Useful Alternatives to $^{99m}$Tc-Labeled Radiopharmaceuticals: The Clinical Point of View

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Technetium $^{99m}$Tc (Tc$^{99m}$) is widely used in clinical settings for routine diagnostic purposes. The favorable emission energy (140KeV) and relative short half life, made the well recognized success of this isotope in Nuclear Medicine. Recent shortage of Molybdenum/Technetium raised the issue of possible new strategies to reduce the need of this product. Alternative can be reached with two approaches: Acquisition and post processing tools aimed to reduce the need of the radiotracers labeled with Tc$^{99m}$.

**Alternative radiopharmaceuticals**

The first approach is based on the demonstration that the use of specific modalities such as high sensitivity gamma cameras and reconstruction iterative programs do not modify the diagnostic accuracy when compared to standard procedures, allowing lower doses of radiopharmaceuticals (Tc$^{99m}$ labeled). This is a dosimetric benefit itself and minimize the effect of Molybdenum shortage.

The use of alternative radiopharmaceuticals has to be validated on basis of clinical equivalence and cost effects. Careful analysis is necessary to avoid misuse without clinical benefit. In particular in Nuclear cardiology alternative have been evaluated for perfusion studies. Tc$^{99m}$ appear to be the best balance as TI$^{201}$ is clinically less accurate and Rubidium$^{82}$ more expensive. However, in case of shortage these two alternative and relative pro and cons, have to be considered.

**References**


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Campini et al 2008 European Journal Nuclear Medicine molecular imaging 15;S2.