Tc-99m MDP Scan with Unusual and Isolated Skeletal Metastasis in Skull Bone in a Case of Testicular Seminoma

Abstract

Seminomas are common germ cell tumors (GCT) that may arise in the testes as well as in extra testicular locations such as mediastinum with/without testicular tumor. Testicular tumors are usually detected early due to their location and presentation as testicular mass. The overall prognosis of the seminomatous GCTs is good with surgery as the mainstay of treatment in localized disease. Bone metastases, especially when present in isolation are exceedingly rare in seminoma. Here, we present a rare case of skull bone metastasis in a case of testicular seminoma which was detected on technetium-99m labeled methylene diphosphonate bone scintigraphy with single-photon emission computed tomography with computed tomography.

Keywords: *Bone metastasis, isolated skull metastasis, seminoma, single-photon emission computed tomography with computed tomography, technetium-99m labeled methylene diphosphonate scan*

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Description

A 45-year-old man presented with progressively enlarging painless swelling in the right inguinal region and right side of scrotum, which he first noticed 1 year ago but did not seek medical attention. On physical examination, a large swelling (measuring ~15 cm × 10 cm) was noted in the right inguinal region which was continuous with right scrotal swelling (measuring ~20 cm × 15 cm). Further history revealed that patient underwent right orchidopexy and right hernioplasty 3 years ago. The patient also had a nonmobile, firm and painless swelling in the left frontal region of skull since 1 month. Ultrasound revealed a large heterogeneously hypoechoic soft-tissue mass arising in the right scrotum and extending cranially into right inguinal region reaching up to right paraumbilical area retroperitoneally with displacement of inferior vena cava toward the left side. The mass was also seen to encase the right common iliac artery. The right testis was not separately visualized from the mass; and left testis was not visualized in the scrotum or anywhere along the path of testicular descent. No history of the left testicular removal could be elucidated. Contrast-enhanced computed tomography of the abdomino-pelvic region showed a large lobulated solid cystic mass lesion in the right scrotal and inguinal region with involvement of the right spermatic cord and retroperitoneal lymph nodal metastasis. No other distant metastatic lesions were noted. Serum beta-human chorionic gonadotropin level was 369 mIU/ml (normal <10 mIU/ml) and lactate dehydrogenase level was 1983 U/L (normal: <248 U/L). Serum alpha-feto protein was in normal range. Core biopsy from the inguinal mass revealed histomorphological features consistent with seminoma. The patient underwent three-phase skeletal scintigraphy with technetium-99m labeled methylene diphosphonate in view of suspicious left frontal region swelling to rule out skeletal metastasis in skull and at other site(s). Mildly increased tracer pooling in the left fronto-parietal region of skull was noted in the blood pool images. Whole body images acquired after 3 h of intravenous tracer administration showed heterogeneously increased tracer uptake in the left fronto-parietal region. In addition, faint tracer distribution was seen at the periphery of large inguinal and scrotal mass, and right lower limb edema was also noted in the whole-body images [Figure 1]. Single-photon emission computed tomography with computed

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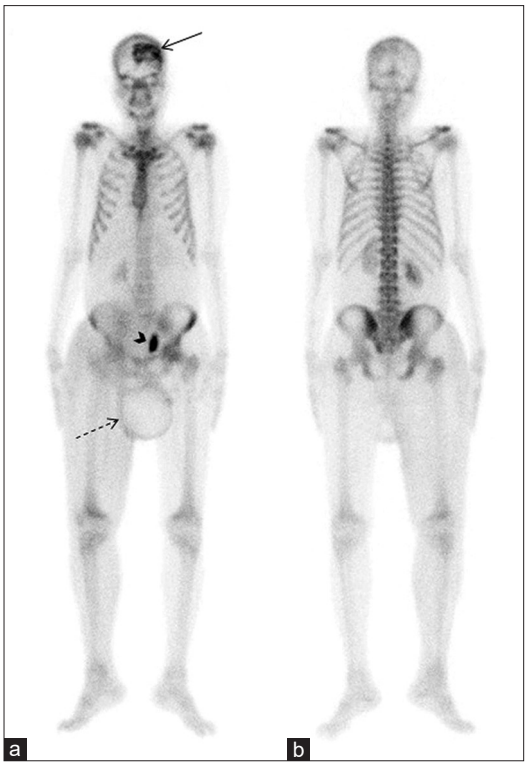

