Telangiectatic Osteosarcoma: Radiologic-Pathologic Comparison

**PURPOSE:** To describe the imaging characteristics of a large series of telangiectatic osteosarcomas with pathologic findings for comparison.

**MATERIALS AND METHODS:** The authors retrospectively reviewed 40 pathologically confirmed telangiectatic osteosarcomas. Patient demographics and images from radiography (n = 36), bone scintigraphy (n = 17), angiography (n = 4), computed tomography (CT) (n = 25), and magnetic resonance (MR) imaging (n = 27) were evaluated by three authors in consensus for lesion location, size, and intrinsic characteristics. There were 27 men (68%) and 13 women (32%) in the study, with an age range of 4–83 years (mean age, 24 years).

**RESULTS:** Lesions frequently affected the femur, tibia, and humerus. Radiographs showed geographic bone lysis, a wide zone of transition, and matrix mineralization. CT demonstrated low attenuation, MR demonstrated high signal intensity on T2-weighted images, and both demonstrated hemorrhage, which simulated the appearance of aneurysmal bone cyst. Viable sarcomatous tissue surrounding hemorrhagic and/or necrotic regions was best seen at contrast material–enhanced CT and MR imaging, with thick peripheral, septal, and nodular enhancement in all cases. Subtle matrix mineralization in this viable tissue was best seen at CT. An associated soft-tissue mass was also seen in 19 of 25 cases (76%) at CT and in 24 of 27 cases (89%) at MR imaging.

**CONCLUSION:** CT and MR imaging findings of telangiectatic osteosarcoma often include thick nodular tissue (and matrix mineralization at CT) in a largely hemorrhagic and/or necrotic osseous lesion with an associated soft-tissue mass, which allows distinction from aneurysmal bone cyst.

Many different types of osteosarcoma have been described, including conventional high-grade intramedullary, parosteal, perioseal, intracortical, small cell, low-grade intramedullary, and telangiectatic. Telangiectatic osteosarcoma was described by Paget in 1854 (1) and was subsequently referred to by Gaylord as a "malignant bone aneurysm" in 1903 (2). This subtype of osteosarcoma is well recognized, although unusual, representing 2.5%–12.0% of all lesions (3–10). Characteristically, telangiectatic osteosarcoma is primarily (>90%) composed of multiple aneurysmally dilated cavities that contain blood, with viable high-grade sarcomatous cells in the peripheral rim and septations around these spaces (Fig 1). It is therefore not surprising that telangiectatic osteosarcomas may be confused with aneurysmal bone cysts, both radiologically (with all imaging modalities) and pathologically (11–14). The prognosis of telangiectatic osteosarcoma was previously believed to be much worse than that of conventional osteosarcoma (3). However, results of more recent studies indicate that survival is similar to or even mildly improved in comparison to that of conventional high-grade intramedullary osteosarcoma (15–17).

In previous studies, investigators have emphasized the clinical and pathologic aspects of telangiectatic osteosarcoma (3–10). Only limited evaluation of radiologic characteristics has been presented to date (18–24). Specifically, the radiographic appearance has been described but has not often been investigated quantitatively. The use of other imaging modalities to evaluate telangiectatic osteosarcoma, including bone scintigraphy, angiog-
Figure 1. Gross morphologic and microscopic specimens of telangiectatic osteosarcoma. (a) Photograph of coronally sectioned whole-mount specimen shows central cystic and/or hemorrhagic spaces (*) and a thick rim of tissue containing viable neoplasm (region between arrowheads). (Hematoxylin-eosin stain.) (b) Photograph also shows hemorrhagic and/or cystic spaces (c) and surrounding rim of viable tumor (*). (Hematoxylin-eosin stain; original magnification, ×175.)

MATERIALS AND METHODS

We retrospectively reviewed all cases of telangiectatic osteosarcoma in the archives of the Armed Forces Institute of Pathology and the Washington Hospital Center Cancer Institute. This study was performed with the approval of the Armed Forces Institute of Pathology Human Subjects Committee and the institutional review board at Washington Hospital Center Cancer Institute. Informed patient consent was not required by either institution.

