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LETTER TO THE EDITOR

Response to comment by Aprile et al.: The EANM and SNMMI practice guideline for lymphoscintigraphy and sentinel node localization in breast cancer

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Dear Sir,

In their comment on our practice guideline for lymphoscintigraphy and sentinel node localization in breast cancer [1], Aprile et al. point out the particular aspect of the specific activity of the administered radiocolloid [2]. Indeed, the critical colloid dose of phagocytosis may differ for the distinct reticuloendothelial organs [3] and also for different particle size materials. We are grateful to the authors for their comment, as we did omit this topic in our guidelines.

A fundamental concept of diagnostic nuclear medicine is the tracer principle. Among other things, this permits us to observe processes in the body without perturbing those processes. Accordingly, we usually seek to use radiopharmaceuticals with high specific activity for diagnostic studies. This generally applies to the clinical procedure of sentinel node localization, but not necessarily to all types of lymphoscintigraphy or lymphatic mapping.

As mentioned by the authors, the net clinical impact of variations in specific activity are not well established in the literature, as many other covariates can also influence reports of "success" in sentinel node procedures. Among these are size of lymph nodes, number of nodes in a basin, variations in labelling with ^{99}Tc vs ^{99m}Tc (depending on when and how generators are eluted and radiopharmaceutical agents are prepared), diverse criteria used by surgeons to define sentinel vs non-sentinel nodes, use of a variety of agents with different particle sizes and chemical properties, variable times of counting or imaging after injection, differing injection techniques and several other variables that can affect the washout rates from injection sites, lymphatic flow rates, overall nodal uptake rates in draining basins and flow through to second-tier nodes.

An important factor to take into account is the lymphatic system itself. In the skin the lymphatic network is richer than in breast parenchyma, and the migration from radiocolloids from the injection site to sentinel nodes is almost always fast and considerable.

Probably for skin-related tracer administration (as in melanoma or for superficial injections in breast cancer) the number of particles may be less important as a variable affecting sentinel node uptake. Nevertheless, for tracer administration around or in breast tumours the number of particles may become relevant [4, 5].

Many of the suggested variables were covered to some extent in the guideline. It would be reasonable to include specific activity as another variable in the list. Indeed, the kit reconstitution instructions may allow the addition of different ^{99m}Tc activities (e.g. for human serum albumin, a range of 185–5,550 MBq in a volume of 1–5 ml). For the majority of sentinel node procedures, we may thus advocate the concept that colloid preparation should have the highest effective specific activity (i.e. maximum activity loaded onto the smallest number of particles). Therefore, as in most other diagnostic studies, the use of a fresh ^{99m}Tc eluate during the preparation is of pivotal importance [6].

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Thus, a combination of specific activity and particle size would need to be identified for a guideline recommendation, and this is an area which deserves further investigation.

References

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