PET/CT: First-Line Exam To Assess Disease Extent of Disseminated Coccidioidomycosis

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The authors have nothing to declare.

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Abstract:

Coccidioidomycosis is an infection caused by inhalation of the Coccidioides fungus. Most infections remain subclinical or are confined to the pulmonary system. Disseminated disease is rare. Traditionally, a combination of imaging modalities have been utilized to determine disease extent. We suggest F18-Fluorodeoxyglucose (FDG) PET/CT as a single first-line imaging exam to assess disease extent. We present a case of disseminated coccidioidomycosis to the lung, mediastinum, soft tissues, and skeletal system. To our knowledge, no prior case reports demonstrate such widespread disease utilizing PET/CT.

Key Words: PET/CT, coccidioidomycosis, osteolytic lesions

Introduction:

Less than 1% of coccidioidomycosis infections result in extrapulmonary disseminated disease, and less than half of those involve the skeletal system (1). A single imaging exam with F18-FDG PET/CT provides comprehensive assessment of disease extent.

Case Presentation:

An immunocompetent, 22 year-old African-American male was admitted for work up and treatment of presumed pneumonia, which was refractory to empiric therapy. The patient reported 3 months of fever, night sweats, weight loss, and difficulty breathing. He was born in Liberia, moved to Texas 15 years ago, and recently traveled to Ohio. CT of the chest, abdomen, and pelvis demonstrated multiple osteolytic lesions. Left iliac lesion biopsy demonstrated coccidioidomycosis.
PET/CT was performed to determine disease extent (Figures 1-3). Pertinent findings included hypermetabolic mediastinal, hilar, and mesenteric/retroperitoneal lymphadenopathy with SUVmax 30.8 g/mL, nonhypermetabolic pulmonary nodules, and widespread hypermetabolic osteolytic lesions with SUVmax 30.6 g/mL. He was subsequently treated with a combination of high dose fluconazole, itraconazole, and amphotericin. He responded well clinically and was discharged home.

**Discussion:**

F18-FDG is a glucose analog positron emitter, whose primary imaging use has traditionally been staging and monitoring of malignancy. Infectious and inflammatory cells, however, also preferentially metabolize glucose (3). PET/CT imaging of infection/inflammation is gaining greater acceptance, to include evaluation of joint prosthesis, fever of unknown origin, AIDS-related disorders, and vascular graft infections (2). Previously, multiple imaging modalities were utilized to assess infectious/inflammatory disease extent, to include bone scintigraphy, radiography, CT, and MRI (4). Now, whole body PET/CT can provide a single comprehensive assessment of anatomic and metabolic extent of infection/inflammation involving both the soft tissues and osseous structures.

Risk factors for disseminated coccidioidomycosis include African American or Filipino ancestry, immunocompromised state, and male gender (4). The nonspecific symptomatology and indolent nature can lead to delayed diagnosis, with recurrence or spread possible 2 or more years after the initial infection. Fever of unknown origin work up is then pursued and frequently utilizes multiple imaging exams to determine disease extent.
Skeletal involvement of disseminated coccidioidomycosis predominantly causes osteolytic lesions which are FDG avid on PET/CT. Additionally, soft tissue assessment with PET/CT can demonstrate clinically occult soft tissue infection/abscesses which may need surgical debridement. Thus F18-FDG PET/CT can provide whole body comprehensive assessment of disease extent and guide biopsy targets and therapy (2).

**Conclusion:**

Though rare, disseminated coccidioidomycosis is associated with significant morbidity and mortality to include clinically occult abscesses. Previously, a combination of multiple imaging exams were utilized to determine disease extent. PET/CT, however, provides whole body metabolic and anatomic assessment of disease and should be considered a first-line imaging exam in these patients.

**References:**

Figure 1: Maximum intensity projection (MIP) images demonstrate too numerous to count foci of increased FDG activity representing disseminated disease.
Figure 2: Axial CT (left column), corrected PET (center column), and fused PET/CT (right column) images through the neck (top row), mid-thorax (center row), and pelvis (bottom row) demonstrate hypermetabolic mediastinal lymph nodes and lytic posterior C2 and left iliac lesions.
Figure 3: Sagittal CT (left), PET (center), and fused PET/CT (right) images demonstrate disseminated disease scattered throughout the vertebral bodies and posterior spinal elements at multiple levels.