2016년 춘계심혈관통합학술대회

4월 16일(토) 15:50-17:20

Arrhythmia 7 Debate: Valvular AF

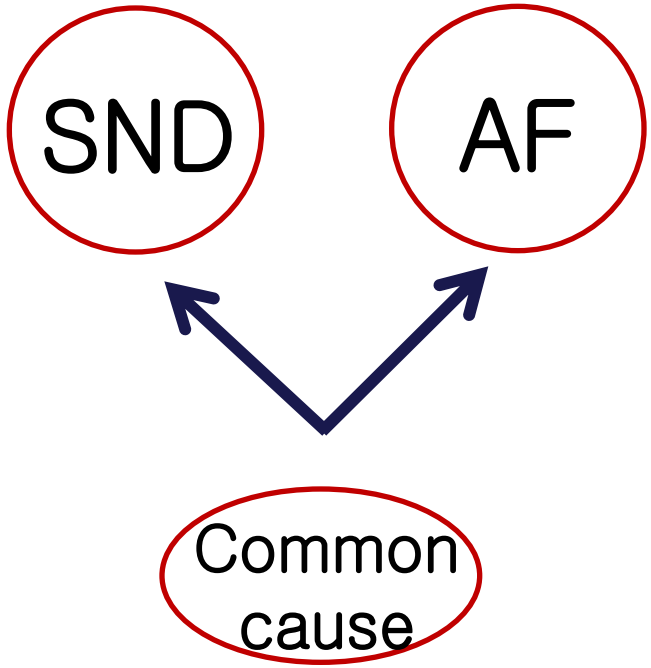
15:50-16:00 Keynote Lecture

Sinus node dysfunction and AF
: same disease or just an associated phenomenon?

