Optimization of a routine method for bone marrow dose estimation in ^{177}Lu-EDTMP therapy Experience in Uruguay.

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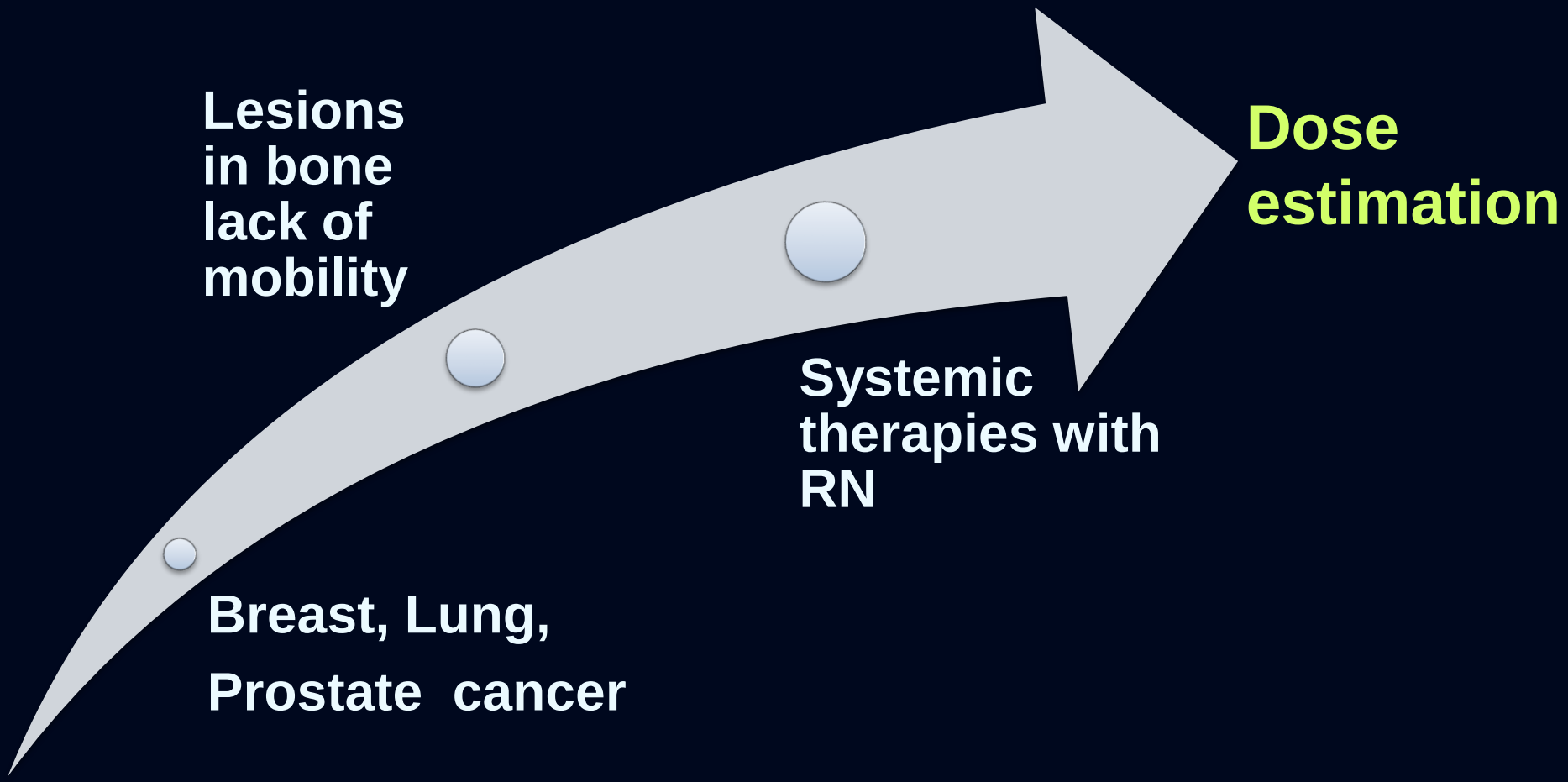
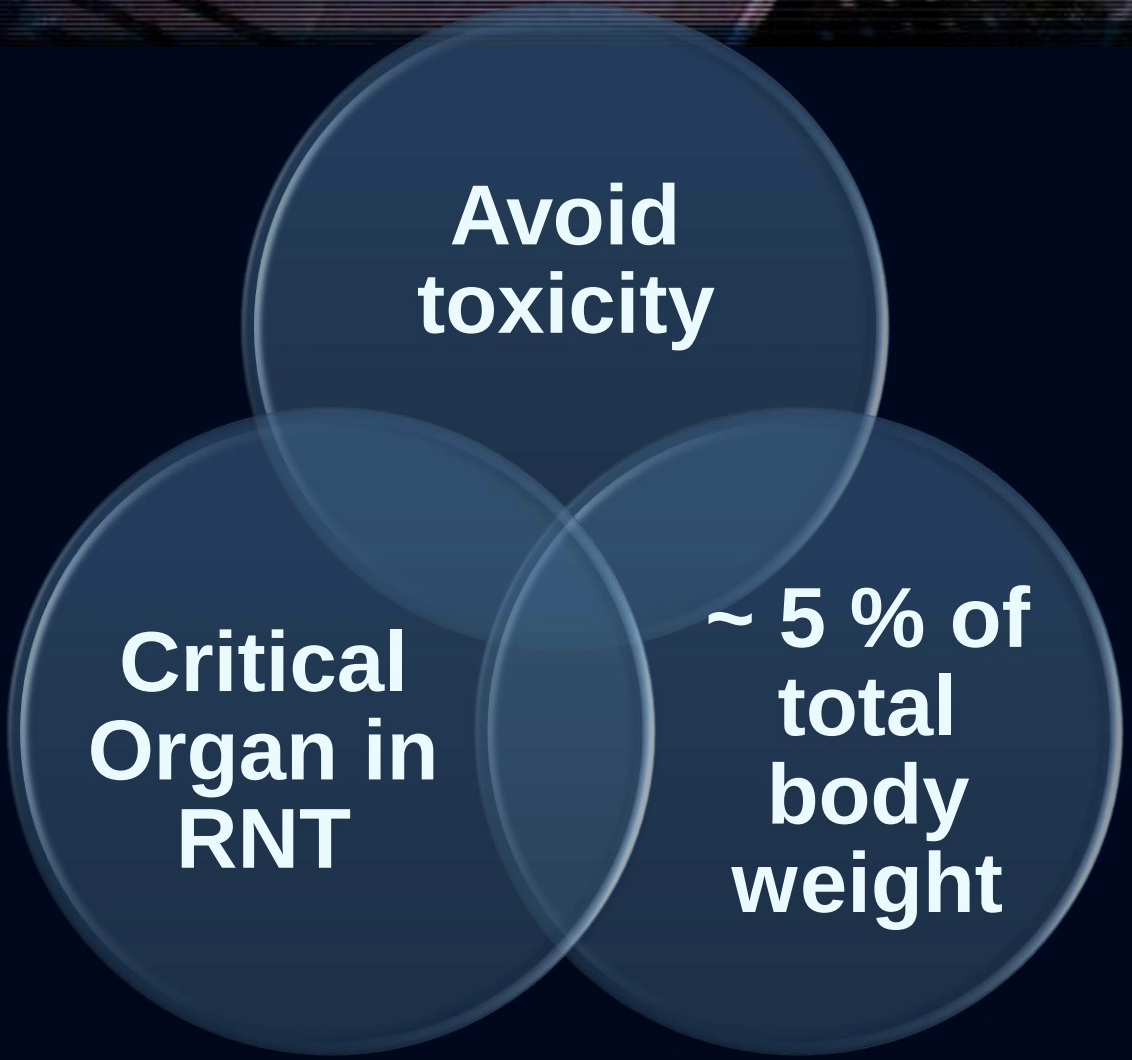
Development of Quantitative Nuclear Medicine Imaging For Patient Specific Dosimetry CRP – IAEA

Quantitative methods for individual dosimetric calculations in Nuclear Medicine


Lesions in bone lack of mobility
Breast, Lung, Prostate cancer
Systemic therapies with RN
Dose estimation

Bone Marrow



Objective

To optimize an image quantification method to improve bone marrow and whole-body dosimetry in ^{177}Lu EDTMP

To improve therapy and patient protection in Uruguay.

