ONCODAILY MEDICAL JOURNAL

abstract

Utilizing (18)F-FDG PET/CT Imaging for Enhanced Staging and Treatment Decisions in Pediatric Rhabdomyosarcoma

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doi.org/10.69690/ODMJ-018-0425-1554

SIOP ASIA 2025
SAUDI ARABIA

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Utilizing (18)F-FDG PET/CT Imaging for Enhanced Staging and Treatment Decisions in Pediatric Rhabdomyosarcoma

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DOI: *https://doi.org/10.69690/ODMJ-018-0425-1554*

Introduction: Rhabdomyosarcoma(RMS) treatment is guided by an initial risk assessment. Standard diagnostic imaging like CT, MRI, and bone scan are used for staging. (18)F-FDGPET-scan has the potential to optimize RMS staging by functional assessment. We aim to evaluate the role of PET/CT scans in RMS staging and treatment decisions.

Methodology: We conducted a retrospective analysis on pediatric patients under the age of 18 years with RMS from May 2018 to December 2023. Patient demographics, PET/CT-scan findings at diagnosis, and impact on treatment decisions were assessed. All patients were thoroughly discussed in an MDT.

Results: We identified 57 patients with RMS who underwent PET/CT-scan at the time of diagnosis (median age 5.5 years; range,0.1-18). Head and neck non-para-meningeal (n=17,30%) and para-meningeal (n=12,21%) were the most common primaries. Thirty-nine patients(68%) had embryonal subtypes, and metastasis was present at diagnosis in thirteen(23%). Eleven patients had had surgery prior to referral: seven patients had negative PET/CT scans, three had uptake at the site of primary, and two at lymph nodes(LN). Among the remaining 46, PET/CT-scan detected distant metastatic sites in three and confirmed suspicion of metastasis in one. Eight patients underwent LN biopsies due to PET/CT findings, and five of them showed disease positivity. The PET/CT scan findings at diagnosis influenced management decisions in 14 patients, resulting in changes in the radiotherapy field(n=9), risk group (n=2), or the decision to administer radiotherapy(n=3). PET/CT scans aligned with other diagnostic Methodology: in all patients except three: two exhibited suspicious LN involvement via MRI/CT- scans but were negative according to PET/CT scans and biopsies, while the third patient's scans did not indicate LN involvement, which was confirmed positive by PET-scan and biopsy.

Conclusion: In pediatric RMS, PET/CT scans improved initial staging accuracy for our patients, especially in detecting nodal involvement and distant metastases. They helped our MDT make critical treatment decisions. PET/CT scan has the potential to replace other diagnostic modalities including CT-chest, bone scan, bone marrow biopsies, and sentinel LN assessment.