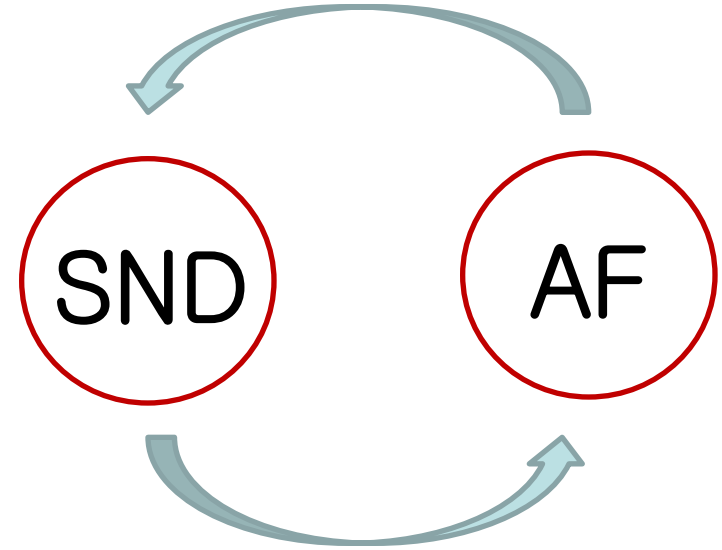
울산대 내과

남 기병

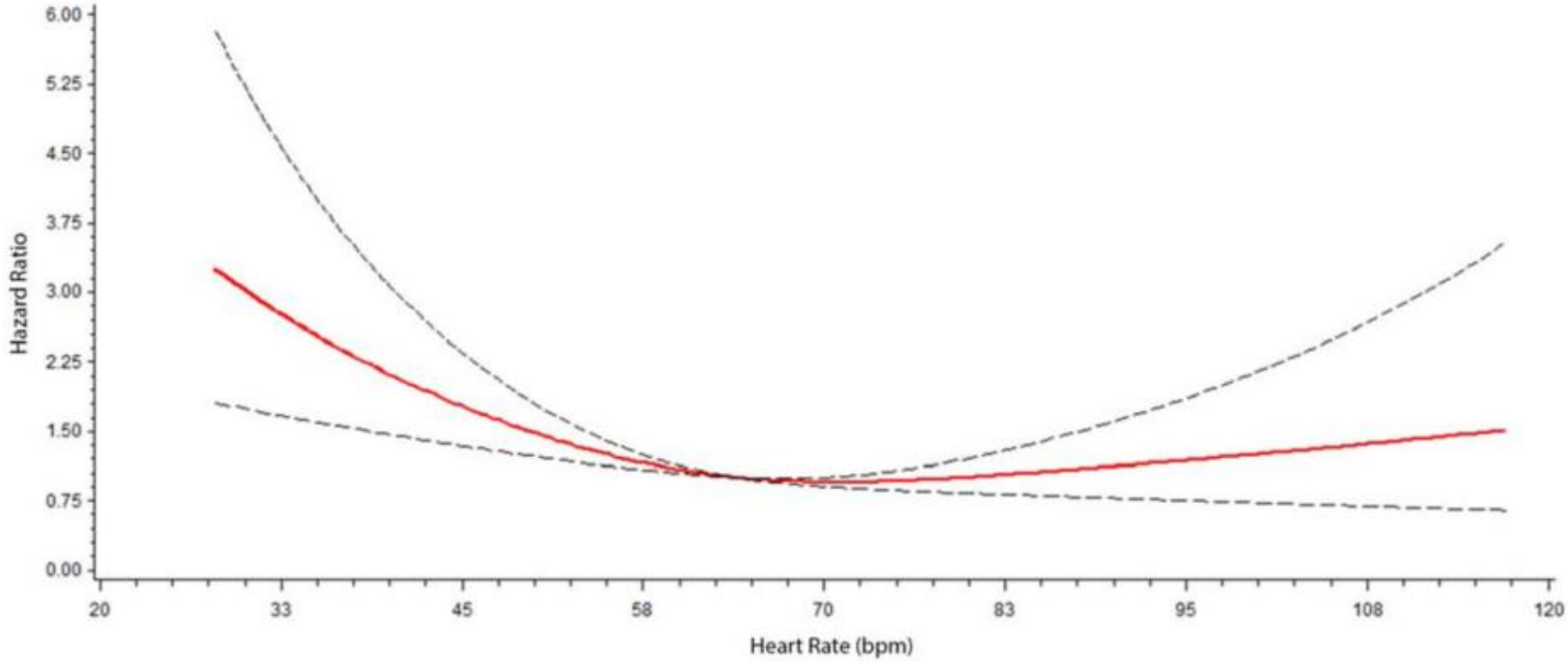
Same disease