Materials & Methods

Mediso Gamma Camera	
2 heads	3/8 “, rectangular field
medium energy collimator	matrix 128 x 128
window centered in the peak of energy (±15%)	92.5 MBq (2.5 mCi) mean tracer dose

Materials & Methods

AP and PA whole body images acquisition

The first images at 1 without patient micturition	100% of injected activity

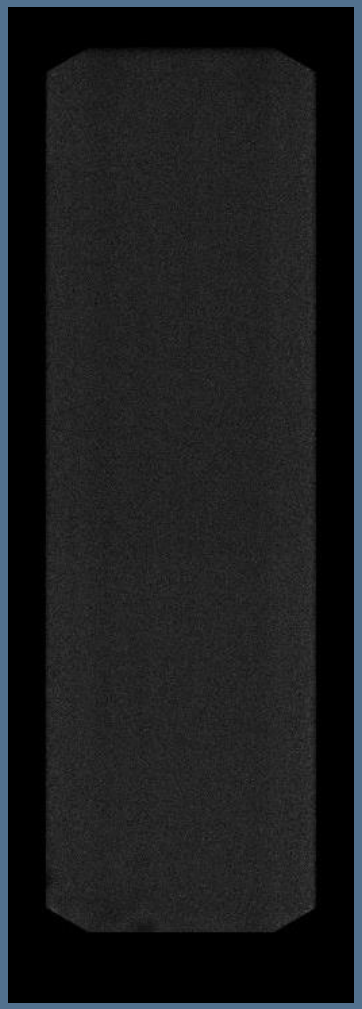
After patient micturition at 6, 24, 48 hours post administration	Scattering corrections triple-energy-window (TEW) method (± 15%).

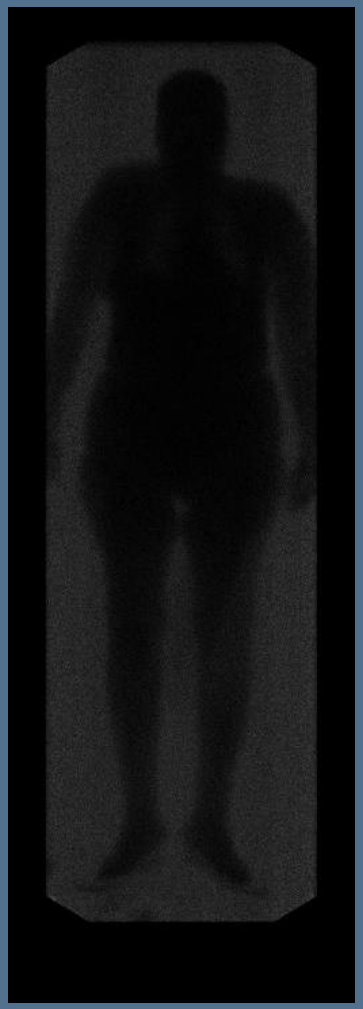
Individual patient attenuation correction	^{57}Co flood source

