Validity of cardiac implantable electronic devices in assessing daily physical activity.

Data on physical activity assessed by cardiac implantable electronic devices (ICD/CRT) have been used for prognostic implications in heart failure patients, but no study has ever compared these data to validated external accelerometers. 73 ICD/CRT recipients (age 60 ± 20 years, 21% female) received a validated external accelerometer over a period of 7 days. Thereafter, data on physical activity of both ICD/CRT and external accelerometers were retrieved and compared using Spearman's rank correlation coefficient and Bland Altman plots. Mean total daily activity was 276 ± 85 min (range 72-462) as assessed by the external accelerometers and 237 ± 105 min (28-575) as assessed by the ICD/CRT activity sensors (p < 0.7) between the two measurements was observed in a majority (70%) of patients (p < 0.05 each). However, a Bland Altman plot revealed a broad variation of total daily activity between both methods (95% limits of agreement -225 to 147 min), resulting in differences in the duration of daily activity up to several hours. In multivariate regression analysis, no influence of age, NYHA functional class, left ventricular ejection fraction, underlying disease or type of device on these differences was observed. As compared to a validated external accelerometer, daily physical activity assessed by ICD/CRT devices shows strong intra-individual correlations, but differs substantially regarding the absolute amount of daily activity.
Thus, using ICD/CRT activity data for more precise clinical or prognostic information without prior validation is of limited value.