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CASE IMAGE

[^{99m}Tc] Tc-MDP bone SPECT/CT diagnosing unstable slipped capital femoral epiphysis with secondary AVN in a patient with misleading knee pain

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Abstract

Bone scan is highly sensitive whole-body imaging with relative low radiation in patients with non-localized skeletal symptoms. Patient is 12-year-old boy with Down syndrome, suffering recent claudication and exacerbated left knee pain unable to walk even with crutches. Three-dimensional Single photon emission computed tomography/Computed tomography (SPECT/CT) detected left slipped capital femoral epiphysis (SCFE) and secondary Avascular necrosis (AVN).

KEYWORDS

[^{99m}Tc] Tc-MDP, bone SPECT/CT, hip AVN, SCFE, unstable SCFE

SCFE and Down syndrome has been rarely reported in single individuals, which are more commonly complicated, difficult treated with less favorable prognosis.

[^{99m}Tc] Tc-Methylene diphosphonate (Tc-MDP) bone scintigraphy is an established functional imaging modality for visualization of bone metabolism and remodeling; while available literature does not definitely clarify its applicability in SCFE.[1] While plain radiography (anteroposterior and frog lateral views) is the choice for diagnosing slipped capital femoral epiphysis in suspected individuals,[2] bone scan is capable of discovering the disease and finding secondary complications in patients with ambiguous symptoms. Patient was a known case of Down syndrome with BMI equal to 31 who presented with claudication; symptoms and complaints were all localized in left knee. Bone scan successfully localized the epiphyseal slippage, described the perfusion abnormality in left femoral head and diagnosed the secondary AVN as a one stop shop modality avoiding unnecessary delay in treatments introduction (Figures 1 and 2). Image reveals a masterpiece of hybrid functional/anatomical imaging in skeleton.

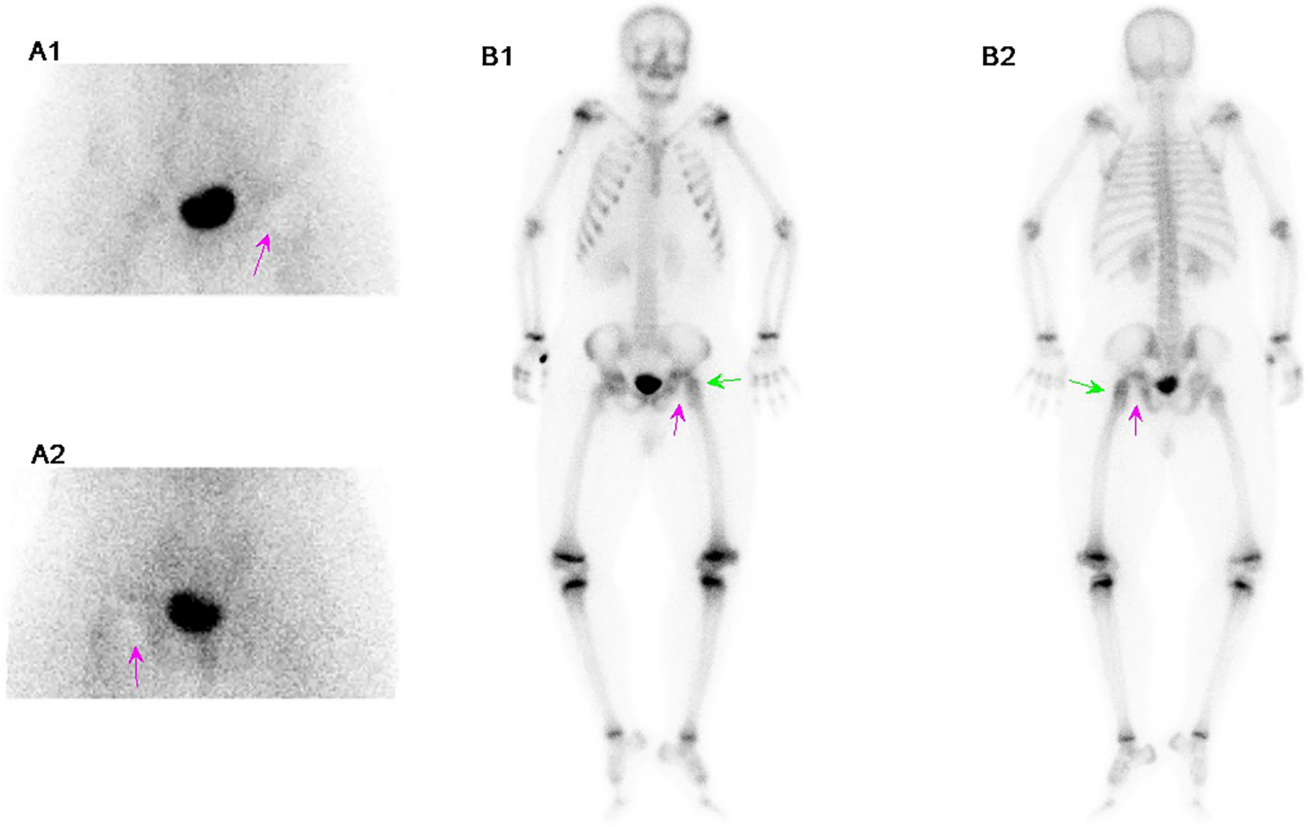

FIGURE 1 (A) Blood pool image of pelvis (A1 anterior, A2 posterior views): remarkable photopenia in left hip region suggesting massive effusion and/or vascular compromise (pink arrows). (B) Delayed whole body bone scan 2 h after injecting [^{99m}Tc] Tc-MDP showing dislocated left hip joint with diffuse hyperactivity (B1 anterior, B2 posterior views): Superolateral sliding of active left femoral neck (green arrows) with absent activity in the region of left femoral head (pink arrows).