Pathology reports were reviewed for all patients with a diagnosis of telangiectatic osteosarcoma in our archives (n = 45). Criteria for inclusion in the study were similar to those in previous investigations (3–10): (a) images of adequate quality available for review (radiography, angiography, bone scintigraphy, CT, or MR imaging), (b) a predominantly lytic lesion on radiographs, (c) a cystic mass with multiple cavities at gross and histologic examination (if available) that composed most of the lesion, and (d) aneurysmally dilated spaces at histologic examination that contained blood or necrotic tumor with associated viable sarcoma cells (allowing distinction from aneurysmal bone cysts) that produced osteoid (prior to treatment with chemotherapy and/or radiation therapy).

Five cases were eliminated for further review because the images available for evaluation were obtained after the initiation of therapy (chemotherapy and/or radiation). The remaining 40 cases of telangiectatic osteosarcoma formed the study group for this investigation. Clinical characteristics recorded included patient age and sex, symptoms at presentation, and anatomic site involved.

Image Evaluation

Images were reviewed in consensus by two experienced musculoskeletal radiologists (M.D.M., S.w.J.) and one orthopedic oncologist (H.T.T.) with complete knowledge of the pathologic findings. Images were obtained with radiography (n = 36), bone scintigraphy (n = 17), angiography (n = 4), CT (n = 25), and MR imaging (n = 27). Evaluation of the anatomic site included the specific bone affected (proximal or distal for long bone lesions), side involved, and lesion center for long bone lesions (epiphysis, metaphysis, or diaphysis). The presence of epiphyseal extension for lesions centered in the metaphysis was determined by means of the imaging modality that best depicted the lesion. Tumor size was determined in two perpendicular dimensions that defined the largest and smallest extent by means of the imaging modality that best depicted the lesion.

Radiography

Radiographs were analyzed for pattern of bone destruction (geographic or moth-eaten and/or permeative), width of the zone of transition (narrow [sclerotic or nonsclerotic] or wide), presence of radiolucent striations in or around the lesion, absence or presence and degree (mild, moderate, marked, or aneurysmal) of expansile remodeling of bone (enlargement of the bone circumference), periosteal reaction (presence and type [aggressive [lamellated, perpendicular to bone, or Codman triangle] or nonaggressive [solid]]), presence or absence of pathologic fracture, presence of cortical destruction and a soft-tissue mass, and evidence of matrix mineralization (subtle or obvious) and its extent (mild, moderate, marked) and character (osteoid [opaque and cloudlike or ivory in appearance] or chondroid [ring and arc calcification]). Matrix mineralization was also localized as intraosseous, extraosseous (in the soft-tissue mass), or both.

Scintigraphy and Angiography

Delayed bone scintigraphic images were evaluated for the degree of radionuclide uptake (none, mild, moderate, or marked), homogeneity, and heterogeneity (and if the latter, the presence of central photopenia [donut sign]). Angiographic images were evaluated for the
presence of tumor staining (avascular, hypovascular, or hypervascular) and the degree (mild, moderate, or marked) and type (diffuse or peripheral) of tumor blush. The presence or absence of early draining veins was also determined.

CT Scanning

Transverse CT scans were obtained with 3–10-mm section thickness, with bone and/or soft-tissue windows available for review. CT images were evaluated for tissue homogeneity or heterogeneity and predominant tissue attenuation (lower than, similar to, or higher than that of muscle). In those patients with predominantly lower attenuation than that of muscle, the location of higher-attenuation tissue, if present, was determined as central, peripheral, septal, or intermixed. The presence or absence of fluid levels was also determined. Cortical destruction and soft-tissue mass (presence or absence for both features) were evaluated. In cases of cortical destruction and soft-tissue mass, this extension was designated as focal if there was involvement of less than 33% of the bone circumference or diffuse if there was involvement of more than 33% on transverse CT images.

Lesion margin was determined to be defined with a pseudocapsule (higher-attenuation rim), defined without a pseudocapsule, or infiltrative (ill-defined margin). The presence, extent (mild, moderate, or marked), and character (osteoid or chondroid) of matrix mineralization was evaluated as described with radiographs (matrix mineralization assessment included one case of conventional tomography rather than CT for a total of 26 cases reviewed for this finding). The location of matrix mineralization was determined as (a) central, mixed, peripheral, and/or septal; and (b) intraosseous, extraosseous (in the soft-tissue mass), or both. In patients with both unenhanced and contrast material-enhanced CT images available, the degree (mild, moderate, or marked) and the predominant pattern of contrast enhancement were evaluated as thin peripheral and/or septal (rim and septa thinner than 2 mm), thick peripheral and/or septal (rim and septa thicker than 2 mm) with nodularity, thick peripheral and/or septal (rim and septa thicker than 2 mm) without nodularity, peripheral nodular, central nodular, or diffuse.

