Magnetna resonanca podkožnega granuloma anulare: serija štirih primerov

MRI of subcutaneous granuloma annulare: A series of four cases

Avtor / Author

Ustanova / Institute

Liona Jug[1], Mitja Rupreht[2,3]

[1]Univerzitetni klinični center Maribor, Oddelek za transfuziologijo, Maribor, Slovenija; [2]Univerzitetni klinični center Maribor, Radiološki oddelek, Maribor, Slovenija; [3]Univerza v Mariboru, Medicinska fakulteta, Katedra za radiologijo, Maribor, Slovenija;

[1]University Medical Centre Maribor, Department for Transfusiology, Maribor, Slovenia; [2]University Medical Centre Maribor, Department for Radiology, Maribor, Slovenia; [3]University of Maribor, Faculty of Medicine, Department for Radiology, Maribor, Slovenia;

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Doc. dr. Mitja Rupreht, dr. med., Univerzitetni klinični center Maribor, Radiološki oddelek, Ljubljanska 5, 2000 Maribor, Slovenija
Telefon +386 2 321 2255
E-pošta: mitja.rupreht@ukc-mb.si

Izvleček

Namen: *Podkožni anularni granulom (SGA) je redki benigni mehkotkivni psevdotumor, ki se pojavi večinoma pri starosti od 2 do 5 let in običajno v spodnjih udih. Natančno poznavanje slikovnih najdb ob drugih podatkih omogoča pravilno diagnozo brez invazivnih posegov.*

Metode: *V prispevku opisujemo primer s sledenjem ter tri spremljajoče primere. Otroci so bili stari med 5 in 10 let.*

Rezultati: *Ena podkožna tvorba je bila lokalizirana na dorzalni strani sprednjega dela stopala, tri pa na gležnju. Pri vseh primerih je magnetnoresonančna (MR) preiskava pokazala neostro omejene podkožne tvorbe, pri enem primeru pa je bilo področje blago hipointenzivno in heterogeno v tekočinsko-občutljivih sekvencah. Intravenski kontrast je bil apliciran le pri enem primeru.*

Zaključek: *Le natančni klinični podatki o lokaciji omogočajo najdbo lezije*

Abstract

Background: *Subcutaneous granuloma annulare (SGA) is a rare benign soft tissue mass that occurs mostly in the lower limbs of young children. Detailed knowledge of imaging findings is needed to avoid unnecessary invasive diagnostic procedures.*

Materials and Methods: *One follow-up case and three companion cases are presented. All children were between the ages of 5 and 10 years.*

Results: *The MRI findings demonstrated ill-defined subcutaneous masses in three cases while in one case the mass was mildly hypointense and heterogeneous on fluid-sensitive sequences. Contrast agent was administered intravenously only in one case, where moderate enhancement was observed. .*

Conclusions: *Detailed clinical description of the lesion location was crucial. In addition, knowledge of MR imaging findings was necessary for a correct dia-*

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pri MR-preiskavi. Poznavanje najdb pri MR-preiskavi pravi-loma omogoča natančno postavitev diagnoze brez invazivne diagnostike.

gnosis to reassure the parents and avoid unnecessary invasive diagnostic procedures.

INTRODUCTION

Granuloma annulare represents a group of benign dermatoses that can present as a cutaneous or a subcutaneous lesion (1). Subcutaneous granuloma annulare (SGA) occurs typically in children between the ages of 2 and 5 years (2). It clinically manifests as a painless, nonmobile subcutaneous lump, sometimes with skin manifestations (3). Histopathologically, it consists of granulomas in the dermis and/or hypodermis formed by palisaded histiocytes with a mucin deposition in the central foci (4, 5).

Ultrasound (US) and magnetic resonance imaging (MRI) typically show an ill-defined masses with various vascularization patterns (3).

The clinical diagnosis can be challenging, which can result in requests for diagnostic imaging where the lesion could be misinterpreted as aggressive, leading to unnecessary invasive work-up (1).

The purpose of this paper is to present MRI findings of a granuloma annulare in four different cases.