Associated phenomenon



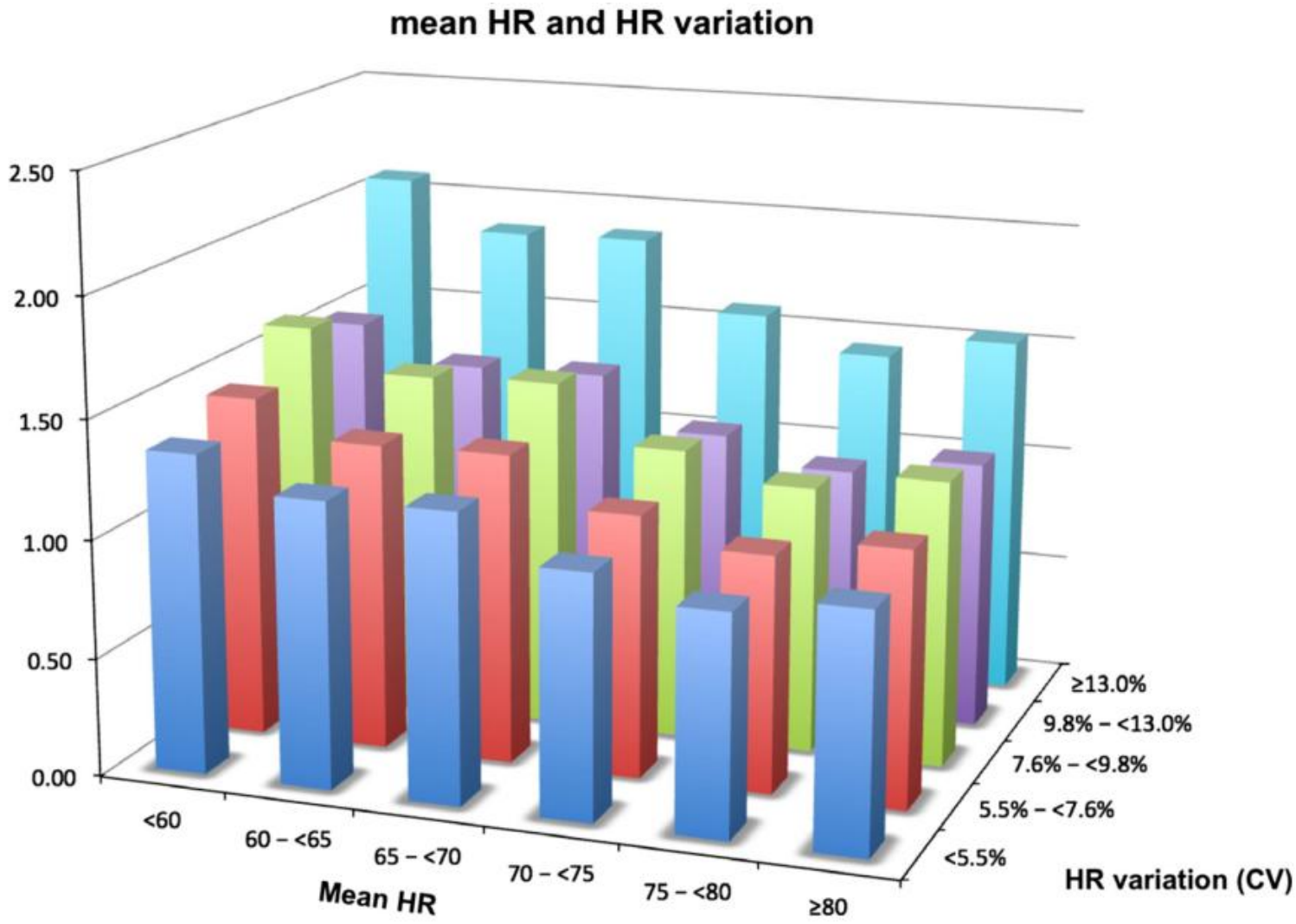
Resting Heart Rate and Incident AF in the Elderly



