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LETTER TO THE EDITOR

Radiolabelled choline and FDG PET/CT: two alternatives for the assessment of lymph node metastases in patients with upper urinary tract urothelial carcinoma

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Sir,

We read with great interest the paper by Sassa et al. published in the *European Journal of Nuclear Medicine and Molecular Imaging* entitled "Evaluation of ^{11}C-choline PET/CT for primary diagnosis and staging of urothelial carcinoma of the upper urinary tract: a pilot study" [1]. Nuclear medicine modalities are able to detect metabolic changes in neoplastic cells. This has been demonstrated in many tumours, but the role of FDG and ^{11}C-choline PET/CT in the evaluation of upper urinary tract urothelial carcinoma (UUT-UC) is still undefined. Thus, we are grateful to the authors for the interesting and innovative study. To date, few data are available regarding the staging of UUT-UC, and unfortunately the level of evidence is poor, especially for lymph node evaluation.

Sassa et al. [1] in their prospective study enrolling 16 patients found a sensitivity and specificity in lymph node invasion of 91.6 % and 50 %, respectively. Conversely, Asai et al. [2] in their retrospective study in 50 patients found a sensitivity and specificity of 83 % and 100 %, respectively, using FDG as a metabolic radiopharmaceutical agent. Beyond the limitations of these studies, it is reasonable to imagine that PET/CT could play a role in the staging of UUT-UC and in planning lymph node dissection (LND). The best LND template is still unknown and it is limited to staging only [3]. However, some limitations and controversies have arisen. Firstly, LND in transitional cancer of the bladder is used for both tumour staging and cancer control. This is in contrast to what is known on UUT-UC, even though UUT-UC has the same histotype of the lower urinary tract. Secondly, CT urography has the highest diagnostic accuracy in UUT-UC [4–6], but its performance in detecting suspicious lymph node metastases has not been fully evaluated. Although the presence of enlarged lymph nodes is highly predictive of metastasis [7], the anatomical site for the LND has not been clearly defined and consequently the effective accuracy of imaging is doubtful. Thirdly, few models that are able to accurately predict lymph node involvement in locally advanced cancer have been described [8]. Fourthly, it seems that the number of removed lymph nodes has a lower impact on patient survival than the LND template [9]. Lastly, CT urography and MRI are unable to discriminate patients with a high risk of lymph node metastases from those with a low/intermediate risk, and thus are unable to guide LND planning.

The promising results of ^{11}C-choline PET/CT in the primary diagnosis and staging of UUT-UC raises interesting questions that only further studies will answer:

1. Can we use radiolabelled choline PET/CT to better stratify patients and to understand the best LND template?
2. Can PET/CT change the indication to conservative surgery (endourological treatment) from more aggressive surgery (nephroureterectomy with lymphadenectomy)?
3. Do coregistration of CT urography and PET/CT data allow better staging of primary tumour and lymph node metastases?

Moreover, Asai et al. [2] found that using a dedicated protocol for patient preparation, hypermetabolic lesions could be

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easily detected and UUT-UC precisely located by FDG PET/CT in spite of the difficulties posed by urinary excretion of the tracer. Therefore, FDG PET/CT could be considered an alternative diagnostic strategy in this setting.

In conclusion, we believe that Sassa et al. [1] have raised more questions than answers. Further studies are needed in this tumour that is close to bladder cancer but at the same time completely different and unclear.

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