The role of 18F-FDG-PET/CT for staging patients with high risk non-muscle invasive bladder cancer before radical cystectomy

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Introduction & Objectives: 18F-fluorodeoxyglucose positron-emission tomography-computed tomography (FDG-PET/CT) is increasingly used in the preoperative staging of patients with muscle-invasive bladder cancer. In contrast, the clinical value of FDG-PET/CT in high risk non-muscle invasive bladder cancer (NMIBC) is unknown. This study aims to assess the clinical value of FDG-PET/CT in addition to conventional staging in patients with high risk NMIBC before radical cystectomy (RC).

Materials & Methods: From January 2011 to November 2021, we retrospectively reviewed the records of patients with high risk or very-high risk NMIBC scheduled for RC. Tumor stage was determined based on FDG-PET/CT or CT-scans of abdomen, pelvis and chest. The staging based on CT versus staging based on PET/CT were then compared. The primary outcome was clinical impact of PET/CT in high-risk NMIBC management, defined by the frequency of PET/CT-results that led to upstaging and subsequent change in disease management.

Results: A total of 1206 patients were identified, of which 130 met the inclusion criteria. In 16/111 (14%) patients, cTNM-stage on FDG-PET/CT and CT were different. Upstaging by FDG-PET/CT occurred in 15/111 (13%) patients; downstaging in one patient (1%). The treatment recommendation changed in 10/111 (9%) patients based on additional FDG-PET/CT findings. In five of these patients, potential curative treatment was replaced by palliation because of distant metastases detected by FDG-PET/CT. Additionally, 24/111 (22%) patients had lesions detected by FDG-PET/CT that were suspected second primary tumors; a second primary malignancy was confirmed in 8/111 (7.2%; or 7/20: 33%).

Conclusions: Although rare, metastases can occur in patients with high-risk NMIBC scheduled to undergo RC and preoperative imaging is therefore recommended. FDG-PET/CT is able to detect metastases that cannot be detected by conventional CT, although these might include false-positive findings. Performing FDG-PET/CT can be considered in patients with the highest-risk NMIBC but oncological outcomes need to be investigated.