MR Imaging

MR imaging was performed with various MR imaging units that operated at a low field strength of 0.3–0.5 T (n = 2) or a high field strength of 1.0–1.5 T (n = 25). MR images available for review included T1-weighted spin-echo (480–800/14–30 [repetition time msec/echo time msec]) (n = 27), T2-weighted spin-echo (1,800–4,100/70–119) (n = 26), and contrast-enhanced T1-weighted spin-echo (n = 13) images. Lesions were evaluated for homogeneity or heterogeneity (mild, moderate, or marked) on both T1- and T2-weighted MR images. The predominant signal intensity of the lesion was also determined on T1-weighted images (low [less than that of muscle], intermediate [similar to that of muscle], high [greater than that of muscle, approaching that of fat]) and T2-weighted images (low [similar to that of muscle], intermediate [similar to that of fat], or high [much greater than that of fat]).

Foci of hemorrhage were graded as present if there were areas of high signal intensity with all MR pulse sequences or if there were fluid levels. Foci of low signal intensity with all pulse sequences were also recorded as present or absent, subtle or obvious, and small, moderate, or large in extent and were correlated to determine if they corresponded to areas of mineralized matrix on radiographs or CT images (if available). The presence or absence of cortical destruction and soft-tissue mass were evaluated. In patients with a soft-tissue mass, this extension was designated as focal or diffuse with the same criteria used for CT. Lesion margin was determined as defined with a pseudocapsule (low-intensity rim with all MR pulse sequences), defined without a pseudocapsule, or infiltrative (ill-defined margins). MR images were also evaluated for the presence of joint involvement (foci of intraarticular tumor) and neurovascular encasement (replacement by tumor of the normal fat that surrounds all major neurovascular bundles).
Figure 3. Telangiectatic osteosarcoma of the scapula in a 35-year-old man with a lump in his shoulder. (a) Oblique radiograph of the shoulder shows the expansile lesion of the scapula with a thick curvilinear band of mineralized matrix (osteoid) superolaterally (arrow). (b) Posterior bone scintigraphic image shows marked heterogeneous uptake of radionuclide peripherally and central photopenia (donut sign, d). (c) Transverse contrast-enhanced CT scan shows nodular peripheral and septal enhancement (arrowheads) with central low attenuation (*). Foci of mineralized matrix are seen in the viable tumor rind in the periphery and septa (arrows). (d) Photograph of transversely sectioned gross specimen demonstrates typical cystic hemorrhagic spaces (*) surrounded by nodular rinds of viable neoplasm (t) that corresponded to imaging findings.

Pathologic Findings

Pathologic material was reviewed (F.H.G.) in an attempt to determine the cause of the imaging findings in the 35 patients with this material available. This evaluation included the presence or absence of hemorrhage in the lesion cystic spaces and determination of the location of the viable tumor (intermixed with the necrosis and/or hemorrhage or surrounding the cystic spaces). In cases in which the viable tumor was surrounding the cystic spaces, an evaluation of the thickness of this tissue as either predominantly thick and/or nodular (>2 mm) or thin (<2 mm) was performed. In addition, the location of the matrix mineralization as being either in the central necrotic and/or hemorrhagic areas of tumor or in the viable neoplasm surrounding the cystic areas was determined. In the five cases in which histologic material was not available for review, the pathology reports were searched for the above described findings.

RESULTS

Of the 40 telangiectatic osteosarcomas in our study, 27 were in male patients (68%), and 13 were in female patients (32%). The patients ranged in age from 4 to 83 years (mean age, 24 years). Clinical presentation included pain (n = 31),
Figure 4. Telangiectatic osteosarcoma of the tibia in an 83-year-old woman with knee pain and swelling. (a) Anteroposterior radiograph of the knee shows a geographic lytic lesion with a wide zone of transition centered in the metaphysis but extending to subchondral bone proximally. Subtle osteoid mineralization is seen medially (arrows). (b) Coronal T1-weighted (480/30) MR image depicts marrow replacement by heterogeneous tissue with areas of high signal intensity representing hemorrhage and associated soft-tissue mass (arrow). (c) Transverse contrast-enhanced T1-weighted (480/30) MR image shows a thick rim of enhancement (between arrowheads) around the cystic spaces (*) and focal protrusion into the soft tissue anteromedially (arrow). (d) Transverse fat-suppressed T2-weighted (2,513/100) MR image shows focal soft-tissue protrusion (solid arrow), multiple fluid levels representing hemorrhage (arrowheads), and a region of low signal intensity medially (open arrow) that corresponds to matrix mineralization seen on the radiograph.

