

Precision management in castration resistant prostate cancer (CRPC): A theranostic approach

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Introduction:

The term theranostics is the combination of a diagnostic tool that helps to define the right therapeutic tool for specific disease. It signifies the "we treat what we see and see what we treat" concept. A diagnostic radionuclide is labelled with the target and once expression is documented, the same target is labelled with a therapeutic radionuclide and treatment is executed. In Nuclear Medicine theranostics is easy to apply because of an easy switch from diagnosis to therapy with the same vector. This concept is utilized in few malignancies and prostate cancer is one of them. PSMA (prostate specific membrane antigen) expression in normal and other tumor is less than prostate cancer cell. Its expression increases with higher grade and hormone resistance. We have reported excellent sensitivity and detection capability of PSMA for sub centimeter sized lymph nodes at staging. Besides evaluation of recurrence, ⁶⁸Ga- PSMA PET can be utilized in advanced prostate cancer for detection of metastasis. ⁶⁸Ga-PSMA also serves the basis of treatment of CRPC with ¹⁷⁷Lu PSMA. Progression to androgen independence is the main cause of morbidity & death in these patients. Based on the theranostic concept the aims of treatment with ¹⁷⁷Lu PSMA are to improve outcome by early interventions in suboptimal responders, sparing low risk patients from over treatment, reduce treatment related side effects, ensure effective palliation & improve quality of life. Tumor targeting with ¹⁷⁷Lu PSMA saves normal tissue & delivers high dose to tumor. Easy radiopharmaceutical labelling & high expression in all cancer cells makes it an optimal target for radionuclide therapy. It is safe with a low toxicity profile. In our experience at RGC I & RC (our institute) we have seen objective regression in lesions and symptomatic relief & found it to be a safe & effective method for treating end stage androgen independent, progressive CRPC. We believe that treatment of recurrent prostate cancer is feasible with ¹⁷⁷Lu PSMA with a positive objective response & a low side effect profile where achievable tumor dose is demonstrated by Ga-68 PSMA scan before therapy. Recent Publications 1. Gupta M et al. (2017) Risk stratification & staging in prostate cancer with prostate specific membrane antigen PET CT : A one-stop-

shop. Hell. J. Nucl. Med. 20 Suppl:156. 2. Gupta M et al. (2017) Comparative study of ⁶⁸Gallium-prostate specific membrane antigen positron emission tomography-computed tomography and magnetic resonance imaging for lymph node staging in high risk prostate cancer patients: An initial experience. World J. Nucl. Med. 16(3):186-191. 3. Gupta M et al. (2018) incremental value of ⁶⁸gallium-position specific membrane antigen positron emission tomography/ computed tomography in patients with abnormal PSA and benign transrectal ultrasound biopsy. Urology Annals. 10(2):150-153. 4. Choudhury P S and Gupta M (2017) Personalized & precision medicine in cancer: A theranostic approach. Curr. Radiopharm. 10(3):166-170. control of advanced therapeutic medicinal products.