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EDITORIAL COMMENT

From Images to Insights

Multimodal Imaging for Cardiac Metastases in Myxoid Liposarcomas

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Myxoid liposarcomas (MLS) is a common subtype of liposarcoma that can occur in various parts of the body.[1] Clinically, approximately one-third of patients with MLS experience distant metastases to the retroperitoneal, abdominal, and bone sites; however, cardiac metastases are rare.[2] The time interval between primary lesion and cardiac metastasis is relatively long and most patients remain asymptomatic until cardiac compression or invasion of adjacent organs appear, potentially delaying diagnosis. This underscores the importance of early detection of cardiac metastases.

In this issue of *JACC: Case Reports*, Estrada et al[3] present a case of cardiac and pericardial masses occurring 12 years after primary surgery for MLS of the left thigh. The patient received an early diagnosis of cardiac metastasis during the short period between the first postoperative recurrence and the development of cardiac involvement. This was achieved through the use of multimodality cardiac imaging such as echocardiography, computed tomography (CT), and cardiac magnetic resonance (CMR), which are invaluable for the assessment and management of recurrent MLS to complement histopathologic evaluation. However, these are not simply dependent on the performance of the modality but require judgment based on the physician's advanced expertise. These diagnostic imaging studies contribute to more accurate diagnosis and treatment planning through the collaboration of a multidisciplinary medical team and specialists.

ECHOCARDIOGRAPHY

Two-dimensional echocardiography, which is a simple, noninvasive method, can help detect pericardial effusion, intracavitary masses, and assess ventricular function. Cardiac metastases from MLS show an irregular and cystic solid component mass. The key is for the physician to evaluate the presence of irregular pericardial nodules and pericardial effusion in real time and not miss any suspicious findings. It is a first imaging technique for diagnosing such lesions during follow-up, but the area of tissue that can be covered using standard transducers may not be sufficient to fully assess the extent of the tumor mass, and it is up to the physician to decide whether to select an additional modality.

CARDIAC MAGNETIC RESONANCE

The high soft tissue contrast and resolution of CMR, complemented by fat suppression techniques that detect small fat components within the lesion, has advantage for clarifying anatomic details: low to iso-signal intensity on T1-weighted imaging, high-signal intensity on T2-weighted imaging, and often heterogeneous high-signal and focal spotty low-signal intensity on fat-saturated T2-weighted imaging.[4] This is the evidence for the presence of adipose tissue nodules, areas of highly aggregated adipoblasts in pathology, and is an important imaging basis for the diagnosis of MLS. Delayed enhancement scans show a band of cottony soft tissue density shadow with heterogeneous enhancement within the lesion. Expert knowledge and experience in appropriate CMR sequences and their interpretation for differential diagnosis including primary and secondary

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malignancies, benign tumors, thrombi, vegetations, and other infective lesions are essential for accurate diagnosis.[5]

CARDIAC COMPUTED TOMOGRAPHY

Cardiac CT is also a useful tool for identifying cardiac metastases.[6] Additionally, CT is beneficial for cancer staging by identifying possible mediastinal extension and distant metastasis, which complements CMR. On plain CT images, a mass appears as predominantly fatty to hypodense and heterogeneous masses with areas of low-attenuation values. Contrast-enhanced CT shows no significant enhancement or minimally enhancing mass lesion. However, CT alone may not be sufficient to adequately determine the nature of some lesions, so an experienced radiologist must suggest the use of CT in combination with other modalities if necessary.

POSITRON EMISSION TOMOGRAPHY–COMPUTED TOMOGRAPHY

Positron emission tomography computed tomography (PET-CT) by using the tracer 18F-fluorodeoxyglucose (18F-FDG) is a useful noninvasive test in guiding treatment and follow-up strategies in MLS by detecting early metastatic lesions and identifying primary and metastatic soft tissue sites. MLS typically exhibits FDG high uptake. However, the physician must interpret the images comprehensively because some metastatic lesions may be poorly integrated on PET-CT as the metastasis are not always uniformly FDG avid. In addition, FDG-PET may determine malignancy and differentiate liposarcoma subtypes depending on the mean 18F-FDG standardized uptake values of MLS.[7]

HISTOLOGIC FINDINGS OF MLS

MLS is composed of round to spindle-shaped cells and a variable number of signet ring lipoblasts in a background of mucinous matrix with a branching vascular pattern.[8] High-grade MLS (round cell component >5%) is associated with a poor prognosis. Most MLS carry a t(12;16) (q13;p11) translocation, resulting in an FUS-DDIT3 fusion gene which is useful to support the diagnosis of MLS.

MLS is distinguished by a unique pattern of metastatic spread, underscoring the importance of detecting metastatic lesions to determine prognosis and guide treatment decision. However, the diagnosis of MLS remains a challenge and guidelines for the timing and type of imaging surveillance in MLS have not been fully established. Therefore, the approach using a combination of these noninvasive multimodality imaging plays a pivotal role in the diagnosis of cardiac metastases of MLS. The success of the diagnosis relies on each physician's expertise in integrating clinical information with imaging findings. Moreover, collaboration within a multidisciplinary team ensures accurate diagnosis and effective treatment, ultimately improving patient outcomes through radiotherapy and surgical resection.

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