THE ROLE OF PET/CT IN DETECTING OCCULT DISEASE IN SYNCHRONOUS TUMORS: A CASE REPORT OF MERKEL CELL CARCINOMA AND NON-HODGKIN LYMPHOMA

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Introduction/Justification: Merkel Cell Carcinoma (MCC) is a rare and aggressive cutaneous neoplasm characterized by a high tendency for recurrence and metastasis, primarily affecting older adults with fair skin. The introduction of PET/CT with 18F-FDG has significantly enhanced the diagnosis and management of MCC, providing superior sensitivity in detecting occult disease compared to computed tomography. This advancement profoundly impacts patient staging and therapeutic decisions. Similarly, non-Hodgkin lymphomas, a heterogeneous group of neoplasms originating from B cells, T cells, or natural killer cells, also benefit from PET/CT for diagnosis and follow-up, underscoring the significance of this modality in oncological practice. Herein, we present a rare case of synchronous Merkel cell carcinoma and non-Hodgkin lymphoma. **Report:** A 61-year-old male patient with a history of treated diffuse large B-cell lymphoma and multiple comorbidities presented with symptoms of progressive asthenia, night sweats without fever, weight loss, and a nodular reddish lesion on the left thigh; no palpable lymph nodes were found. Initial blood work showed pancytopenia; bone marrow biopsy did not reveal infiltration by high-grade histological non-Hodgkin lymphoma, but could not rule out focal infiltration by a low-grade histological lymphoma of immunophenotype B. Further investigation included a skin nodule biopsy, histopathologically consistent with Merkel cell carcinoma. PET/CT revealed extensive neoplastic involvement, including a retroperitoneal mass, neoplastic involvement of multiple bilateral lymph node chains, diffuse hyperdensities throughout the body, and a pulmonary nodule. Biopsy of the retroperitoneal mass confirmed low-grade non-Hodgkin lymphoma, suggesting a follicular subtype. The patient underwent resection of the Merkel cell carcinoma lesion in his thigh. A compromised deep margin was detected, warranting adjuvant radiotherapy and adjuvant chemotherapy with cisplatin + etoposide, administered concurrently with rituximab for lymphoma treatment. **Conclusion:** This case underscores the complexity of diagnosing and treating synchronous neoplasms, emphasizing the need for a multidisciplinary and individualized approach. 18F-FDG-PET/CT plays a pivotal role in detecting occult disease and assessing the extent of the conditions in this setting.

Keywords: Merkel cell carcinoma, Non-Hodgkin lymphoma, Occult disease, PET/CT.

https://doi.org/10.1016/j.htct.2024.04.100

BRAIN METABOLISM REDISTRIBUTION FROM NEOCORTEX TO PRIMITIVE BRAIN STRUCTURES IN A PATIENT WITH HODGKIN'S LYMPHOMA

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Introduction/Justification: We have recently demonstrated a 18F-FDG PET/CT image pattern of brain metabolic redistribution from the neocortex to evolutionary ancient brain structures during the acute phase of COVID-19 respiratory syndrome (1). We report here a patient with extensive lesions caused by Hodgkin's lymphoma whose PET/CT demonstrated changes in the cerebral distribution of FDG, with reduced uptake in the neocortex and a relative increase in the basal ganglia, similar to that observed in acute COVID-19 (1). **Report:** A 57-year-old female patient with a history of hypertension and hypothyroidism, presented with weight loss and generalized lymphadenopathy. Biopsy revealed nodular sclerosis classical Hodgkin's lymphoma subtype. 18F-FDG PET/CT was requested for staging. The images showed marked hypermetabolism in lymphadenopathy below and above the diaphragm, spleen, and bone marrow, consistent with lymphoma infiltration. Reduced radiotracer uptake was also observed in the cerebral neocortex and relatively increased uptake in the basal ganglia. Semiquantitative analysis of FDG uptake in multiple brain regions was conducted using dedicated software, and the standard deviation (SD) of brain uptake in each region was calculated compared to a normal database, using the whole brain as the reference region for normalization. Quantification revealed marked increased relative uptake in lenticular nuclei (13.7 SD), thalamus (4.6) and brainstem (3.7), and reduced uptake in the frontal, parietal, and temporal lobes (-3,9 to -0,1 SD). Before starting chemotherapy, the patient experienced weakness, multiple episodes of diarrhea, and decreased level of consciousness. She developed hemophagocytic syndrome, septic shock, and died

