

Characterising RR Intervals in Atrial Fibrillation Detected through Screening

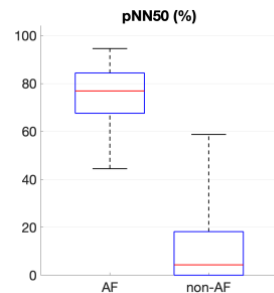
Rayo Akande¹, James Brimicombe¹, Martin R. Cowie², Andrew Dymond¹, Hannah Clair Lindén³, Gregory Y. H. Lip⁴, Jenny Lund¹, Jonathan Mant¹, Madhumitha Pandiaraja¹, Emma Svennberg⁵, Kate Williams¹ and Peter H. Charlton¹, on behalf of the SAFER Investigators

¹ University of Cambridge, Cambridge, UK; ² Astrazeneca, Cambridge, UK; ³ Zenicor Medical Systems AB, Stockholm, Sweden; ⁴ University of Liverpool, Liverpool, UK; Aalborg University, Aalborg, Denmark; ⁵ Karolinska Institute, Stockholm, Sweden

Introduction: Atrial fibrillation (AF) is known to be characterised by increased RR interval variability. However, the characteristics of RR intervals in AF detected through screening have not been extensively studied. The aim of this study was to characterise RR intervals in AF detected in screening of older, community dwelling adults.

Methods: This study used ECGs collected from adults aged 65 and over in the SAFER AF Screening Programme. ECGs were recorded between the thumbs using a handheld device. 2,709 ECGs were analysed, consisting of 671 ECGs exhibiting AF (from 43 subjects), and 2,038 non-AF ECGs (each from a different subject). QRS complexes were identified using the 'jqrs' beat detector, from which RR intervals were calculated. The following RR interval characteristics were extracted: mean; standard deviation; variance; root mean square of successive RR interval differences; standard deviation derived from a Poincare plot; percentage of RR intervals within ± 60 ms of the median RR interval (RRpm60); and percentage of successive RR intervals that differ by more than 50ms (pNN50).

Results: All characteristics differed between AF and non-AF. pNN50 had highest performance for discriminating between AF and non-AF (AUROC of 96%). This was because in AF a median (lower – upper quartiles) of 77 (68-84) % of successive RR intervals differed by >50ms, compared to only 4 (0-18) % in non-AF. RRpm60 also had strong discriminatory performance (AUROC of 95%). The remaining measures of RR interval variability had good performance (AUROCs of 88-90%). Mean RR interval had moderate performance (AUROC of 64%).



Comparison of pNN50 between AF and non-AF.

Conclusion: This study furthers our understanding of RR interval characteristics in AF. In the future this could form the basis of an algorithm to automatically identify ECGs exhibiting AF with applications in AF screening.