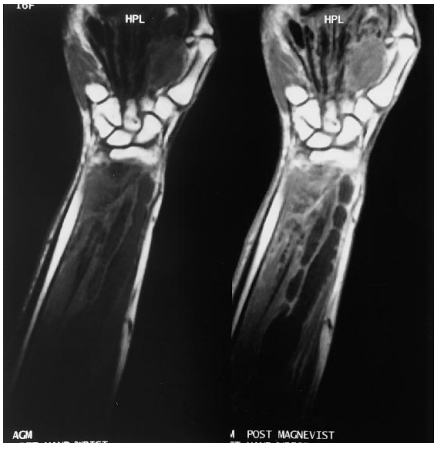

Fig. 2 Coronal T1-weighted images before and after Gd-DTPA show oblong fluid collections with minimal peripheral enhancement

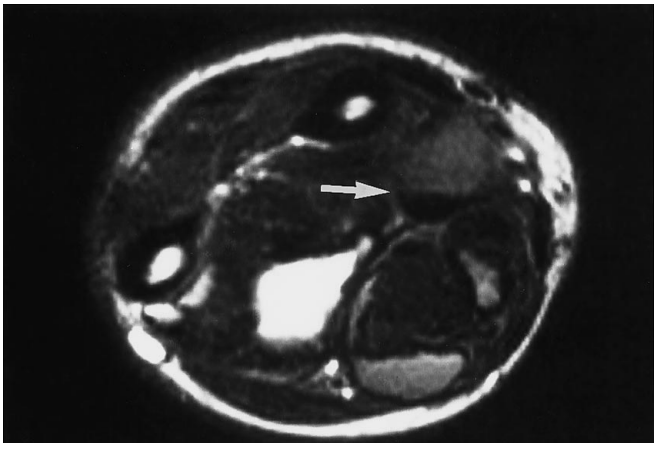

Fig. 3 Axial T2-weighted image shows fluid collections of varying signal intensity, reflecting varying calcium content. Note the fluid level with dependent settling of calcium (*arrow*)

(Fig. 1). MRI demonstrated concordant calcifications and oblong fluid collections with minimal peripheral enhancement on T1-weighted images post-administration of Gd-DTPA (Fig. 2). On T2-weighted images, signal amplitude varied with the variable calcium content of the collections and fluid/calcium levels were evident in axial images (Fig. 3).

Discussion

The exact mechanism for the formation of milk of calcium collections in dermatomyositis is unknown. Hesla et al. [3], who described the ultrasound appearance of such collections, speculated that they resulted from pseudo bursa formation between calcified tissue planes. The dystrophic calcifications seen in this disease are felt to be part of a post-inflammatory scarring process and are known to occur despite a normal calcium/phosphorus relationship, as in our patient.

Feasibility and approach to surgical management of contractures such as those in our patient require accurate definition of the gross calcifications, the fluid collections, and their relationship to surrounding soft tissues. Plain films show the calcifications well and ultrasound can characterize the fluid collections, but MRI can demonstrate both as well as their global relationship to the surrounding soft tissues in any plane. While MRI is not sensitive for detecting small calcifications, the gross calcifications seen on plain films are readily recognized by their low signal amplitude on both T1- and T2-weighted sequences. Fluid and milk of calcium collections are exquisitely demonstrated by MRI, with signal amplitude reflecting differences in fluid content and fluid/calcium levels. Accurate detection and localization are important in guiding surgery and minimizing the risk of post-operative sinus tracts with possible superinfection in these steroid-dependent children.

The ability of MRI to assess all of the soft-tissue changes in dermatomyositis also makes this an excellent modality for monitoring progression or remission of the disease. Good correlation has been reported between the distribution of involvement determined by MRI and functional assessment [1, 4].

Conclusion

MRI is very effective in imaging milk of calcium collections in juvenile dermatomyositis and serves as a valuable adjunct to plain films in pre-operative assessment of contracture sites.

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