
# LUTETIUM DOTATATE DUAL TIME POST THERAPY SCINTIGRAPHY

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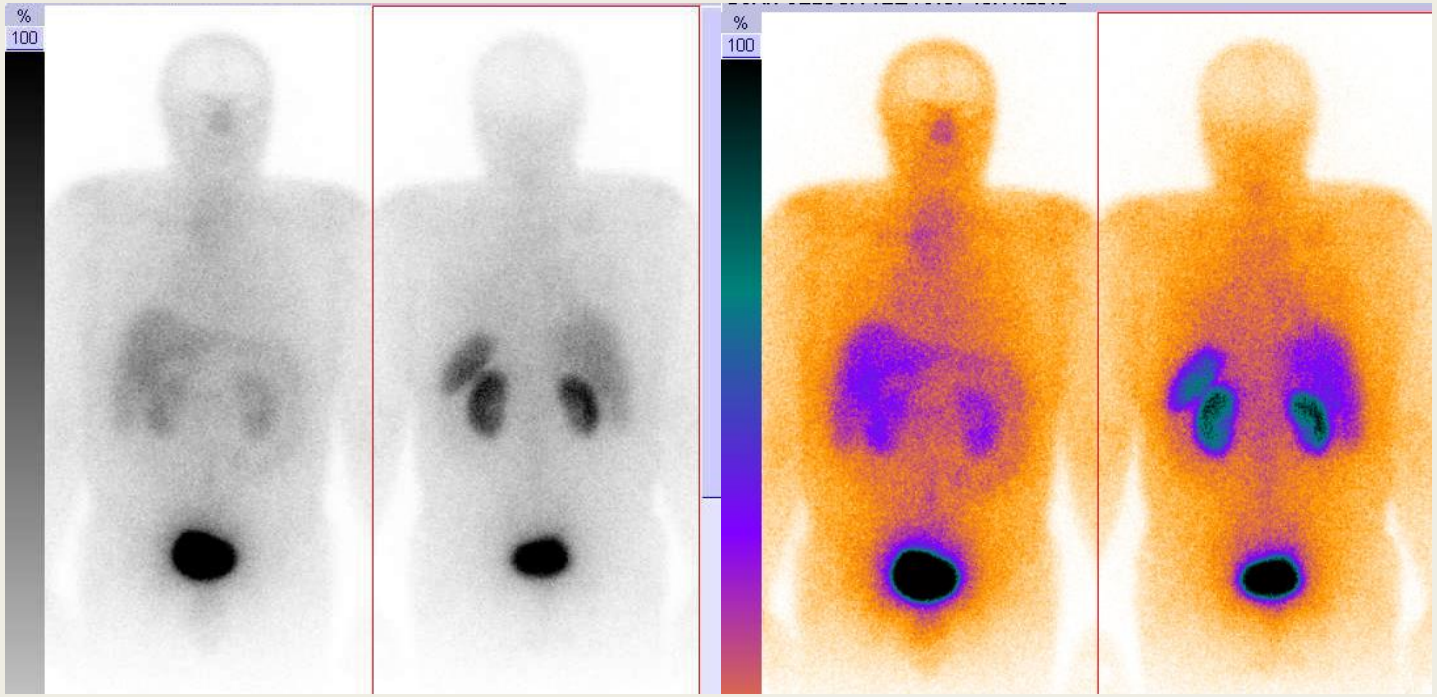
- Radiolabeled somatostatin analogs are used for diagnostic purposes and afterword possible radionuclide therapy mainly for metastatic neuroendocrine tumors but also can be indicated as radionuclide therapy in dedifferentiated metastatic thyroid cancer patients.
- The most important criteria in planning the application of peptide receptor radionuclide therapy (PRRT) is to demonstrate somatostatin receptor positivity of the tumor cell.
- Another factor are the various types of somatostatin receptors (SSSTR 2-5) and the affinity of the radiolabeled somatostatin analog to the particular SSTR.

- Well established radiopharmaceuticals for somatostatin receptor scintigraphy (SRS) are
- $^{111}$Indium Octreotide (OctreoScan) and
- $^{68}$ Gallium labeled somatostatin analogs, but also
- $^{99m}$Tc-EDDA/ HYNIC-Tyr3-octreotide (*tectrotid*).