Radiographic Findings

Radiographs (n = 36) showed geographic bone destruction in 94% (n = 34) of cases (Figs 2-5). Moth-eaten or permeative destruction was seen in only two cases (6%). A narrow zone of transition (without sclerosis) was seen in 17% (n = 6) of cases, and a wide transition zone was seen in 83% (n = 30). Radiolucent striations were seen in 22% (n = 8) of cases (Fig 5a). However, only two cases (6%) had these striations in the lesion, while the other cases of striations (n = 6) were either superior or inferior to the lytic lesion (Fig 5a).

Expansile remodeling of bone was common (75%) (n = 27; mild in 15 and moderate in five), although this feature was marked with aneurysmal appearance in only seven cases (19%) (Fig 3a). Periosteal reaction was also frequent (72%) (n = 26), with aggressive characteristics in all but two cases (6%) with solid cortical thickening (Fig 5a). Pathologic fractures were seen in 22 cases (61%), and cortical destruction was apparent in 28 (78%), with an associated soft-tissue mass in 19 (53%) (Table).

Matrix mineralization was identified on radiographs in 21 cases (58%) and was subtle and mild in extent in all cases (Table) (Figs 3a and 4a). Areas of matrix mineralization in these largely lytic lesions were seen as small dense focal curvilinear or lobular areas of calcification in the periphery of the telangiectatic osteosarcoma, with an appearance of osteoid in all cases. Matrix mineralization was detected only in the osseous tumor component in seven cases (33%), only in the soft-tissue mass in four (19%), and in both components in 10 (48%).

Bone Scintigraphy and Angiography Findings

Bone scintigraphy (n = 17) depicted marked uptake of radionuclide with heterogeneity in all cases. Central phottopenia (donut sign) was seen in 11 cases (65%) (Fig 3b). Angiography (n = 4) demonstrated marked hypervascular peripheral tumor stain with early draining veins in two cases and moderate hypervascular peripheral tumor blush without early draining veins in the other two cases (Fig 2a).

CT Findings

CT (n = 25) showed marrow replacement by tissue with heterogeneous atten-
uation in 24 cases (96%), with homogeneity in only one case (4%) (Figs 2b, 3c, and 5b). Lesion tissue attenuation was predominantly lower than that of muscle in 20 cases (80%), and in all of these cases, there was tissue with higher attenuation (similar to that of muscle) around the periphery and along septations. The predominant tissue attenuation was similar to that of muscle in five cases (20%). Lesion tissue attenuation was predominantly lower than that of muscle in 19 cases (76%) (Table) (Figs 2b, 3c, and 5b). The soft-tissue extension was designated as focal protrusion (less than 33% of bone circumference) (Fig 5b) through the cortex in 74% (n = 14) of these cases, with the remainder (26%) showing diffuse extension (Table). The lesion margin appeared infiltrative in 20 cases (80%), defined with no pseudocapsule in four cases (16%), and defined with a pseudocapsule in one case (4%).

Nodular regions of matrix mineralization (osteoid) were detected in the periphery and lesion septations in 22 of 26 cases (85%, includes one case evaluated only with conventional tomography, not CT) (Table) (Figs 2b, 3c, and 5b). The calcification was seen only in the intrasosseous tumor component in six of 22 cases (27%), only in the soft-tissue component in one case (5%), and in both components in 15 cases (68%). In four patients, both pre- and postcontrast CT images were available and showed a thick peripheral and septal pattern of enhancement with nodularity in all cases, which was mild (n = 2) or moderate (n = 2) in degree (Table) (Figs 2b, 3c).