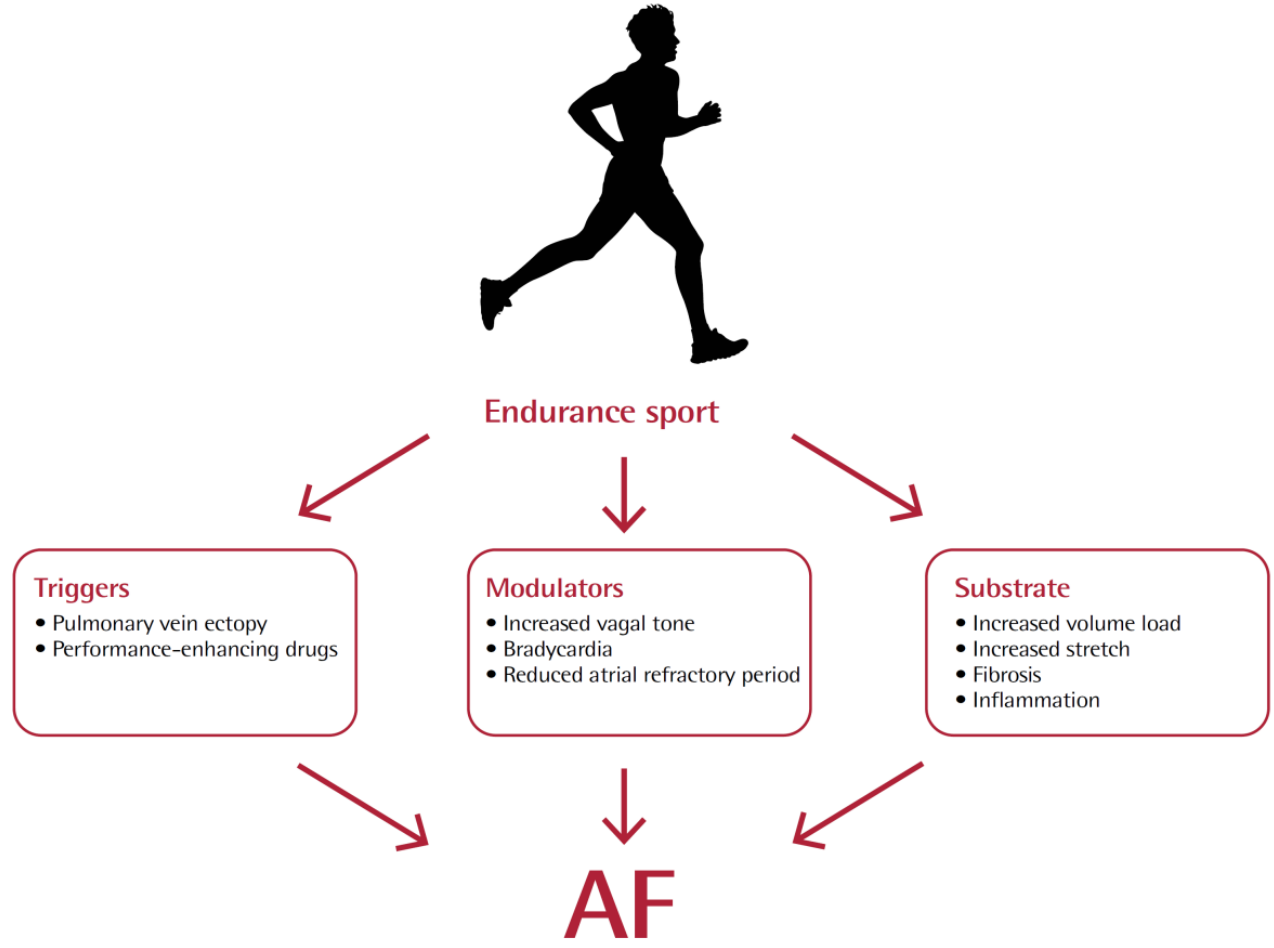
Conclusion: *In the elderly, low heart rates are associated with an increased risk of AF. Potentially, underlying alterations in autonomic tone and/or subclinical sinus node dysfunction manifested as slow heart rate predispose to AF.*

PACE 2015; 38:591–597

Low resting heart rates are associated with new-onset AF in patients with vascular disease: results of the ONTARGET/TRANSCEND studies



