Calcium-Gluconate Extravasation Mimicking Heterotopic Ossification in a Patient with Traumatic Brain Injury

Travmatik Beyin Yaralanmalı Bir Hastada Heterotopik Ossifikasyonu Taklit Eden Kalsiyum-Glukonat Ekstravazasyonu

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Dear Editor,

Heterotopic ossification is a medical condition that significantly increases existing disability and hinders rehabilitation. Early and differential diagnoses should therefore be made carefully. Clinical and laboratory findings should be supported by radiological images. This report, together with the clinical findings and radiological images provided herein, intends to draw attention to the diagnostic confusion caused by calcium-gluconate extravasation.

A 14-year-old male patient with traumatic brain injury who had been monitored for 5 months was admitted to our clinic. He had undergone surgery for cranial hematoma and left femoral shaft fracture. He had bilateral hip pain and restricted hip mobility, and clinical examination revealed pain in the middle part of the left leg (fracture zone) and distal part of the left cruris during palpation. Ultrasonographic imaging revealed profiles consistent with heterotopic ossification in the vicinity of the fracture zone of the left femur and around both hip joints (Figure 1A,B). In the sonographic examination of the distal part of the left cruris, calcifications resembling heterotopic ossification but with a typical "zone phenomenon" image were not observed (Figure 2A,B). Radiographic (Figure 3) and scintigraphic (Figure 4) imaging showed profiles consistent with heterotopic ossification in both hip joints and the vicinity of the fracture zone on the left femur. The serum calcium, alkaline phosphatase and sedimentation levels were in the normal range. On detailed review of the previous medical records, it was discovered that vascular access was established in distal part of the left cruris during intervention in the post-accident acute phase, and that intravenous calcium-gluconate was administered, but calcium-gluconate extravasation developed. It was unclear whether the ultrasound image of this localization was created directly by the calcium preparation itself, or whether the image was caused by the irritant effect of calcium on soft tissues, or whether the image represented a new immature heterotopic ossification area.

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Received/Geliş Tarihi: 20.07.2015
Accepted/Kabul Tarihi: 18.08.2015

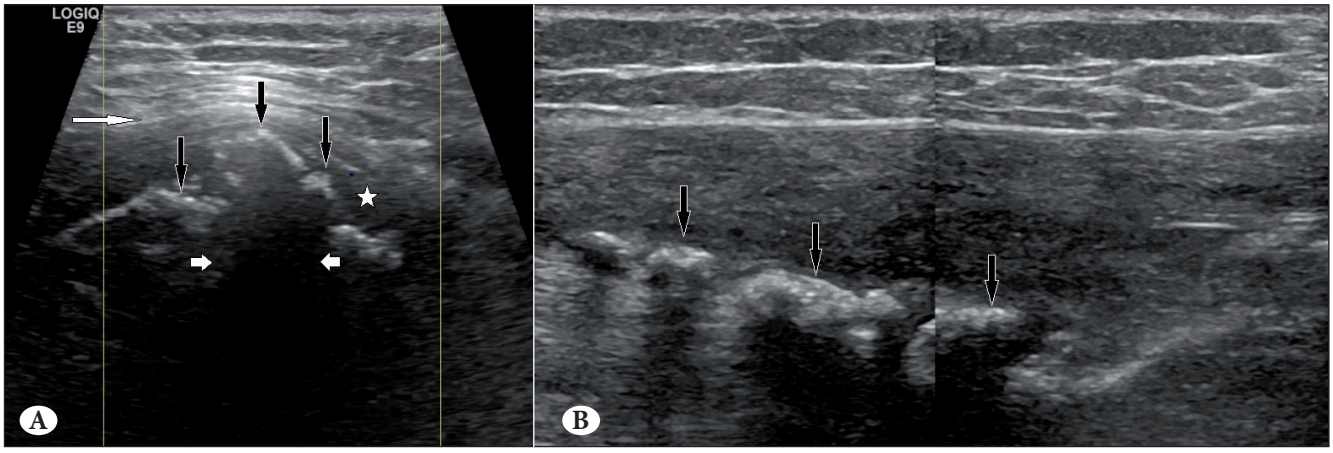

Figure 1. A,B) Longitudinal (A) and transverse (B) sonograms of the vicinity of the greater trochanter show, in deep structure plans, dense hyperechoic mineralization zones (black arrows) between muscles and clear acoustic shadows associated therewith. There is hyperechoic tissue (asterisk) around the hyperechoic mineralized zone (black arrows) consistent with edema (zone phenomenon), and undulations near the surfaces of the plans of the neighboring fascial structures.

