Influence Of Inter Electrode Atrial Lead Distance On Acapconfirm™ Viability

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Abstract

Introduction: The AcapConfirm™ feature available with the Zephyr pacemaker family (St. Jude Medical) is designed for monitoring patient’s atrial capture threshold periodically, and automatically adjusting the atrial pulse amplitude. Previous studies showed a relative low proportion of patients at three months follow-up with recommended automatic atrial capture after the AcapConfirm™ viability test. The purpose of the present study is to evaluate the effect of inter electrode distance on the viability of the AcapConfirm™ algorithm.

Methods and Results: 132 patients (66 woman and 86 men; 71, 08 ± 8, 04 years old) were enrolled into this prospective evaluation. Sixty six bipolar leads (models 1882 (54p) and LPA1200M (12p)) with an inter electrode distance of 10 mm (Group A) were compared with sixty six bipolar leads (model 1999) with an inter electrode distance of 1,1mm (Group B). Set-up test AcapConfirm viability and manual step-down atrial threshold test as well as automatic threshold testing by AcapConfirm™ were performed at 3 months after implantation. A positive viability of the AcapConfirm™ algorithm was much lower in Group B (37, 9%; 95% confidence interval, 10, 3% – 65, 4%) versus thirty two patients (48, 5%; 95% confidence interval, 20, 9% - 76%) in Group A. However, the difference was not statistically significant (χ²=1, 51; p=0, 33). The most frequent reason to reject the AcapConfirm activation was a too small evoked response to polarization ratio (N9). At 3 months, threshold results from the AcapConfirm™ positive test were: 0, 53 ± 0, 13 V in Group B versus 0, 67 ± 0, 18 V in Group A (p< 0, 01). The differences between automatic and manual measurements were ≤0.25V in all patients.

Conclusion: We observed that a short inter electrode distance (1,1mm) is more likely correlated with a lower frequency of AcapConfirm™ viability and threshold that a standard inter electrode distance (10mm). A small evoked response to polarization ratio was the most common cause of a negative test of AcapConfirm™ viability.

Introduction

The AcapConfirm™ feature available with the Zephyr pacemaker family (St. Jude Medical) is designed for monitoring patient’s atrial capture threshold periodically, and automatically adjusting the atrial pulse amplitude. AcapConfirm™ use pacing depolarization inter-egal to calculate atrial-evoked response. Previous studies showed a relative low proportion of patients at three months follow-up with recommended automatic atrial capture after the AcapConfirm™ viability test.

The purpose of the present study is to evaluate the effect of inter electrode distance on the clinical viability of the AcapConfirm™ algorithm. Viability of atrial threshold monitoring algorithm is defined as the percentage of patients who had atrial threshold monitoring enabled.

Key Words:
Acapconfirm, Automatic Threshold, Interelectrode Distance.

Study Design

This observational, prospective data collection study included 142 consecutive patients with right atrial leads (bipolar) and right ventricular leads (bipolar) admitted for dual chamber pacemaker implantation. The intervention was performed by a single operator with experience in atrial and ventricular lead placement, under local anaesthesia and conscious sedation using a combination of intravenous midazolam and fentanyl. All patients received prophylactic intravenous antibiotics just before the procedure. Both leads were inserted via the left or right subclavian venous approach. The atrial and ventricular lead position choice was left to the discretion of the operator. After the device was implanted and before the patient was discharged from the hospital, the pacemaker was interrogated and the patient underwent chest radiography and standard 12-lead electrocardiography. Set-up test AcapConfirm™ viability and manual step-down (2,5 to 0,25V @ 0,4ms) atrial threshold test as well as automatic threshold testing by AcapConfirm™ were performed at implant, and 3 months after implantation. Data from participants who successfully completed both an automatic and manual capture thresholds test during follow-up at three months, were compared.

Statistical Analysis

Continuous variables were expressed as mean ± standard deviation range, while categorical data were expressed as frequency and
Automatic Atrial Threshold ACapConfirm™

ACapConfirm™ not recommended (codes)
modulation associated with respiration can affect the IEGM signal and fusion of a paced atrial depolarization with a spontaneous P wave often results in a small or even nonexistent ER, myopotential noise induced by various maneuvers has a demonstrable impact on AER sensing and, for certain exercises, cardiac beats exhibit a signal-to-noise ratio less than 2.11

Limitation
This study represents observational data from a single centre and thus should be considered exploratory. The major limitation is the small number of patients included, which means that the results will have to be confirmed by other groups as well.

Conclusions
According to our data, a short inter electrode distance (1,1mm) is more likely correlated with a lower frequency of AcapConfirm™ viability and lower threshold than a standard inter electrode distance (10mm). A small evoked response to polarization ratio was the most common cause of a negative test of AcapConfirm™ viability. Larger prospective studies are necessary to confirm our findings.

References
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