Respiratory motion may degrade image quality in cardiac PET imaging. Since cardiac PET studies often involve cardiac gating by ECG, a separate respiratory monitoring system is required increasing the logistic complexity of the examination, in case respiratory gating is also needed. Thus, we investigated the simultaneous acquisition of both respiratory and cardiac gating signals using II limb lead mimicking electrode configuration during cardiac PET scans of 11 patients. In addition to conventional static and ECG-gated images, bioimpedance technique was utilized to generate respiratory- and dual-gated images. The ability of the bioimpedance technique to monitor intrathoracic respiratory motion was assessed estimating cardiac displacement between end-inspiration and -expiration. The relevance of dual gating was evaluated in left ventricular volume and myocardial wall thickness measurements. An average $7.6 \pm 3.3$ mm respiratory motion was observed in the study population. Dual gating showed a small but significant increase (4 ml, $p = 0.042$) in left ventricular myocardial volume compared to plain cardiac gating. In addition, a thinner myocardial wall was observed in dual-gated images ($9.3 \pm 1.3$ mm) compared to cardiac-gated images ($11.3 \pm 1.3$ mm, $p = 0.003$). This study shows the feasibility of bioimpedance measurements for dual
gating in a clinical setting. The method enables simultaneous acquisition of respiratory and cardiac gating signals using a single device with standard ECG electrodes.