MR Imaging Findings

MR imaging (n = 27) showed marrow replacement by heterogeneous tissue in all cases on T1-weighted images (n = 27) (Figs 4 and 5). The degree of heterogeneity on T1-weighted MR images was marked in 22 cases (81%), moderate in four (15%), and mild in one (4%). This tissue had predominantly intermediate signal intensity (similar to that of muscle) on T1-weighted MR images in 13 cases (48%) and predominantly tissue of higher signal intensity (greater than that of muscle, approaching that of fat) in 14 cases (52%). On T2-weighted MR images (n = 26), signal intensity was moderately heterogeneous in 18 cases (69%), markedly heterogeneous in seven cases (27%), and homogeneous in one case (4%). There was predominant high signal intensity (much greater than that of fat) on all T2-weighted MR images. Areas of hemorrhage with high signal intensity depicted with all MR pulse sequences were seen in 26 cases (96%), and fluid levels were seen in 24 cases (74%) [n = 20] with T1-weighted MR sequences and 89% [n = 24] with T2-weighted MR sequences) (Table) (Figs 4 and 5). All cases showed at least one of these MR imaging characteristics of hemorrhage.

Focal areas of low signal intensity were depicted with all pulse sequences in 13 cases (48%) (subtle and small in extent in all cases) in the periphery of the lesion (Table) (Fig 4d). These areas corresponded to areas of mineralized matrix on radiographs and/or CT images in all cases in which these images were available for comparison (n = 11). Cortical destruction with an associated soft-tissue mass was seen in 89% (n = 24) of cases, with 50% (n = 12) showing focal protrusion (less than 33% of bone circumference), while the other 50% revealed diffuse extension (Table) (Figs 4 and 5). The lesion margin appeared infiltrative in 13 cases (48%), defined with no pseudocapsule in 11 cases (41%), and defined with a pseudocapsule in three cases (11%). Joint involvement was seen in 12 cases (44%).
(d) Sagittal contrast-enhanced fat-suppressed T1-weighted (600/18) MR image shows thick nodular enhancement of the peripheral and septal regions that correspond to viable neoplasm (n) around the hemorrhagic spaces (*). (e) Sagittally sectioned gross specimen demonstrates the hemorrhagic and/or cystic spaces (*) and surrounding rinds of viable tumor (arrows). p = patella, t = tibia, f = femur.

Figure 5 (continued).

### DISCUSSION
Telangiectatic osteosarcoma has been described as a rare variant of osteogenic sarcoma (3,5,9,17). In other studies, however, it composes up to 12% of osteosarcomas (8,15). Patient demographics, clinical symptoms, and lesion locations are similar to those in conventional (high-grade intramedullary) osteosarcoma (25) and those in previous reports (3-5,8-10, 18). In our series, lesions affected adolescents or young adults (mean age, 24 years), showed a male predilection (male to female ratio, 2.1:1.0) and nonspecific clinical symptoms of pain, and involved the femur (50%) or tibia (25%) most commonly. Pathologically, telangiectatic osteosarcoma consists of large hemorrhagic or necrotic cavities that compose most (>90%) of the tumor volume with viable high-grade sarcomatous cells around the periphery and septations of these spaces (3-14). These histologic features are the cause of telangiectatic osteosarcoma often having been described as showing nonspecific bone lysis on radiographs and simulating aneurysmal bone.
sarcoma seen in all cases pathologically was also well demonstrated with additional imaging modalities. Bone scintigraphy showed heterogeneous marked uptake of radionuclide (100%) with photopenia centrally (donut sign) in 65% of cases. CT shows predominantly lower-attenuation fluid-filled spaces in 80% of cases, while MR images demonstrated predominantly high signal intensity on T2-weighted MR images in all cases. MR imaging evidence of hemorrhage either as foci of high signal intensity with all MR pulse sequences or as fluid levels was also seen in all cases. In fact, 52% of cases showed predominantly high signal intensity on T1-weighted MR images, a feature that is unusual with other neoplasms. Fluid levels were more frequently apparent at MR imaging (89%) than at CT (48%) because of the superior contrast resolution of MR imaging.