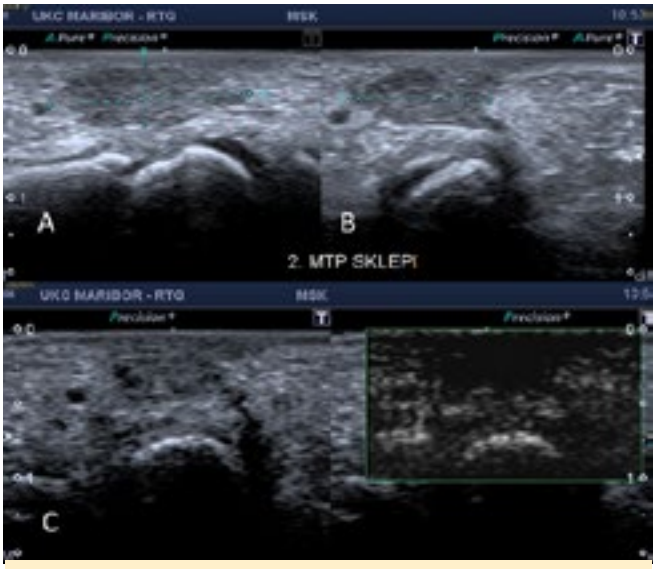

Figure 1. *Ultrasound (US) image of the right forefoot revealed an oval, mildly hypoechoic heterogenous subcutaneous mass dorsally at the level of the second metatarsophalangeal joint in sagittal (A) and transverse (B) planes (between blue markers). Doppler examination (C) did not demonstrate vascularity.*

CASE REPORT

A 9-year-old girl presented to the dermatologist with a 1-month history of a lump on the dorsum of the forefoot. Palpation revealed a nonmobile elastic painless mass between the second and third metatarsals with no overlying skin manifestations. The patient was referred for US examination, which demonstrated a hypoechoic non-vascularized subcutaneous mass (Figure 1). Simultaneously, another similar lesion at the level of the tibiotalar joint was discovered (Figure 2). Owing to the nonspecific US findings, MRI was recommended by the performing radiologist. MRI of the foot and ankle revealed ill-defined subcutaneous masses dorsally at the level of the second metatarsophalangeal joint (Figure 3) and talocrural joint (Figure 4).

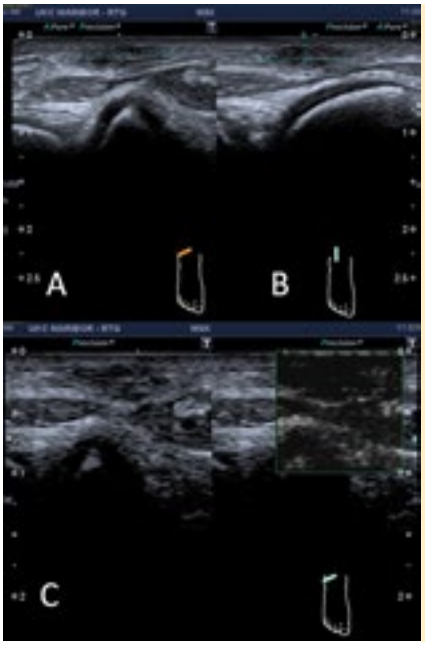

Figure 2. *US of the right ankle. An additional subcutaneous mass was demonstrated anterolaterally at the level of the talocrural joint (between blue markers) in the transverse (A) and sagittal (B) planes. Again, no vascularity was observed on Doppler examination (C).*

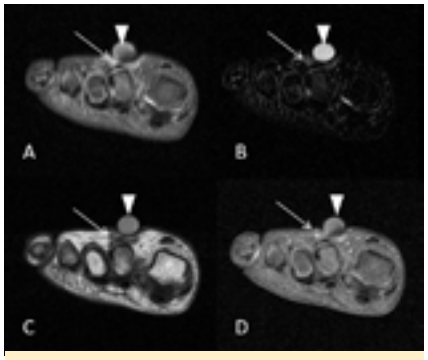

Figure 3. *MRI of the right forefoot in the transverse plane at the level of the metatarsophalangeal joints. An ill-defined subcutaneous mass of irregular shape (arrows) was observed. The mass was moderately hyperintense on fat-suppressed proton density (PDFS) (A) and short-tau inversion recovery (STIR) (B) images, T1 hypointense (C) with moderate inhomogeneous contrast enhancement on fat-suppressed T1 image (D). Note the compression of the lesion by a skin marker.*

