

## Calibration test of PET scanners in a multi-centre clinical trial on breast cancer therapy monitoring using 18F-FLT.

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**UNLABELLED:** A multi-centre trial using PET requires the analysis of images acquired on different systems We designed a multi-centre trial to estimate the value of 18F-FLT-PET to predict response to neoadjuvant chemotherapy in patients with newly diagnosed breast cancer. A calibration check of each PET-CT and of its peripheral devices was performed to evaluate the reliability of the results.

**MATERIAL AND METHODS:** 11 centres were investigated. Dose calibrators were assessed by repeated measurements of a 68Ge certified source. The differences between the clocks associated with the dose calibrators and inherent to the PET systems were registered. The calibration of PET-CT was assessed with an homogeneous cylindrical phantom by comparing the activities per unit of volume calculated from the dose calibrator measurements with that measured on 15 Regions of Interest (ROIs) drawn on 15 consecutive slices of reconstructed filtered back-projection (FBP) images. Both repeatability of activity concentration based upon the 15 ROIs (ANOVA-test) and its accuracy were evaluated.

**RESULTS:** There was no significant difference for dose calibrator measurements (median of difference -0.04%; min = -4.65%; max = +5.63%). Mismatches between the clocks were less than 2 min in all sites and thus did not require any correction, regarding the half life of 18F. For all the PET systems, ANOVA revealed no significant difference between the activity concentrations estimated from the 15 ROIs (median of difference -0.69%; min = -9.97%; max = +9.60%).

**CONCLUSION:** No major difference between the 11 centres with respect to calibration and cross-calibration was observed. The reliability of our 18F-FLT multi-centre clinical trial was therefore confirmed from the physical point of view. This type of procedure may be useful for any clinical trial involving different PET systems.

Résumé en anglais

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## Liens

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