NONDIPOLAR CONTENT OF BODY SURFACE QRS AND QRST INTEGRAL MAPS

Mark Potse, André C. Linnenbank, Heidi A.P. Peeters*, and Cornelis A. Grimbergen

Medical Physics department, Academic Medical Center, Meibergdreef 15,
1105 AZ Amsterdam, The Netherlands *University Hospital Utrecht, The Netherlands

Introduction The 'nondipolar content' of body surface QRST integral maps has been used for over two decades for diagnosing ventricular repolarization disorders. The algorithm for computing nondipolar content uses a Karhunen-Loève transform that is usually created from the covariance matrix of a large set of recordings. The selection of a patient population for determining this matrix may have an influence on the nondipolar content.

Methods We used several patient groups and different ECG intervals to determine a covariance matrix, and computed the nondipolar content of QRS and QRST integral maps of patient and control groups using each of these matrices. The nondipolar content was compared to the visually determined nondipolarity, and to other diagnostic parameters. Furthermore, the nondipolar content of slightly left and right shifted maps was computed to search for a minimum value ("shifting method").

Results The selection of a different patient group for determining the covariance matrix can yield differences in nondipolar content of up to 5 %. If QRS integral maps are used for determining the covariance matrix, the resulting transform gives very low nondipolar contents for QRS integral maps, but up to 13 % higher nondipolar contents for QRST integral maps, compared to other covariance matrices. With the 'shifting method' for nondipolar content, the outcome of visual analysis can be predicted with 90 % specificity and 95 % sensitivity.

Conclusion Although there is a similarity in nondipolar content computed with covariance matrices determined from different patient groups, the differences can be important. To enable comparison of results, a standard is necessary. The minimum nondipolar content of a set of shifted maps correlates better with the visual nondipolarity than the 'normal' nondipolar content does.