Angiosarcoma arising from skeletal haemangiomatosis in an atomic bomb survivor

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Abstract
The authors report a unique case in which an angiosarcoma arose from skeletal haemangiomatosis in a 72 year old man. This patient had a history of atomic bomb irradiation more than 50 years ago. Radiographically, the patient had multiple sclerotic foci of benign haemangiomas in the pelvis, the sacrum, and the left femur. The patient developed a high grade angiosarcoma in the left pubic bone. It is thought that atomic bomb irradiation played an important role in the development of the malignant lesion.

Keywords: angiosarcoma; haemangioma; atomic bomb

Malignant transformation of benign haemangiomas is rare. We describe a patient with skeletal haemangiomatosis who developed a secondary angiosarcoma in the pelvis.

Case report
In March 1996, a 72 year old Japanese man presented with a five month history of left hip pain. This patient had been exposed to atomic bomb irradiation at Hiroshima near the end of the Second World War. His medical history included diabetes mellitus, liver cirrhosis, and colon polyps. The patient underwent colon polypectomy at 71 years of age. On admission, radiographs of the pelvis revealed multiple sclerotic foci in iliums, the sacrum, and left proximal femur, and an extensive osteolytic lesion in the left pubic bone (fig 1). Computed tomography showed multiple irregular osteosclerosis in the pelvis. A 99mtechnetium scintigraphic scan showed increased uptake only in the left pubic bone. A systemic investigation failed to find other lesions. The patient subsequently underwent an open biopsy. Specimens obtained from the sclerotic area of the left ilium consisted of sclerotic bony trabeculi and cavernous haemangiomas (fig 2). Specimens obtained from the left pubic bone were composed of spindle pleomorphic cells with nuclear atypia and massive interstitial hemorrhage (fig 3). A pronounced vascular formation lined by the atypical cells was noted. Mitotic figures were common (7–8/10 high power fields). The cells were found to have positive immunoreactivity for factor VIII associated antigen (using a monoclonal antibody from Dako Japan, Kyoto, Japan). Based on the radiographic and histological findings, a diagnosis of angiosarcoma arising from benign...
haemangiomatosis was made. Despite intensive chemotherapy and 50 Gy of irradiation, the tumour continued to increase in size. The patient died of massive retroperitoneal bleeding in April 1997. Radiographic changes in multiple sclerotic areas concordant with haemangiomatosis were not seen until the patient’s death.

**Discussion**

Atomic bomb survivors are known to have a high risk of developing various malignant and benign tumours. A significant excess risk for cancers of the digestive system, breast, gastrointestinal tract, lung, skin, liver, ovary, urinary bladder, and other organs has been demonstrated. Sarcomas with a haematopoietic origin, such as leukaemia, lymphoma, and multiple myeloma are also frequently seen in atomic bomb survivors. Malignant bone tumours in these patients are less common. In addition, the incidence of non-cancer diseases such as liver cirrhosis and myocardial infarction is increased. Our patient had a medical history of liver cirrhosis and colon polyps.

Skeletal haemangiomatosis is recognised as a rare, congenital, or developmental disorder. It is defined as multiple haemangiomatous lesions that involve two or more non-contiguous osseous sites. Skeletal haemangiomatosis can be associated with cutaneous, soft tissue and/or visceral haemangiomas. The histological findings are identical to capillary and cavernous haemangiomas of other sites. Patients with systemic haemangiomatosis have high morbidity because of massive bleeding; however, the prognosis for patients with haemangiomatosis confined to the bone is more favourable. Some patients with skeletal haemangiomatosis develop local pain and deformity, but others are asymptomatic. Radiographs of skeletal haemangiomatosis show mixed osteolytic and osteoblastic lesions. Histologically, these lesions are identical to capillary and cavernous haemangiomas, but osteoblastic lesions are rare. In this case, the lesion met criteria for both osteoblastic and osteolytic lesions, suggesting mixed biological activity.

Our patient had a benign haemangiomatosis confined to the bone. De novo angiosarcoma is a rare, high-risk sarcoma that arises from a bone with haemangiomatosis. The diagnosis was confirmed by the presence of epithelioid endothelial cells. Cytoplasmic vacuoles of various sizes are reported to be present in all cases. Signet ring cell-like structures also are identified in most epithelioid haemangiendotheliomas. These pathological findings were not found in our case.

Our patient developed a secondary angiosarcoma from a benign skeletal haemangiomatosis more than 50 years after being exposed to irradiation from the atomic bomb. Because of the patient’s clinical history and the rarity of de novo malignant transformation of skeletal haemangiomatosis, we believe that the radiation played an important role in the development of the malignant lesion. A careful search of the literature revealed no similar reports.

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