J Intern Med 2015

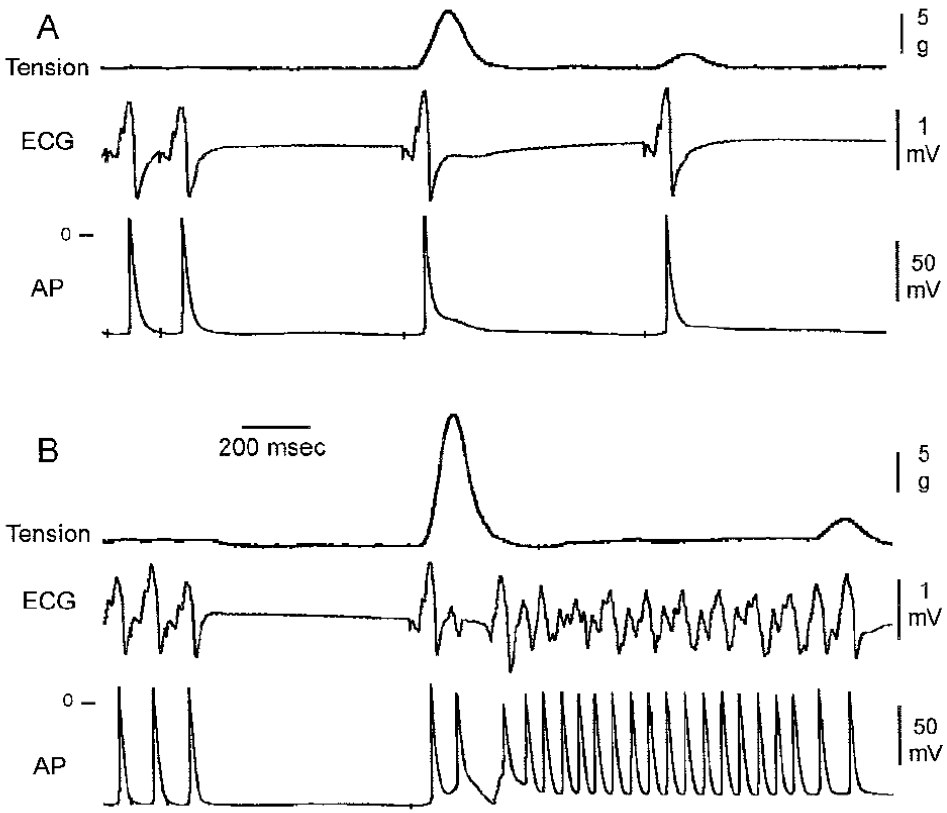


Bradycardia

Dispersion of repolarization

(vagal tone) – reduced AP duration

Reinduction of Atrial Fibrillation Immediately After Termination of the Arrhythmia Is Mediated by Late Phase 3 Early Afterdepolarization–Induced Triggered Activity



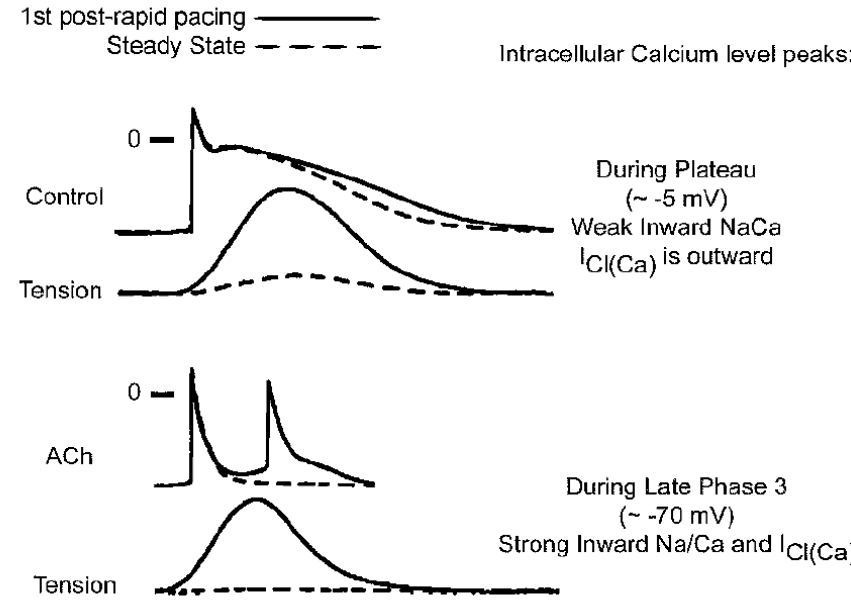
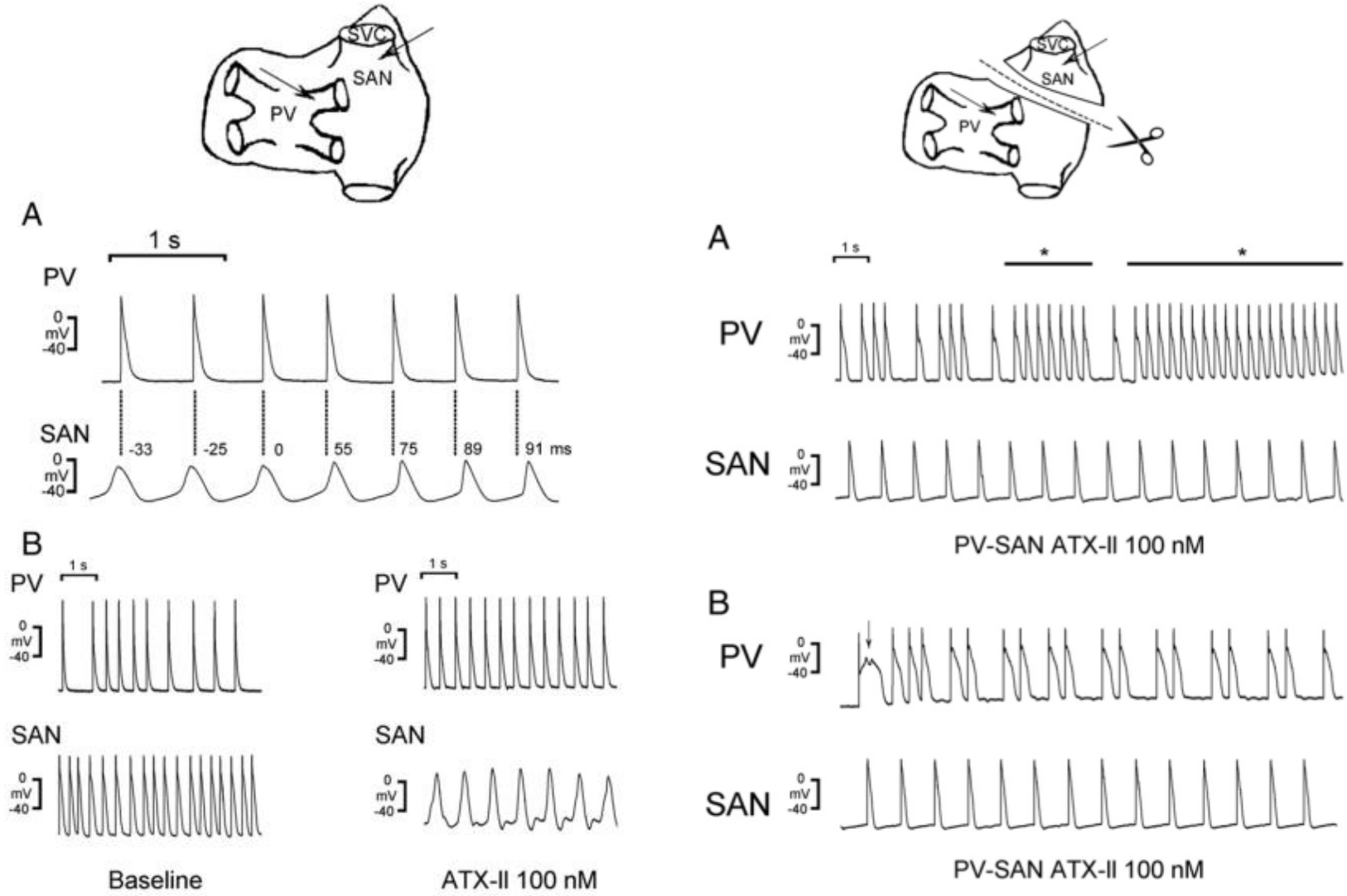