The imaging appearance of prominent fluid-filled hemorrhagic spaces simulates that of aneurysmal bone cysts (11-14, 26-29). However, three additional imaging features are common and, in our opinion, support the diagnosis of telangiectatic osteosarcoma as opposed to aneurysmal bone cyst and can help eliminate potential misdiagnosis. The first imaging feature that favors the diagnosis of telangiectatic osteosarcoma as opposed to aneurysmal bone cyst is the detection of thick, solid nodular tissue surrounding the cystic spaces. This appearance was best depicted after intravenous contrast material administration at CT (four cases), MR imaging (12 cases), or angiography (four cases), with all cases showing thick peripheral, septal, and nodular enhancement. This thick enhancing rim again corresponds to the viable high-grade sarcomatous tissue surrounding the hemorrhagic and necrotic spaces seen pathologically in our 35 cases with histologic tissue available for review. The thick peripheral and septal nodular tissue can also be seen before contrast material administration (although not as well) at MR imaging and CT (80% of cases) as solid tissue around fluid-filled spaces, and it is vital to direct biopsy to this viable tissue that harbors diagnostic tissue.

In contrast to aneurysmal bone cysts, in our experience, show only a thin peripheral rim and septal enhancement pattern without nodularity, which reflects the limited thickness of reactive tissue around the hemorrhagic spaces characteristic of this lesion.

The second imaging feature is the detection of matrix mineralization in the lesion, which reflects an underlying osteoid-producing tumor. As would be expected, this mineralization can only occur in the previously described viable neoplastic tissue around the periphery and septations of the necrotic and/or hemorrhagic spaces. This was confirmed in our 35 cases with histologic material available for review. It is often subtle on radiographs and of limited extent because the viable tumor cells comprise only a small amount of the lesion (<10%) compared with the volume of cystic spaces (>90%). This subtle osteoid was recognized on only 58% of radiographs and had a thick curvilinear or nodular appearance that may allow differentiation from the thin rim of bone around the periphery and, rarely, in the septations in aneurysmal bone cysts (26). This potential distinguishing feature between telangiectatic osteosarcoma and aneurysmal bone cyst warrants further investigation.

CT was the optimal imaging modality for demonstration of the matrix mineralization seen in 85% of cases in the intrasosseous and/or soft-tissue components of the lesion. In retrospect, areas of low signal intensity with all MR pulse sequences (48%) corresponded to this mineralization, although it was always much more apparent on CT images or radiographs. In addition, low signal intensity with all MR pulse sequences is not distinctive of mineralization and could have several other causes, including fibrosis and hemosiderin deposition.

The final imaging feature that we believe helps to distinguish telangiectatic osteosarcoma from aneurysmal bone cyst reflects the more aggressive growth of the former lesion. Cortical destruction with associated soft-tissue mass was a frequent finding in telangiectatic osteosarcoma at CT (92% and 76%, respectively) and MR imaging (89% for both). The telangiectatic osteosarcoma lesion margin was commonly infiltrative or nonencapsulated (89% at MR imaging, 96% at CT), and protrusion into the soft tissues was often only focal (64% at CT, 50% at MR imaging). The growth pattern of aneurysmal bone cysts is much different, typically showing expansile remodeling of a large portion of the cortical circumference (>33%), not focal protrusion and an intact outer periosteum (with associated fibrosis) seen as soft-tissue attenuation at CT and as areas of low signal intensity with all MR pulse sequences (26-29). This creates (a) a well-defined encapsulated rim or margin that must be incised...
at surgery to enter the lesion and (b) lack of a soft-tissue mass.

We acknowledge limitations of this study, including its retrospective nature. Because of the referral basis of our patient population, we were unable to control the technical imaging parameters used in performing the radiologic studies and could not directly map the imaging findings to the pathologic results. We also did not directly compare the ability of various imaging modalities to depict specific findings, since this was not the goal of our study. Finally, patient follow-up and ultimate outcome are also difficult or impossible to assess from our referral population. Despite these limitations, we believe our results add substantial understanding of the imaging appearance of telangiectatic osteosarcoma.

In conclusion, imaging findings of telangiectatic osteosarcoma are often characteristic. CT and MR imaging reflect the largely hemorrhagic and/or necrotic composition of most of the lesion, with a frequent finding of fluid levels. However, the nodular viable high-grade sarcomatous cells that produce osteoid around these cystic spaces are well seen after contrast material administration as a solid thick nodular enhancing rim of tissue that contains subtle mineralization on radiographs (61%) or CT images (89%). These features, as well as aggressive growth with nonencapsulated soft-tissue components, should allow the vital distinction from aneurysmal bone cyst (thin rim and septa surrounding cystic spaces) and help direct biopsy to the viable tissue. Diagnosis and differentiation from conventional osteosarcoma is also important for treatment and prognosis, with recent reports (15-17) indicating improved survival for patients with telangiectatic osteosarcoma.

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