Mapping and Ablation of Complex Cardiac Arrhythmia Guided by a Novel Three-Dimensional Non-Contact Endocardial Activation Mapping System

Wing-Hong Fung, Chi-Kin Chan, Kam-Sang Woo, Wilson Wai-Man Chan, Pinky Ng, Linda Ng, John E Sanderson

From Division of Cardiology, Department of Medicine and Therapeutics, Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong

FUNG et al.: Mapping and Ablation of Complex Cardiac Arrhythmia Guided by a Novel Three-Dimensional Non-Contact Endocardial Activation Mapping System. Conventional cardiac activation mapping requires a sequentially-based method of positioning a catheter in contact with the endocardium to generate intracardiac electrograms at single points during sustained arrhythmia. Significant limitation of such point by point mapping may be encountered when applying to complex arrhythmia e.g. non-sustained arrhythmia or haemodynamically unstable arrhythmia. A novel non-contact mapping system (Ensite 3000 system) providing a three-dimensional simultaneous display of arrhythmia activation may offer a solution. The non-contact mapping system consists of a specially designed balloon catheter (Ensite EP catheter) with 64 insulated wires over the surface of the balloon for sensing electrical potentials on the endocardium and transmitting the signals to the Patient Interface Unit (PIU) for processing. It uses proprietary algorithms to reconstruct the three-dimensional cardiac chamber geometry and global endocardial activation sequences. This non-contact mapping system can provide a navigational guide in assisting ablation catheter to the target sites of interest. In this article, the mapping and ablation procedures in patents with (1) focal right atrial tachycardia, (2) haemodynamically unstable right ventricular outflow tract ventricular tachycardia and (3) symptomatic ventricular ectopics are described. Using this non-contact mapping system, patients with haemodynamically unstable or symptomatic non-sustained arrhythmia may also be successfully treated by ablative therapy with shorter procedure and fluoroscopy time. (J HK Coll Cardiol 2001;9:157-165)

Key words: Ablation, non-contact three-dimensional mapping