

ABLATION OF INCISIONAL ATRIAL FLUTTER USING THE RHYTHMIA HIGH DENSITY MAPPING SYSTEM

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ABSTRACT

Atrial incisional arrhythmias are common following cardiac surgery. We report a case of cavotricuspid isthmus (CTI) dependent atrial flutter presenting several years after surgery for left atrial myxoma excision. The flutter was mapped and successfully ablated using the Rhythmia high density mapping system.

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BACKGROUND

Atrial incisional arrhythmias represent a common complication of cardiovascular surgery¹. The term incisional atrial tachycardia is used when the re-entry zone is localized around postoperative scar¹. Rhythmia (Boston Scientific, Marlborough, MA, USA) is a novel, high-density automated electroanatomic contact mapping system designed to facilitate assessment and ablation of both atrial and ventricular arrhythmia substrates². The system utilizes a 64-pole steerable basket catheter (magnetically located) that is used to create a shell of the chamber of interest and simultaneously collect very high-density, low-noise electrogram information².

CASE REPORT

A 33 year old woman with a history of left atrial myxoma excision, which was performed when she was aged 17 years, presented with a history of palpitations. An atrial tachycardia was diagnosed and she was initially cardioverted electrically and treated with beta blockers, but the symptoms returned. She was referred for conventional electrophysiological study and radio frequency ablation, which was performed on 11th November 2018. During this procedure the earliest "A" signal was localised to the right lateral wall and subsequently ablation was done in this area. However the atrial tachycardia came

back after ablation.

The second ablation procedure was performed on the 10th of December 2018 using the

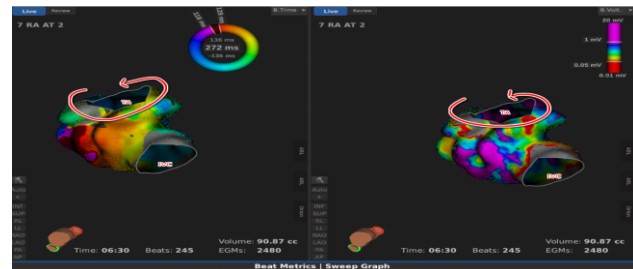


Figure-1: The right atrial activation map on the left side suggested a macro-reentrant wave front travelling in an anti-clockwise direction around the tricuspid annulus (TA), typical of CTI dependent atrial flutter. The voltage map on the right shows the scar (red) caused by incomplete ablation along the CTI line; note that there is another area of scar on the lateral wall, possibly from the previous ablation. Also labelled is the Inferior Vena Cava (IVC).

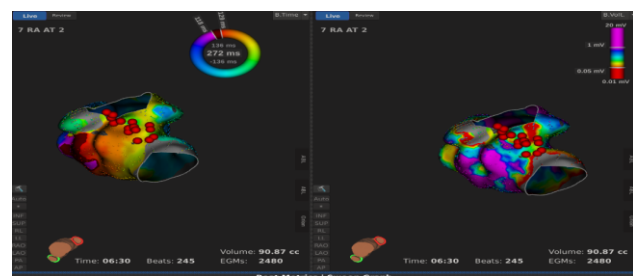


Figure-2: Activation map (left) and voltage map (right) showing ablation along the CTI line. Post-ablation, bidirectional block across the CTI was confirmed using standard differential pacing maneuvers.

Rhythmia mapping system.

The patient was under local anaesthesia and conscious sedation. A deflectable decapolar

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catheter was placed in the coronary sinus, which served as a timing and impedance field reference.

An Orion multipolar basket catheter (Boston Scientific) was used to collect right atrial geometry as well as a voltage and timing map concurrently. 5407 mapping points were collected in 20:10 minutes. The voltage map demonstrated a line of scar at the lateral right atrium, representing the atriotomy scar from the operation to remove the LA myxoma. The activation map revealed two circuits: one was a CTI-dependent counter-clockwise atrial flutter, and the second was a posterior wall circuit which was driven by the first. The Intella NAV Open Irrigated ablation catheter (Boston Scientific) was passed into the right atrium. Ablation was delivered along the CTI flutter line at 30W, 48°C, 17mls/min flow. The tachycardia was successfully terminated during ablation and the ablation line extended to the inferior vena cava. Bidirectional block was demonstrated using pace mapping, following ablation. The patient was discharged in sinus rhythm following 24 hour Holter monitoring.

DISCUSSION

CTI-dependent atrial flutter is the most commonly encountered incisional atrial tachycardia¹. During mapping, it is not uncommon to find a “double-loop” or a “figure of 8” atrial flutter in the right atrium of these patients, and sometimes these circuits are co-dependent³, as in this case.

This CTI dependent atrial flutter was success

fully ablated using the Rhythmia mapping system. The Rhythmia mapping system possesses several advantages which greatly helped with the ablation of this arrhythmia. The Orion catheter allowed fast acquisition of a large number of data points, which generated accurate, coherent 3-dimensional activation maps. Very little manual re-annotation was required of the acquired activation data points. Furthermore, the low noise level allowed meaningful reconstruction of the arrhythmia circuits, especially in low-amplitude areas of scar. The high resolution produced sharp demarcations of the acquired activation times. This permitted delineation of the arrhythmia circuit with associated lines of block and slow activation-facilitating ablation.

CONCLUSION

The Rhythmia system is an effective tool for mapping complex atrial arrhythmias, particularly in patients with a history of previous cardiac surgery and significant atrial scar.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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