- Scintigraphy with *tectrotid* was used for determination of the presence of SSTR positivity in metastatic follicular thyroid cancer patient in whome the radioiodine therapy possibilities were exhausted.
- With the presence of SRS positivity scan with metastatic deposits affinity marked as grade 3, the radiolabeled somatostatin analogs radionuclide therapy with $^{177}$Lu-DOTATATE was applied.
- The radionuclide $^{177}$Lu is both beta and gamma emitter, characteristic which allows imaging after therapy.

- Accepted protocols for PRRT posttherapy scintigraphy suggests dual phase post therapy scanning early as soon as 4 hours after the treatment, 24h and 48h afterwards.
- Due to our local schedule possibilities an early 4hour whole body scintigraphy was done with two different collimators high energy and low energy-high sensitivity with acquisition parameters on dual-headed Siemens E CAM gamma camera with dual window of 113 KeV and 208 KeV (20% windowing) 10cm/minute speed of the table.
- And a late whole body scintigraphy was done 72hous after the therapy with high energy, medium energy and low energy collimators respectfully with the same dual windowing, and at 8cm/minute speed of the table for medium and low energy collimator, and 3cm/minute bed speed for high energy collimator.

- The early whole body $^{177}$Lu-DOTATATE whole body scan with high energy collimator demonstrated visualization of normal physiological distribution and abnormal increased uptakes in most of the lesions seen in *tectrotid* scan with a disappointing degree of uptake grade. Whole body scans with low energy collimator were to distorted.




