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Optimization of the administration method for lutetium (^{177}Lu) oxodotride in the treatment of neuroendocrine tumors

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Why was it done?

Lutetium (177Lu) oxodotreotide

- ✓ Lutetium (^{177}Lu) oxodotreotide is indicated for **treating subtype 2 somatostatin receptor-positive (SSTR2) gastroenteropancreatic neuroendocrine tumors**, well-differentiated G1 and G2, progressive, inoperable or metastatic.
- ✓ This radiopharmaceutical targets cells with SSTR2 overexpression, emitting radiation that causes cell death (figure 1).
- ✓ Initially, the Summary of Product Characteristics (SmPC) included the **gravity method** for intravenous administration (figure 2).
- ✓ This method was adopted and optimized due to incidents during administration.

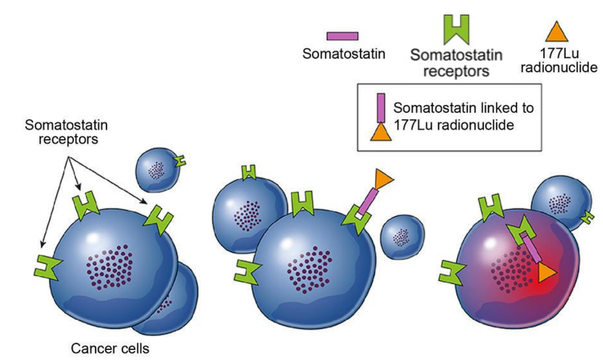

Figure 1 – Simplistic model of the mechanism of action of lutetium (^{177}Lu) oxodotride (pink and orange).(Adapted from [2])

What was done?

Optimization of the administration method of lutetium (^{177}Lu) oxodotreotide to maximize the administered radioactivity and enhance protection for healthcare professionals.

How was it done?

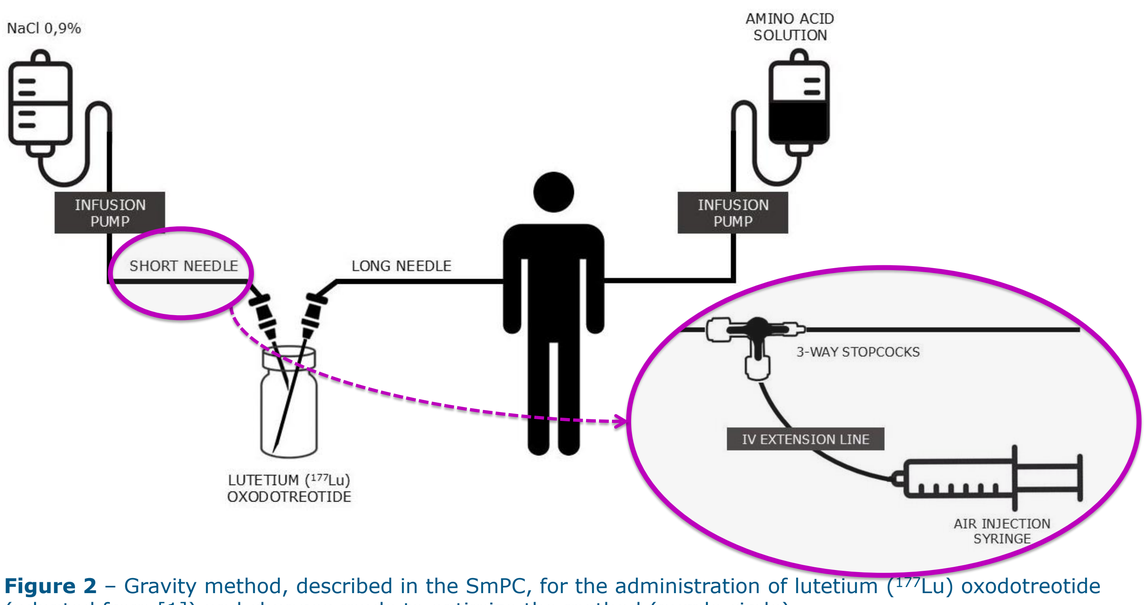

Figure 2 – Gravity method, described in the SmPC, for the administration of lutetium (^{177}Lu) oxodotreotide (adapted from [1]) and changes made to optimize the method (purple circle).

- ✓ Activity measured in well counter and calculated according to the formula $\%A_{\text{remaining}} = \frac{A_{final}}{A_{\ inicial}} \times 100$

What has been achieved?

1 First Administration
Remaining activity: 2.19%

2 Transfer and administration by the syringe pump method
↑ need for manipulation and exposure of professionals.
Lack of adequate protective barriers → **the method cannot be adopted**.

3 Introduction of an infusion pump to regulate the flow of 0.9% NaCl solution
Persistence of some **perfusion difficulties**
Average remaining activity: 1.71%

4 Introduction of 3-Way Stopcock Connected to the Short Needle: Ultimate Optimization
No new complications of leaks and non-perfusion of the radiopharmaceutical
Mean remaining activity: 0.98%

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Figures 3 e 4 – Optimized administration method and its use.

Method optimization

- ✓ Led to a **decreasing trend** in the remaining values of radiopharmaceuticals, ensuring the administration of the **entire activity**;
- ✓ Allows the **reduction of the exposure of professionals**;
- ✓ **Reduces the possibility of contamination** due to the permanence of the radiopharmaceutical in the original vial (SmPC).

What next?

- ✓ We aim to apply this optimized method in other treatments with the same radionuclide.

References

[1] Summary of Product Characteristics - Lutathera. [S.l.] : INFARMED, 2022.
[2] Kasi PM, Maige CL, Shahjehan F, et al. A Care Process Model to Deliver 177Lu-Dotatate Peptide Receptor Radionuclide Therapy for Patients With Neuroendocrine Tumors. Front Oncol. 2019;8:663. Published 2019 Jan 9. doi:10.3389/fonc.2018.00663

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