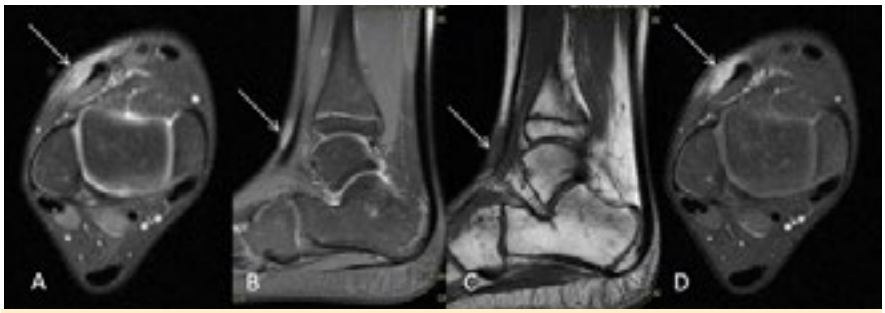

Figure 4. *MRI of the right ankle. An ill-defined subcutaneous mass next to the tendon of the long extensor of the toes (arrow) was hyperintense in PDFS in the transverse (A) and sagittal (B) planes, hypointense on a T1-weighted image (C) with intense enhancement after intravenous contrast administration on a transverse fat-suppressed T1 image (D). Note that the mass was enhanced more intensively and homogenously than the mass in the forefoot (Figure 3).*

Both masses were moderately enhanced after intravenous contrast administration.

Based on clinical and imaging appearances, which were typical for SGA, the clinical decision was to monitor both lesions.

At the follow-up clinical examination 1 year later, a moderate change in the colour of the overlying skin was noted. Dermatological examination, including dermoscopy, demonstrated macular formations with a central

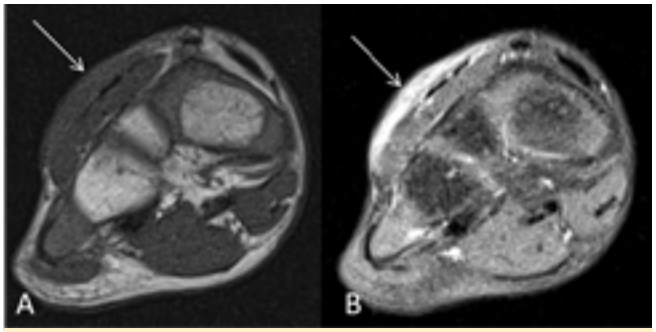

Figure 5. *Companion case No. 1. A 5-year-old boy with a palpable lump. An ill-defined subcutaneous mass of the dorsal forefoot next to the extensor tendons of the toes (arrow) was isointense to muscle on a T1-weighted coronal image (A) and hyperintense on a coronal PDFS image (B).*

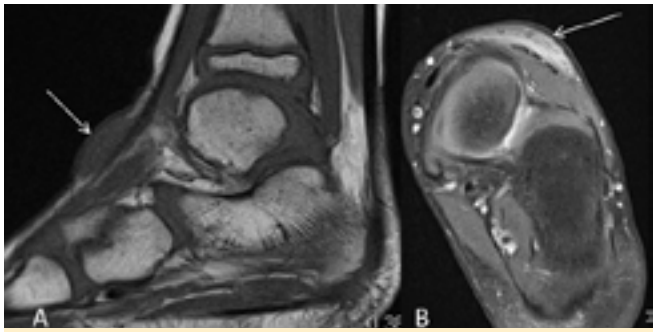

Figure 6. *Companion case No. 2. A 6-year-old boy with a palpable mass. A subcutaneous mass in the subcutaneous tissues of the anterolateral ankle was isointense to muscle on a sagittal T1 image (A) and moderately hyperintense on an axial PDFS image (B).*

