

Clinical Value of 18F-FDG-PET Compared with CT Scan in the Detection of Nodal and Distant Metastasis in Urothelial Carcinoma or Bladder Cancer

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Abstract : Objective: Lymph node involvement along with distant metastasis in a patient with invasive bladder cancer determines the disease survival, therefore, it is an essential determinant of the therapeutic management and outcome. This retrospective study aims to determine the accuracy of FDG PET scan in detecting lymphatic involvement and distant metastatic urothelial cancer compared to conventional CT staging. Method: A retrospective review of 76 patients with UC or BC who underwent surgery or confirmatory biopsy that was staged with both CT and 18F-FDG-PET (up to 8 weeks apart) between 2015 and 2020. Fifty-seven patients (75%) had formal pelvic LN dissection or biopsy of suspicious metastasis. 18F-FDG-PET reports for positive sites were qualitative depending on SUV Max. On the other hand, enlarged LN by RECIST criteria 1.1 (>10 mm) and other qualitative findings suggesting metastasis were considered positive in CT scan. Histopathological findings from surgical specimens or image-guided biopsies were considered the gold standard in comparison to imaging reports. 18F-FDG-avid or enlarged pelvic LNs with surgically proven nodal metastasis were considered true positives. Performance characteristics of 18F-FDG-PET and CT, including sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV), were calculated. Results: Pelvic LN involvement was confirmed histologically in 10/57 (17.5%) patients. Sensitivity, specificity, PPV and NPV of CT for detecting pelvic LN metastases were 41.17% (95% CI:18-67%), 100% (95% CI:90-100%), 100% (95% CI:59-100%) and 78.26% (95% CI:64-89%) respectively. Sensitivity, specificity, PPV and NPV of 18F-FDG-PET for detecting pelvic LN metastases were 62.5% (95% CI:35-85%), 83.78% (95% CI:68-94%), 62.5% (95% CI:35-85%), and 83.78% (95% CI:68-94%) respectively. Pre-operative staging with 18F-FDG-PET identified the distant metastatic disease in 9/76 (11.8%) patients who were occult on CT. This retrospective study suggested that 18F-FDG-PET may be more sensitive than CT for detecting pelvic LN metastases. 7/76 (9.2%) patients avoided cystectomy due to 18F-FDG-PET diagnosed metastases that were not reported on CT. Conclusion: 18F-FDG-PET is more sensitive than CT for pelvic LN metastases, which can be used as the standard modality of bladder cancer staging, as it may change the treatment by detecting lymph node metastasis that was occult in CT. Further research involving randomised controlled trials comparing the diagnostic yield of 18F-FDG-PET and CT in detecting nodal and distant metastasis in UC or BC is warranted to confirm our findings.

Keywords : FDG PET, CT scan, urothelial cancer, bladder cancer

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