

CXCR4 - directed SPECT Imaging using [^{99m}Tc]Tc-PentixaTec in Patients with Primary Aldosteronism

Johanna S. Enke

Meeting Report General Clinical Specialties - Non-oncology Endocrinology/Neuroendocrine

, Alexander Dierks, Katrin Ritzel, Malte Kircher, Christian Pfob, Ralph Bundschuh, Georgine Wienand, Evelyn Asbach, Margret Schottelius, Martin Reincke and Constantin Lapa

Journal of Nuclear Medicine June 2024, 65 (supplement 2) 241581;

Abstract

241581

Introduction: Primary aldosteronism (PA) is an underdiagnosed cause of hypertension either caused by bilateral adrenal hyperplasia (BAH) or unilateral aldosterone-producing adenoma (APA). Previous work has shown that C-X-C-motif chemokine receptor 4-directed positron emission tomography/computed tomography (PET/CT) is an important add-on to native abdominal CT and adrenal vein sampling and can aid in therapeutic decision making. The recent development of a first ^{99m}Tc-labeled CXCR4 ligand with suitable in vivo properties, namely [^{99m}Tc]Tc-PentixaTec, now allows CXCR4-targeted conventional scintigraphy and SPECT, reducing costs and improving general availability of this imaging approach. Here, we report on the first clinical experience with [^{99m}Tc]Tc-PentixaTec as diagnostic tool in PA.

Methods: Six patients (4 male, 2 female, 49±15 years) with PA underwent imaging after i.v. injection of 435±50 MBq [^{99m}Tc]Tc-PentixaTec. First, images were visually inspected for asymmetric tracer accumulation in the adrenal glands. Subsequently, lateralization indices using lesion-to-contralateral adrenal ratio were calculated in SPECT/(CT) images. Scintigraphic findings were compared to CT and adrenal vein sampling in all patients.

Results: Four out of six patients showed lateralization of adrenal tracer accumulation with a median lateralization index of 1.53 (range, 1.28 – 1.68); in the remaining two patients no distinct lateralization of [^{99m}Tc]Tc-PentixaTec uptake could be detected. Focally enhanced tracer retention correlated with adrenal adenomas as detected by CT (median size 17 mm; range, 16 - 19 mm) in all four patients, whereas adrenal vein catheterization did not detect any lateralization in 3/4 subjects. In two of the four patients, primary surgery was recommended: histopathologic work-up confirmed APA in one patient, with an adequate decrease in aldosterone/renin ratio (pre- vs. post-therapeutic: 17.27 vs. 3.91), whereas the second patient received mineralocorticoid receptor antagonists instead of surgery upon patient request. The remaining patients started medical therapy with mineralocorticoid receptor antagonists as well. Clinical follow-up is still pending in these patients.

Conclusions: Non-invasive visualization of CXCR4 in patients with PA using [^{99m}Tc]Tc-PentixaTec is feasible. Further research is warranted to elucidate its diagnostic performance, especially in comparison to CXCR4-directed PET.