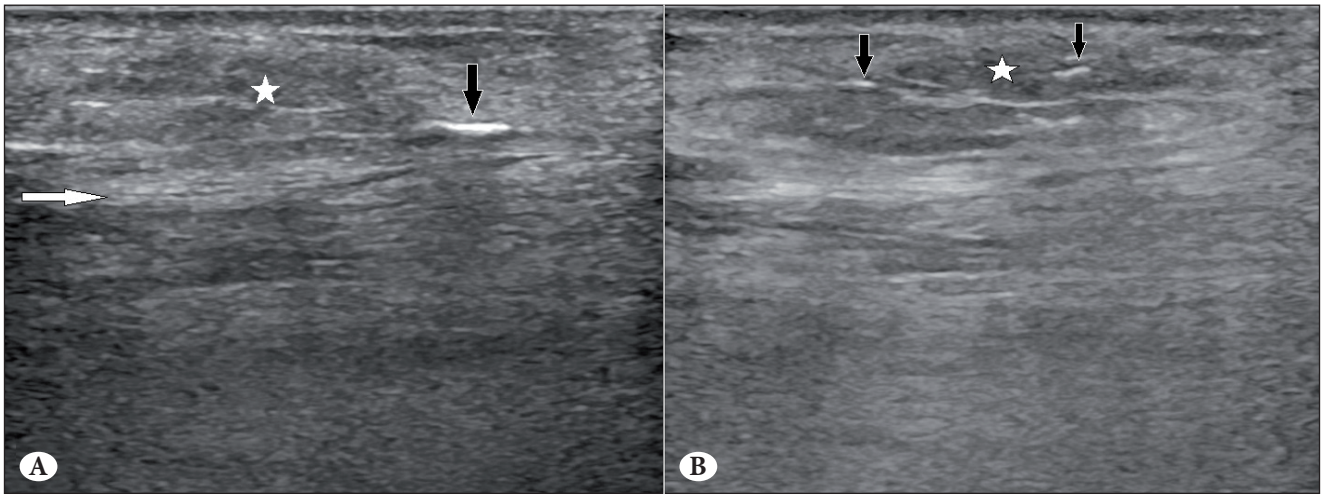

Figure 2. A,B) Transverse (A) and longitudinal (B) sonograms imaging at the crural level reveal an edema zone (asterisk), including millimetric-scale linear calcifications (black arrows) in the subcutaneous fat images that cause undulations toward the depths of the fascial plans.

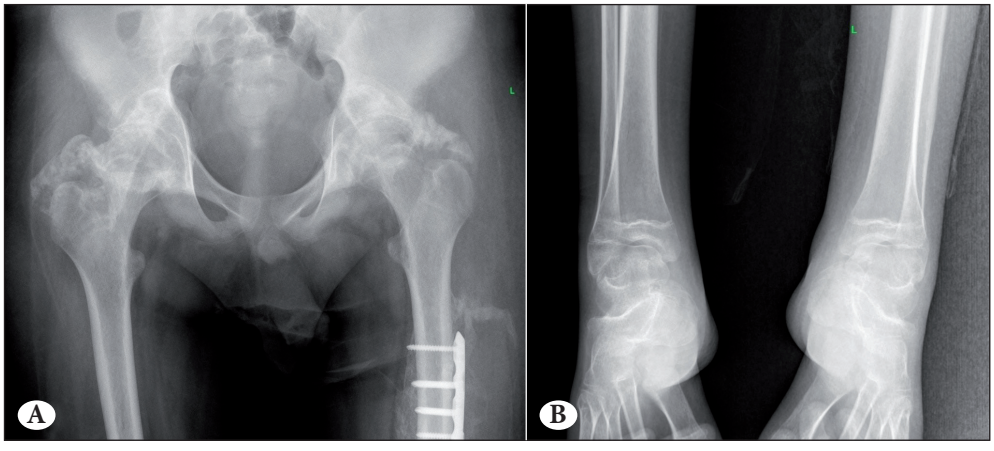

Figure 3. A,B) Anteroposterior (AP) view of the pelvis (A) shows dense calcifications in the vicinities of both greater trochanters and the coxofemoral joints, being more visible on the left side. There is also an increase in amorphous densities around the metallic fixator at the level of the proximal diaphysis of the left femur. Both AP graphs of the ankles (B) reveal normal bone structure and soft tissue images.

J PMR Sci 2016; 19: 144-146
FTR Bil Der 2016; 19: 144-146

Figure 4. **Three-phase bone scintigraphy shows increased activity involvements in the soft tissue plans of the vicinities of both femoral greater trochanters and the coxofemoral joint, and in the left rectus femoris muscle.**

Heterotopic ossification (HO) is defined as abnormal bone formation in soft tissues. It develops secondarily to burns, traumas and surgeries, particularly brain and spinal cord injuries (1,2). HO usually develops around large joints, hinders rehabilitation practices and causes significant functional losses (2). It also results in restricted joint mobility and joint pain accompanied by swelling and increased heat (3). Differential diagnoses with such conditions as thrombosis, arthritis, infection and malignity should therefore be made (2,4). Laboratory and radiological findings are used to diagnose the condition. It is argued that ultrasonography produces highly reliable findings for the diagnosis of early HO (4). Being an uncommon medical condition, calcium-gluconate extravasation is usually reported in neonatal cases and in adults who have undergone extensive surgery. Cutaneous symptoms are frequently seen, and it may cause swelling, pain and restriction of mobility in the affected area. In most cases, a conservative approach is sufficient, and surgery may rarely be needed (5). We aimed to highlight the clinical condition realized in the imaging procedures carried out with the pre-diagnosis of heterotopic ossification, leading to diagnostic confusion.

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