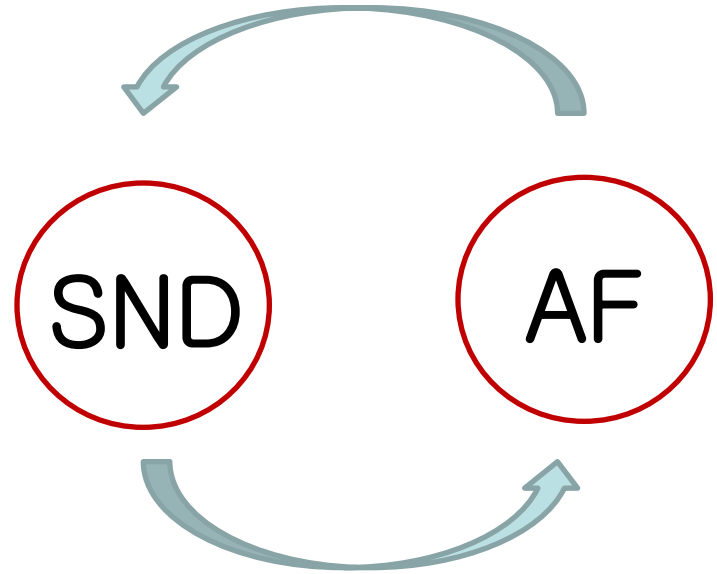
Figure 6. Proposed mechanism for development of late phase 3 EADs. Shown are superimposed action potential and phasic tension recordings obtained under steady-state conditions and during first regular post–rapid pacing beat in control and in presence of ACh. See text for further discussion.

