THE ROLE OF NUCLEAR MEDICINE IN PROSTATE CANCER IMAGING,
TREATMENT AND SURGERY

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Over the past year, prostate cancer imaging and staging with gallium-68 prostate specific membrane antigen (⁶⁸Ga-PSMA) PET/CT has been introduced in clinical practice. The higher sensitivity and specificity compared with C11-choline or other tracers even at low PSA levels have been shown in many papers. Also in high risk patients, ⁶⁸Ga-PSMA PET/CT is increasingly used demonstrating additional value prior to surgery. Although the additional value still has to be established, its role in oncological setting is growing. The same carrier (PSMA) can be used in clinical practice for hormone refractory prostate cancer treatment by labelling it with lutethium-177 (¹⁷⁷Lu), a beta-emitting radionuclide. An overview will be given on the diagnostic and therapeutic value in prostate cancer. A new application ⁶⁸Ga-PSMA, the intra-operative evaluation of prostatectomy margins, has recently been granted by KWF-STW. This evaluation is based on the emission of Cerenkov light, which is a side-effect of the emission of protons from ⁶⁸Ga. This blue light is emitted from tumors that are not completely resected during surgery, whereas in radically resected tumors this light will be attenuated from normal tissue surrounding the primary tumor. A technical evaluation of this technique is presented and the introduction into clinical practice is described. The latest development in image guided surgery is the introduction of technetium-99m PSMA (⁹⁹mTc-PSMA). By using this technique, it might become possible to pre-operatively image prostate cancer metastases in loco-regional lymph nodes and to detect these nodes during surgery using standard probes. It is expected to gain a role in lymph node metastases with a diameter >5mm. In smaller lesions, its role is not clear yet. In this respect, a standard sentinel node procedure is available to image and detect lymph nodes at risk for metastatic disease. All procedures will be discussed during this presentation, high lighting the increasing role of nuclear medicine in cancer staging and treatment.