Bone and spleen uptake of technetium-99m-methylene diphosphonate in a patient with sickle-cell disease: A case report from Sudan

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Received 11 July 2013; revised 24 September 2013; accepted 24 September 2013

Abstract

This case report demonstrates that measurement of the activity of technetium-99m-methylene diphosphonate in bone can play an important role in the diagnosis and follow-up of bone lesions in sickle-cell anaemia. In this case, the whole-body scan revealed remarkably increased activity in the spleen region, in the right ulna and in the left femoral head, consistent with bone infarcts. Bone scanning is a reliable imaging method for early detection and diagnosis of osseous and extraosseous crises in sickle-cell anaemia.

Keywords: 99mTc MDP bone scintigraphy; Bone and spleen abnormality; Sickle-cell disease crises

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Introduction

Sickle-cell disease is one of the most common chronic haemoglobinopathies in the world.1 It is highly prevalent in Africa and the Mediterranean region2,3 and is strongly associated with Plasmodium falciparum malaria.4,5

Technetium-99m-methylene diphosphonate (Tc-99m MDP) bone scintigraphy has been used to detect sickle-cell disease involving the bones. Bone uptake varies in cases of bony infarcts, with decreasing activity due to vascular occlusion and increasing uptake during the healing phase of bone infarction.6,7
Although the high prevalence of malaria in central Sudan is strongly associated with sickle-cell anaemia, the case reported here was the first case of sickle-cell disease referred to the Department of Nuclear Medicine, National Cancer Institute, since it was established in 1995.

Case description

A 16-year-old girl with sickle-cell disease and complaining of bone and joint pain was referred to our department for an MDP bone scan, to rule out a skeletal or soft tissue crisis. Haemoglobin (Hb) analysis showed 72% Hb SS, 25% Hb F and 3% Hb A2.

A bone scan was performed 3 h after intravenous administration of 444MBq of 99mTc MDP. The scan showed increasing soft tissue uptake in the left upper quadrant, consistent with a splenic infarct. Increased uptake was also seen in the right ulna and left femoral head, consistent with bone infarcts. Uptake in the acetabulum indicated a right hip infection (Figure 1).

Discussion

The finding of increased uptake in the right ulna and left femoral head, consistent with bone infarcts, is supported by Lutzker and Alavi6 and Sevim et al.7, who reported that 99mTc MDP uptake in sickle-cell disease increases during the healing phase of bone infarction. Increased uptake of 99mTc MDP was also seen in the left upper quadrant, thought to be due to splenic infarction and subsequent calcification. This result is also in accordance with those of Lutzker and Alavi6, who reported uptake of MDP by the spleen in sickle-cell disease during healing after splenic infarction and subsequently as a result of calcification. Uptake has also been reported, however, in some patients with hyperparathyroidism, chronic renal failure8,9, breast cancer10, neuroblastoma7 and myocardial infarction.12 Therefore, the medical history of the patient should be clearly correlated with the results of the bone scan finding.

The reason that no other cases of sickle-cell disease have been reported previously to our department might be lack of information among physicians about the benefit of nuclear medicine investigations in cases of sickle-cell anaemia crises.

Conclusion

Bone scanning is a reliable imaging method, which can be used for early detection of sickle-cell anaemia crises, particularly in regions where there is a high prevalence of P. falciparum malaria. Careful examination of the patient’s history and the distribution of MDP are mandatory for accurate diagnosis of sickle-cell disease crises.

Conflict of interest

The author declares that he has no conflict of interest.

Acknowledgments

I would like to thank Dr Anas Ahmed and the Nuclear Medicine Department staff at National Cancer Institute for their assistance.
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