Metastatic bone marrow tumours: a report of six cases and review of the literature

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Abstract—Bone marrow aspirations and biopsies are now employed in the investigation of many disorders in haematology, oncology, and internal medicine. In this paper, clinical, laboratory, and pathological findings are presented of patients with bone marrow metastases of solid tumours (n = 6). Anemia was detected in four cases (66.6%), thrombocytopenia in five cases (83.3%), leukopenia in three cases (50%), diffuse bone pain in four cases (66.6%), elevated serum alkaline phosphatase levels in four cases (66.6%), and hypercalcaemia in two cases (33.3%). In conclusion, bone marrow aspiration and biopsy examinations are effective, practical, and cheap in detecting solid tumour metastasis to bone marrow in a selected group of patients.

Key words: Solid tumours; bone marrow metastases; bone marrow aspiration; bone marrow biopsy.

INTRODUCTION

Lung, breast, and prostate cancers are the solid tumours that frequently metastasize to bone marrow [1]. Moreover, malignant melanoma, Ewing sarcoma, neuroblastoma, and hypernephroma, endometrial, testis, nasopharynx, gastric, colorectal, adrenal, and thyroid cancers may also involve bone marrow [2, 3]. Bone marrow metastases are frequently encountered in patients with disseminated solid tumours, or they can also be the presenting sign [4, 5]. The haematological and non-haematological signs of bone marrow metastasis can vary. Bone marrow infiltration-induced anaemia and thrombocytopenia, and myelo-suppression-induced leukopenia are the frequently encountered signs of bone marrow metastases. On the other
hand, bone marrow metastasis can be seen in patients with no apparent haematological abnormalites. However, most of the time, bone pain and tenderness, hypercalcaemia and elevated alkaline phosphatase can be detected [5].

The bone marrow is a common site of metastases in patients with solid tumours. Metastatic bone marrow involvement is found much more frequently at autopsy than in routine staging procedures [6]. The marrow aspirate findings were characterized by numerous to sparse cohesive tumour clusters with nuclear moulding [5]. Bone marrow aspirations and biopsies are now employed in the investigation of many disorders in haematology, oncology, and internal medicine. In this paper, we discuss the clinical, laboratory, and pathological signs of six patients with solid tumours in whom bone marrow metastases were detected by bone marrow aspiration and biopsy examinations.

**PATIENTS AND METHODS**

One hundred and ten patients with solid tumours (breast = 31, colorectal = 25, lung = 19, gastric = 14, prostate = 12, nasopharynx = 4, pancreas = 3, thyroid = 2) diagnosed at the Medical Oncology Clinic of Inonu University between 1996 and 1999 were involved in the study. None of the patients had received chemotherapy or radiotherapy. Bone marrow aspiration was performed on 14 patients with unresolved cytopenia, elevated alkaline phosphatase levels, hypercalcaemia, and bone pain. The Jamshidi technique was used for bone marrow aspiration and superior and posterior iliac crest was selected for both aspiration and biopsy procedures [6]. Out of 14 patients, six (42.8%) were detected to have metastases in whom histopathological examinations of the biopsy specimens confirmed the bone marrow metastases.

**Case 1.**

A 54-year-old female patient who was complaining of back pain and a mass in the right breast was diagnosed to have breast carcinoma. The TNM status was detected to be T3CJ2M1. Laboratory examination revealed the following: haemoglobin level 10.2 g/dl, platelet count 67 000 per mm$^3$, leukocyte count 3000 per mm$^3$, serum alkaline, phosphatase level 310 U/l (normal range 38–155), serum calcium level 10.9 mg/dl (normal range 8.1–10.4), and serum CA-15.3 level 108 U/ml (normal range 7.5–53). Bone marrow aspiration and biopsy examinations revealed bone marrow metastasis (Fig. 1).

**Case 2**

A 61-year-old female patient was seen at the Oncology Clinic because of a bilateral mass in the breasts. Histopathological examination revealed breast carcinoma. The TNM status was detected to be T2N3M1. Laboratory examination showed a