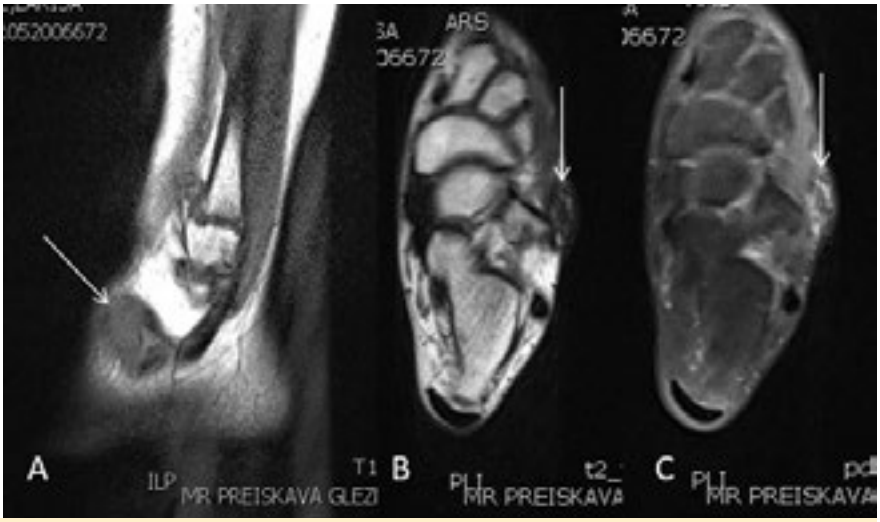

Figure 7. *Companion case No. 3. A 10-year-old girl with a palpable lump. Sagittal MRI of the right ankle (A) demonstrated a hypointense subcutaneous soft-tissue mass (arrows) with a T1 isointense signal to muscle on a sagittal image (A), moderately T2 hypointense (B), and mildly hyperintense heterogenous PDFS (C) signals on axial images. A heterogenous and moderately-hypointense signal on fluid-sensitive sequences (B, C) represented possibly a chronic lesion with fibrotic changes or hemosiderin after minor bleeding into the lesion.*

region of hypopigmentation, typical of SGA. Both lesions were locally treated with methylprednisolone aceponate. After 5 months, complete regression of both lesions was observed

COMPANION CASES

Three companion cases from the personal archive of the second author occurred in children of 5, 6, and 10 years. All were referred from external institutions and were lost to follow-up. In all three, an MRI scan of the ankle was performed. In two cases, the MRI appearances were similar to the first case (Figures 5 and 6). In a 10-year-old girl, the mass appeared mildly hypointense and heterogenous on fluid-sensitive sequences (Figure 7).

DISCUSSION

Soft tissue tumours in children up to 5 years of age are rare and mostly benign (6). In this group, the most common benign masses represent haemangioma (15%), fibromatosis (11%), granuloma annulare (10%), infantile myofibromatosis (8%) and lipoblastoma (8%) (7).

SGA is most commonly located in the lower limbs, but it can also occur in the upper extremities, face, scalp, buttocks, and heel (1, 4, 5, 8). In the diagnostic work-up of superficial soft-tissue masses, the first imaging modality should be US. We noticed, however, that in clinical practice patients are increasingly referred for MRI first.

Typical US findings consist of an ill-defined moderately-hypoechoic mass, with various degrees of vascularity assessed by Doppler examination (3), which is consistent with our findings in the first case. The mass mostly appears isointense or slightly hypointense to muscle on T1-weighted MR images, consistent with our findings. On fluid-sensitive sequences the lesion appears hyperintense, with various degrees and patterns of contrast enhancement (1, 9, 10). In three of the four presented cases, lesions were hyperintense on fluid-sensitive images. In one case (Figure 7), the mass was moderately hypointense on T2 as well as on fat-suppressed proton density (PDFS) images, which could possibly represent mild fibrotic transformation or subacute haemorrhage.

Intravenous contrast was administered only in the first presented case where moderate enhancement was observed. Knowing the potential risk of paramagnetic contrast, combined with the low specificity, it is in our opinion not warranted in cases with typical history, age, location, and non-contrast appearance.

On MRI, small lesions can be easily overlooked, particularly in children, where motion artefacts are frequent. Therefore, we recommend gentle placement of a skin marker at the lump location by the MRI

technologist to avoid compression (Figure 3).
Topical and intralesional corticosteroids are considered as first line therapies and complete regression is usually observed. However sometimes GA is refractory to corticosteroids, so it is necessary to consider second-line systemic therapies such as dapsone, methotrexate, pentoxifylline and sulphasalazine (11).

CONCLUSION

SGA is a rare self-limiting benign subcutaneous soft-tissue mass typically appearing in the lower limbs in early childhood. With a broad differential diagnosis, both detailed clinical data for locating the lesion on MRI as well as proper interpretation of MRI findings are necessary to establish the correct diagnosis without unnecessary invasive work-up.

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