Flood Source ^{57}Co

Flood Source + patinent

Patinent + tracer dose

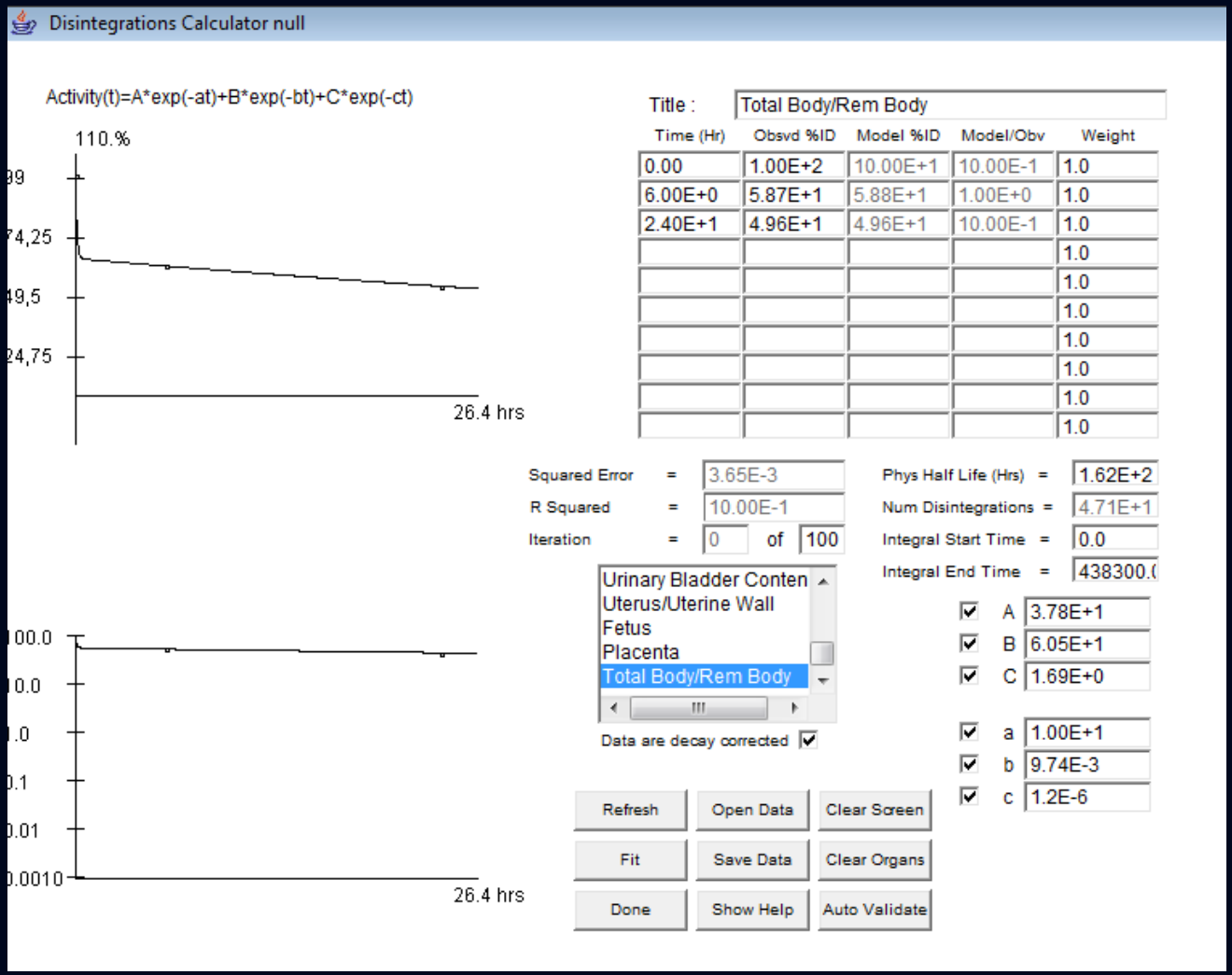




$$C = \sqrt{\frac{I_a\ I_p}{e^{-\mu d}}}\ x\frac{1}{S}$$

Siegl et al

Percentages of reminding activity in the same ROIs and WB were plotted at each time point in OLINDA/EXM to determine the absorbed dose in red marrow .



Results

Mean bone marrow dose

0.95 ± 0.2 mGy/MBq

Mean whole body doses 0.19 ± 0.07 mSv/MBq

Rapid urinary elimination of the radiopharmaceutical.

Conclusions

There is still too much work to be done …

- More cases to get statistically relevant data
- More time points to clearly establish the uptake and elimination phases
- Method efficient, easy to implement in routine and reliable to guarantee adequate bone marrow dose estimation before therapy with radionuclides.

Muchas gracias