early whole body scan with high energy collimator

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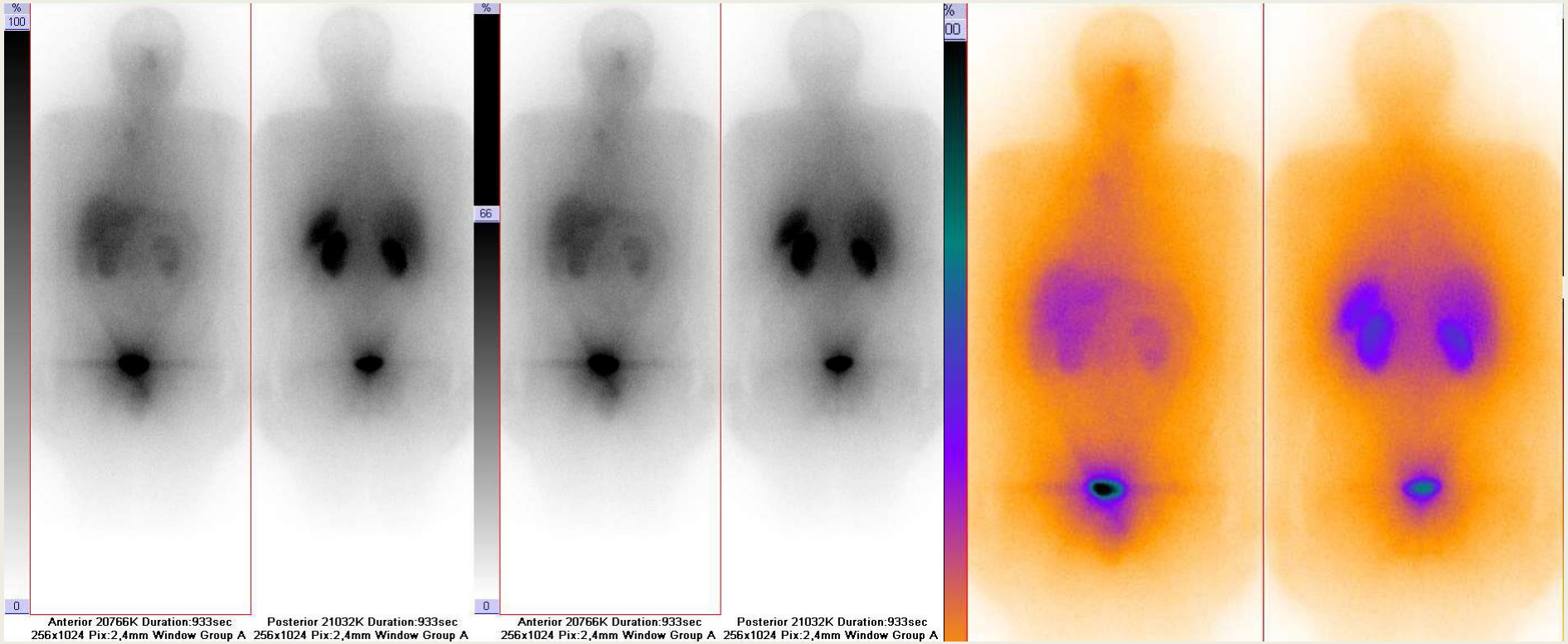
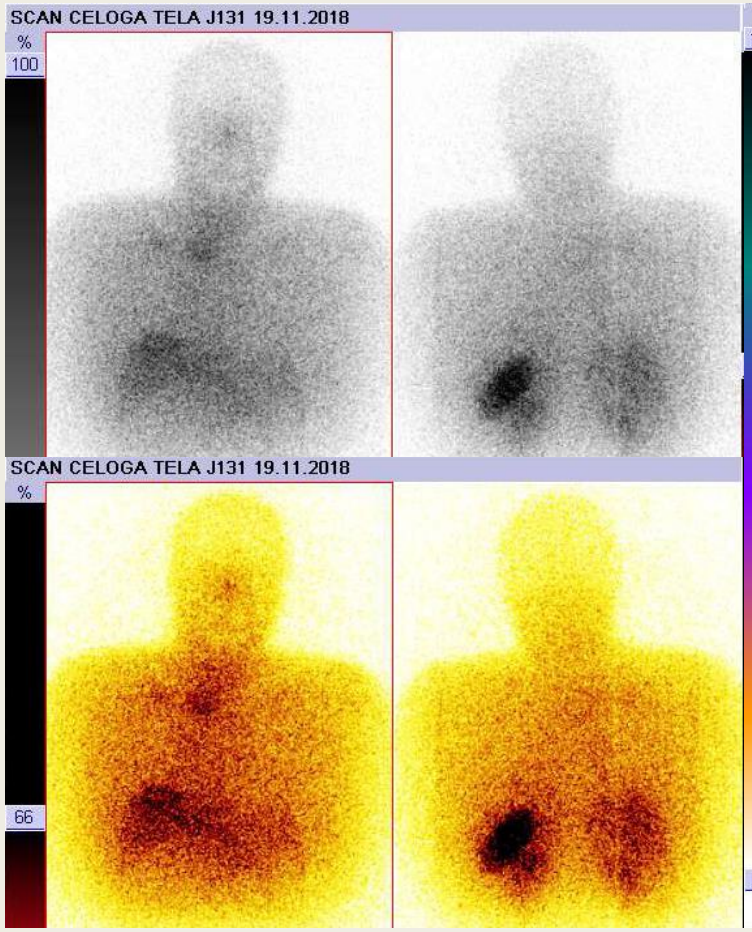
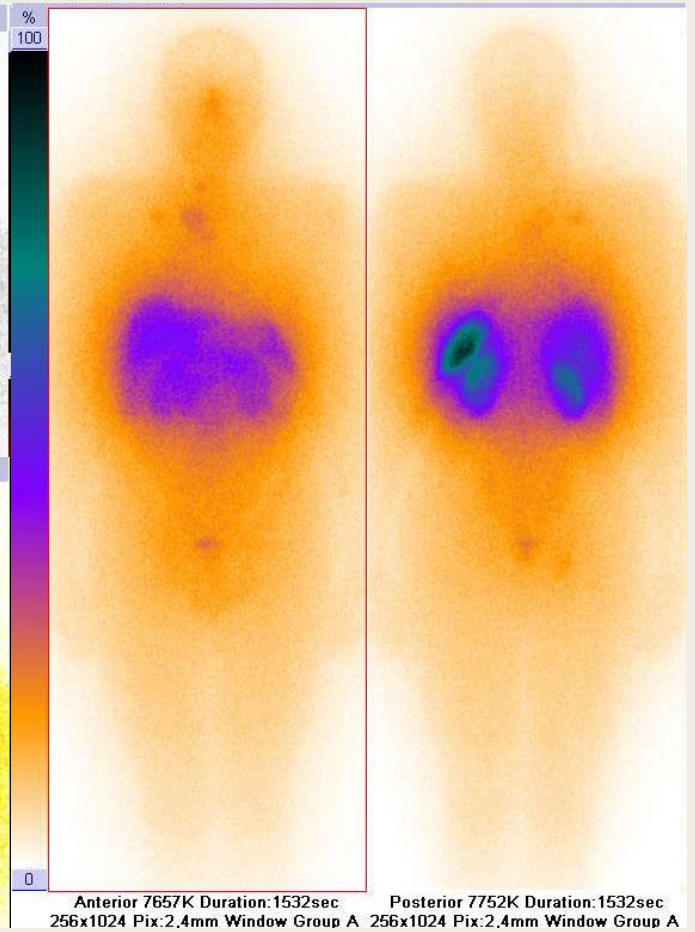



early whole body scan with low energy collimator

In contrast, late whole body scan with low energy collimator as well with medium energy collimator showed an excellent visualization of abnormal increased uptake in all of the lesions seen in *tectrotid* scintigraphy, with high degree of uptake and good target to background ratio.