19 days after PET/CT. Aggressive lymphomas exhibit intense FDG uptake, often with a high tumor burden. This can elevate blood lactate levels, which would become an alternative energy substrate for the brain and, by competition, reduce FDG uptake, as suggested by Yi HK et al (2). This is also described in individuals engaged in intense exercise, where decreased FDG uptake may be attributed to potential lactate utilization by the brain (3). The relatively preserved FDG uptake in the basal ganglia could be viewed as a physiological protective mechanism in response to reduced glucose availability for the brain. The oldest parts of the brain are vital for survival and must be preserved to maintain essential life functions. Despite being an organ with one of the highest glucose demands, the brain lacks the ability to store metabolic products for later use. Therefore, during competition with neoplastic cells for the available energy substrate, metabolic redistribution could contribute to preserving essential brain functions. **Conclusion:** Patients with high tumor burden due to Hodgkin's lymphoma may exhibit not only a global reduction in cerebral glucose uptake but also a redistribution of glucose consumption from the neocortex to older brain structures which are essential for survival.

Keywords: 18F-FDG PET/CT, Brain, Hipometabolism, Lymphoma.

https://doi.org/10.1016/j.htct.2024.04.101

COMPARISON OF PET/CT IMAGES WITH 18F-FDG AND 18F-PSMA-1007 IN METASTATIC ACRAL MELANOMA: A CASE REPORT

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Introduction/Justification: Acral melanoma (AM) is a rare form of cutaneous melanoma and affects acral areas such as the palms, soles, and nails. AM is associated with a worse prognosis compared to other subtypes of cutaneous melanoma, possibly due to its aggressiveness and tendency for metastasize. Despite the advances in surgical techniques, radiotherapy, and molecular targeted therapy/immunotherapy, new treatment modalities for patients with AM is highly desirable to improve survival rates. Staging and restaging AM patients with positron emission computed tomography with 18F-FDG (FDG PET/CT) is essential to detect nodal and distant metastasis in these high-risk patients. However, 18F-FDG cannot be used as a theranostic radiopharmaceutical. The possibility of investing in a theranostic approach to these patients is desirable and radiolabeled PSMA may be a potential tool. Here, we present a patient with AM, which progressed with brain and lung metastases, and highlights the importance of PET/CT images performed with 18F-FDG and 18F-PSMA-1007 (PSMA PET/CT) for the identification of metastases and with potential theranostic approach for this challenge disease. **Report:** D. R.M., a 50-year-old male rural worker, sought medical assistance due to a dark skin lesion with progressive growth in the third left toe in January 2023. The biopsy reveals AM. In September 2023, the patient underwent amputation of the third and fourth left toes and left ilioinguinal lymphadenectomy due to melanoma suspicion; histopathological analysis confirmed melanoma with vertical growth and deep invasion into the dermis as well as lymph node metastases. In January 2024, he presented a reduction in level of consciousness and intense headaches. Cranial magnetic resonance imaging (MRI) revealed multiple brain metastasis with sizes ranging from 0.6 to 4.6 cm, significant swelling, edema, and midline shift. The patient underwent restaging FDG PET/CT and PSMA PET/CT, with a 24-hour interval between studies. FDG PET/CT identified mild metabolism in the brain metastases detected by MRI and no extracranial metastases. On the other hand, PSMA PET/CT impressively identified all brain metastases detected by MRI (with SUVs ranging from 8 to 11) with uptake higher and more extensive than 18F-FDG uptake and no extracranial metastases. At this moment, the patient was admitted to the hospital for neurological symptom control with dexamethasone. **Conclusion:** This case highlights the importance of comparing FDG PET/CT and PSMA PET/CT in assessing patients with AM. PSMA PET/CT emerges as a promising diagnostic imaging modality for detecting distant metastasis in AM, especially brain metastases since PSMA is not normally taken up by the central nervous system. PSMA is extremely avid for AM metastases, rendering this imaging modality highly sensitive for diagnostic purposes, helping guide therapeutic planning. PSMA may be a potential theranostic tool in specific cases. **Acknowledgements:** The study was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Apoio ao Ensino e à Pesquisa do Estado de São Paulo (Cancer Theranostics Innovation Center, CEPID FAPESP #2021/10265-8), and International Atomic Energy Agency (IAEA) technical cooperation projects for development of Latin American Countries (IAEA/TCLAC: EX-BRA6033-2401375).

Keywords: Acral melanoma, FDG PET/CT, PSMA scan.

https://doi.org/10.1016/j.htct.2024.04.102

DMSA-99mTc SPECT/CT AND DTPA-99mTc IMAGES IN CROSS FUSED RENAL ECTOPIA: A CASE REPORT

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