



Reduction of Respiratory Motion during PET/CT by Pulsatile-Flow Ventilation™ (PFV-PET/CT): A First Clinical Evaluation.

Prior JO¹, Péguret N¹, Pomoni A¹, Pappon M¹, Zeverino M¹, Belmondo B¹, Lovis A¹, Ozsahin M¹, Vienne M², Bourhis J¹.

1Lausanne University Hospital, **SWITZERLAND**; **2**BIRD Institute of Pulmonary Care, **FRANCE**

RATIONALE: Respiratory motion negatively affects PET/CT image quality and quantitation. A novel pulsatile-flow ventilation (PFV) system reducing respiratory motion (Transrespirator[®], Percussionaire[®]) was applied in spontaneously-breathing patients to induce sustained apnea during PET/CT.

METHODS: Four patients (aged 65±14y) underwent PET/CT for pulmonary nodule staging (mean Ø11±7mm, range 5-18mm) 63±3min after 18F-FDG injection. PET/CT was repeated during PFV-induced apnea (≥8.5min), 47±7min thereafter. Anterior-posterior thoracic amplitude, maximal standardized uptake value (SUVmax) and SUVpeak (mean SUV in 1-cm-diameter sphere) were compared.

RESULTS: PFV-PET/CT reduced thoracic amplitude (-80%), increased mean lesion SUVmax (+29%) and SUVpeak (+11%), decreased lung background SUVpeak (-25%), improved lesion detectability, and SUVpeak lesion-to-background ratio (+54%). On linear regressions, SUVmax and SUVpeak significantly improved (+35% and +23%, p≤0.02, respectively).

CONCLUSION: PFV-induced apnea reduces thoracic organs motion and increases lesion SUV, detectability and delineation. This might impact clinical patient management by improving diagnosis, prognostication, monitoring and external radiation therapy planning.

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KEYWORDS: HFPV[®]; High-Frequency Percussive Ventilation[®]; Oncology; Lung; PET/CT; Pulsatile-Flow Ventilation™; Respiratory; Respiratory Motion

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130 McGhee Road, Suite 109, Sandpoint ID 83864

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