AUTHOR CONTRIBUTIONS

Marzieh Ebrahimi: Formal analysis; software. **Vahid Ziaee:** Supervision; validation. **Maryam Nemati:** Visualization; writing – original draft. **Zeinab Paymani:** Conceptualization; validation; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this case report are available from the corresponding author, upon reasonable request. Some data may not be made available due to privacy or ethical restrictions. This data includes personal patient details that have been de-identified to protect the patient's anonymity and to comply with health information privacy regulations. If you have specific inquiries regarding the data, please contact the corresponding author directly.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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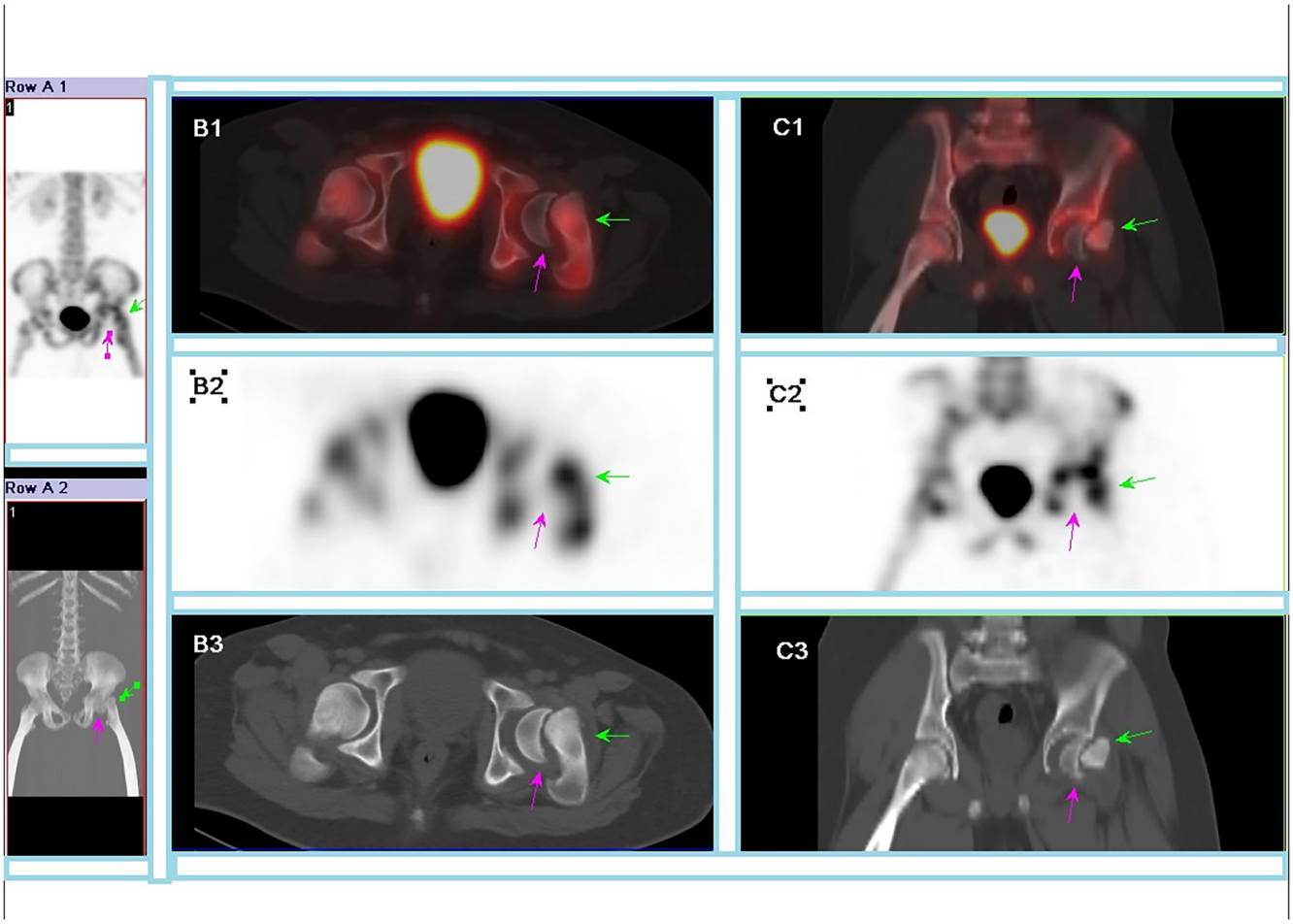

FIGURE 2 (A) Anterior 3D pelvic images (A1 SPECT, A2 CT). (B, C) Pelvis trans-axial and coronal views (first row Hybrid SPECT/CT, middle row SPECT, bottom row CT): Unilateral displacement of left proximal femoral metaphysis anteriorly, superiorly, and laterally in relation to epiphysis. Unstable left SCFE with increased left hip joint space. The left femoral head reveals absent metabolism suggesting secondary avascular osteonecrosis.

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