

## Indiana-ACC Poster Competition Abstract

Do **NOT** write outside the boxes. Any text or images outside the boxes **will** be deleted.

Do **NOT** alter this form by deleting parts of it (including this text) or adding new boxes.

Please structure your clinical research abstract using the following headings: \* Background \* Objective \* Methods \* Results (if relevant) \* Conclusion

Please structure your case study abstract using the following headings: \* Introduction/objective \* Case presentation \* Discussion \* Conclusion

**Title:**

**Using Surface Electrodes to Measure Sympathetic Nerve Activity in Patients with Electrical Storm**

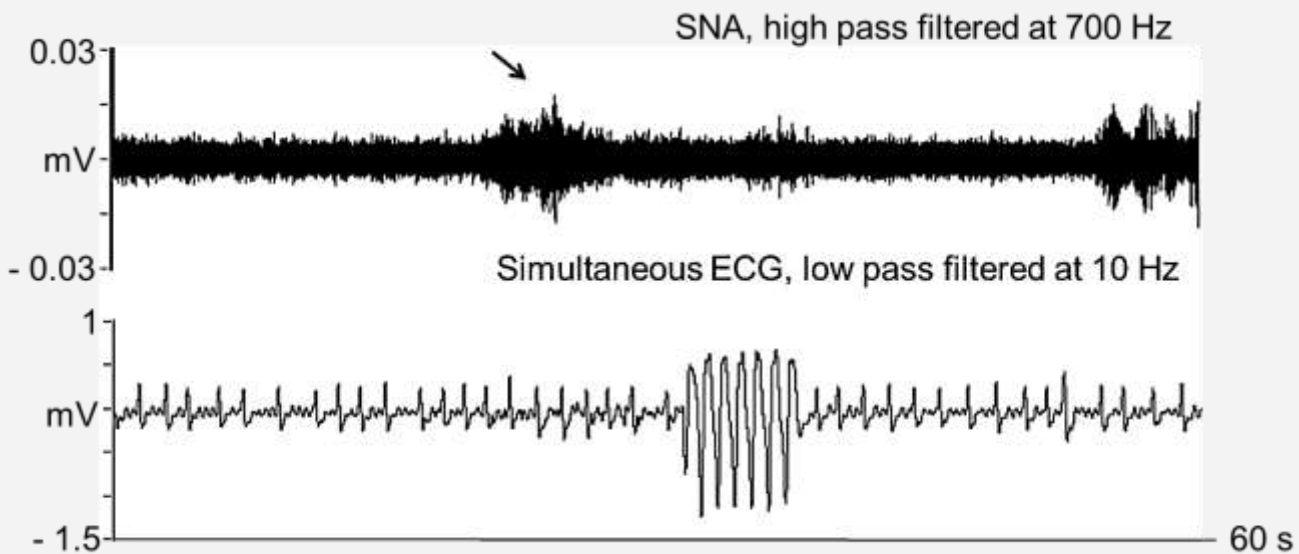
**Abstract:** (Your abstract must use Normal style and must fit into the box. You may not alter the size of this )

**Introduction:** The cutaneous sympathetic nerves in the upper chest originate largely from the stellate ganglion. We hypothesize that (1) sympathetic nerve activity (SNA) can be recorded from the upper chest using surface electrocardiogram (ECG) electrodes and (2) increased SNA precedes the onset of ventricular tachycardia (VT).

**Methods:** Signals acquired from chest ECG electrodes were sampled at 4 KHz. The digitized data were then low pass filtered at 10 Hz to detect the ECG and high pass filtered at 700 Hz to detect SNA.

**Application:** We applied this method first to 7 healthy volunteers (1 man, age  $31 \pm 8$ ) during a cold water pressor test (CWPT). Integrated SNA and the mean arterial blood pressure increased from  $16.8 \pm 8.6$  to  $21.5 \pm 12$  mV-s ( $p < 0.0001$ ) and  $86 \pm 9$  to  $106 \pm 9$  mmHg ( $p < 0.0001$ ), respectively after a hand was immersed in ice-cold water. In 5 patients who had tachycardic response to the CWPT, the average Person's correlation between SNA and the RR interval was  $-0.65 \pm 0.14$  ( $p < 0.05$  for all). These data support the feasibility of recording SNA using surface ECG electrodes. We next applied this new method to 14 patients admitted with electrical storm by continuously recording from ECG leads on the chest for  $29 \pm 16$  hours/patient. Among 34 spontaneous VT episodes detected in 3 patients, 26 (76%) episodes had SNA recorded within 30 s before the onset (arrow in Figure). The latter study indicates that a majority of VT episodes were preceded by cutaneous SNA.

**Conclusion:** Sympathetic nerve activity measured by the electrodes on the skin surface precedes the onset of VT in patients with a history of electrical storm.



**Figure:** Sympathetic nerve activity (SNA) precedes non-sustained VT.

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AD I understand that submission of an abstract constitutes a commitment to be present Indiana-ACC Annual Meeting. I understand that if I cannot be present that my poster will be withdrawn.