psychogenic non-epileptic seizures (PNES), (ii) define the most useful point of HR measurement: pre-ictal, ictal-onset, maximal-ictal or post-ictal, and (iii) define the HR cut-off points to differentiate ES from PNES.

Methods All video EEG (VEEG) at Monash Health from May 2009 to November 2015 were retrospectively reviewed. Baseline (during wakefulness), one-minute pre-ictal, ictal-onset, maximal-ictal and one-minute post-ictal HR were measured for each ES and PNES event. Events less than ten seconds or with uninterpretable ECG due to artefacts were excluded. ROC curve analysis was performed to study the diagnostic accuracy reflected by area under the curve (AUC). The AUC was interpreted as follows: ≤0.5, differentiation of PNES from ES no better than chance; 0.80–0.89, good differentiation; and 0.9–1, excellent differentiation.

Results VEEG of 341 ES and 265 PNES from 130 patients were analysed. The AUC for pre-ictal, ictal-onset, maximal-ictal and post-ictal HR were found to have poor differentiation between ES and PNES. Comparing PNES and bilateral tonic-clonic ES, AUC for absolute maximal-ictal HR was 0.84 (CI 0.73–0.95) and for absolute post-ictal HR was 0.90 (CI 0.81–1.00). Using Youden’s index, to diagnose tonic-clonic ES, the optimal cut-off point for absolute maximal-ictal HR was 114 bpm (sensitivity 84%; specificity 82%; PPV 26.7%, NPV 98.5%) and for absolute post-ictal HR was 90 bpm (sensitivity 91%; specificity 82%; PPV 30.3%; NPV 99.1%).

Conclusions These findings suggest that seizure-related HR increase is useful in differentiating bilateral tonic-clonic ES from PNES. Based on the AUC, the best diagnostic measureme.