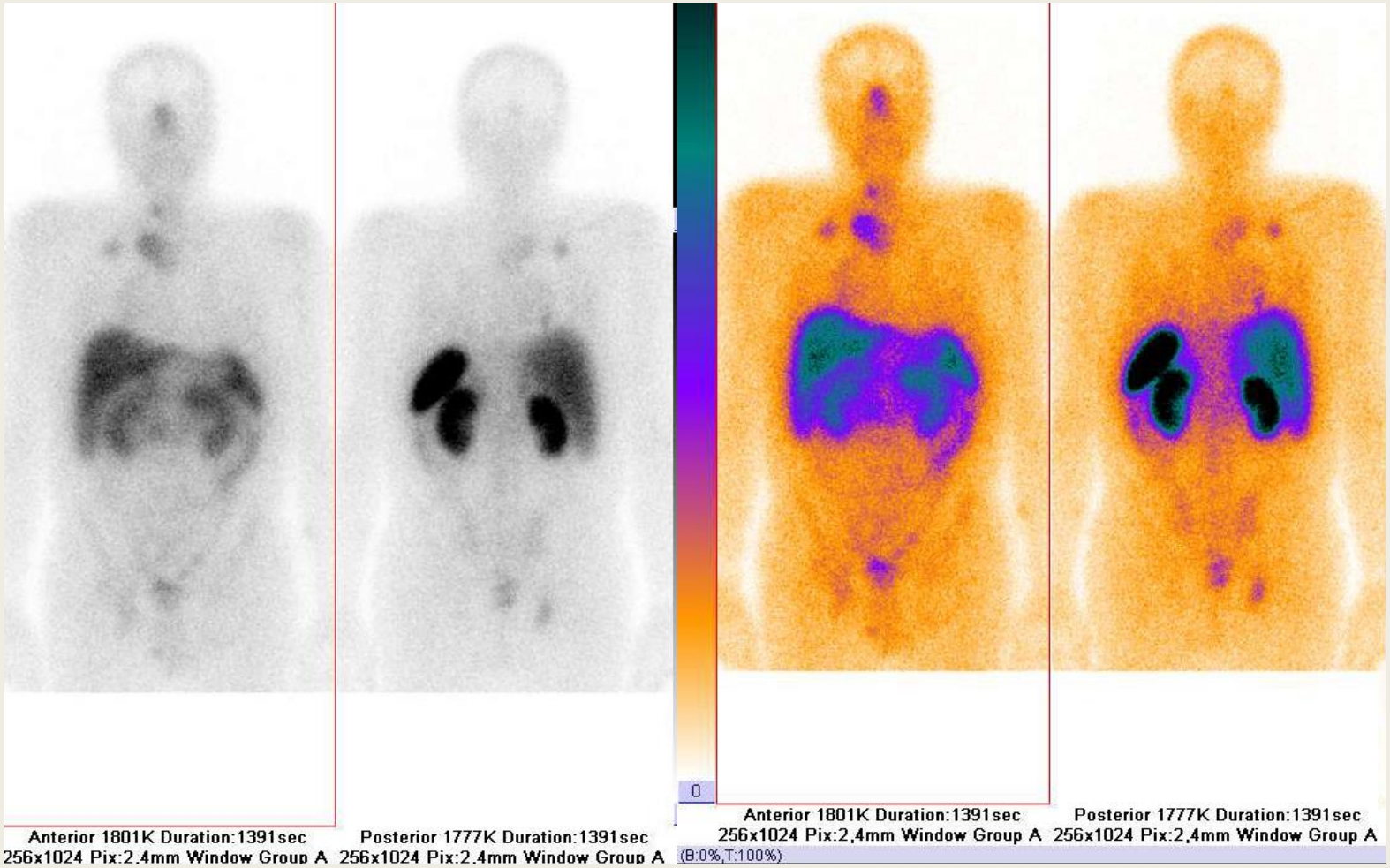



late whole body scan with high energy collimator




late whole body scan with low energy collimator

- As expected, the medium energy collimator showed the best resolution and the higher target to background ratio.




late whole body scan with low energy collimator

# Conclusion

- Our delayed whole body scans showed that early 4hour scanning could be avoided and that the late, as late as 72hours after therapy scans are useful and have an excellent diagnostic value.