Figure 1: Tc99m-MDP bone scintigraphy acquired in anterior (a) and posterior (b) projections. Anterior image shows heterogeneous tracer uptake in the left frontoparietal region (arrow), faint peripheral tracer uptake in the right sided inguinal mass (dashed arrow). Tracer activity in the left pelvic region (arrowhead) likely represents urinary tracer activity. Tc99m-MDP: Technetium-99m labelled methylene diphosphonate

tomography (SPECT/CT) of the skull was also performed which revealed increased tracer uptake along with lytic and erosive changes in the left frontal and parietal bones with soft-tissue component [Figure 2]. There was no history of skull trauma, previous radiation or family history of testicular tumors. The patient was subsequently referred to oncology centre and underwent chemotherapy and radiation therapy.

Seminoma accounts for more than half of all germ cell tumors (GCT). Overall prognosis even in advanced stages is good, however, patients with metastasis have poorer prognosis when compared with localized disease.[1,2] Early detection of unusual bone metastasis is particularly helpful in selecting appropriate therapy protocol in these patients, as the course of treatment may change, particularly in cases of solitary distant bone metastasis. Bone scan is more sensitive than conventional radiography for detecting osteoblastic skeletal metastasis.[2,3] Testicular tumors exhibit lymphatic spread with frequent involvement of paraaortic, supradiaphragmatic, mediastinal, and supraclavicular lymph nodes. Liver and lung are common sites of hematogenous metastases. Bone metastases are very rare in GCT, and majority of these have been reported in non-seminomatous GCT.[1,4,5] In a case series of 2550 cases of GCT, bone metastasis was seen in 19 patients and 3/19 patients were

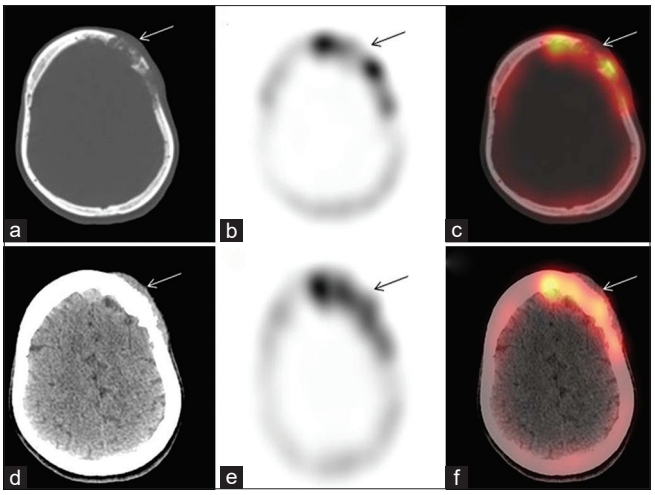

Figure 2: Transaxial CT (a and d), SPECT (b and e) and fused SPECT/CT images (c and f) of the skull. Increased tracer uptake is noted in the lytic erosive lesion involving the left frontal and parietal bones with soft-tissue component (arrows in a-f). SPECT/CT: Single-photon emission computed tomography with computed tomography

of seminomatous GCT with bone metastasis. 10/19 patients had solitary bone metastasis. However, this case series did not specify that solitary bone metastasis arising from seminomatous or nonseminomatous GCT. Overall, presence of bone metastasis in patients with GCT is helpful in prognostication and signifies poor outcome.[6]

Bone metastasis from seminoma, when noted, usually occurs in pelvic bones and spine.[3] Index case also had a history of cryptorchidism, which significantly increases the risk of seminoma. Other risk factors for testicular tumors are HIV infection, age, and family history.[1] This patient tested negative for HIV and had no family history of testicular tumors. The data evaluating the utility of Bone scan and SPECT/CT in bone metastasis is limited, and this case presents the findings of SPECT/CT for this indication, in addition to the findings of planar scintigraphy.[7]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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