Alexander Burashnikov, PhD; Charles Antzelevitch, PhD
Circulation. 2003;107:2355-2360

Sinoatrial node electrical activity modulates PV arrhythmogenesis



Y.-C. Chen
International Journal of Cardiology 173 (2014) 447–452


SND
AF

Short-Term Rapid Atrial Pacing Produces Electrical Remodeling of Sinus Node Function in Humans

DJAVID HADIAN, M.D, DOUGLAS P. ZIPES, M.D, JEFFREY E. OLGIN, M.D, and JOHN M. MILLER, M.D.

From the Indiana University School of Medicine, Krannert Institute of Cardiology, Indianapolis, Indiana

Sinus Node Remodeling in Man. ***Introduction:*** **Depression of sinus node function occurs in dogs and in patients after cessation of atrial flutter and fibrillation. We tested whether transient atrial pacing might produce similar changes in humans.**

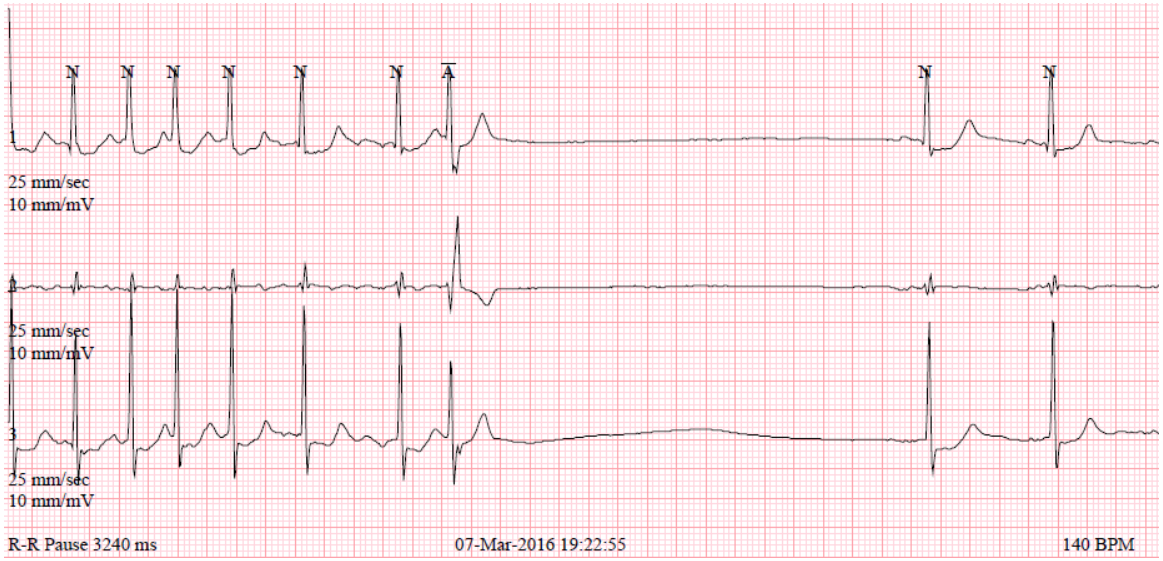
Methods and Results: **We studied the impact of short-term rapid atrial pacing, simulating atrial tachyarrhythmias, on sinoatrial conduction time (SACT) and corrected sinus node recovery time (CSNRT) in 10 patients undergoing electrophysiologic study. None had recognizable structural heart disease, history of atrial fibrillation or flutter, autonomic dysfunction, or any tachycardia for at least 24 hours before study. All cardiac drugs were discontinued >5 half-lives prior to study. No patient had significant hypotension during atrial stimulation. SACT and CSNRT were measured at baseline, and sinus node reset zone was determined. Right atrial pacing was performed for 10 to 15 minutes, after which SACT and CSNRT were measured again. Both parameters increased significantly, from 423 ± 208 msec to 491 ± 214 msec and from 80 ± 50 msec to 96 ± 53 msec, respectively ($P = 0.02$ and $P < 0.001$, respectively).**

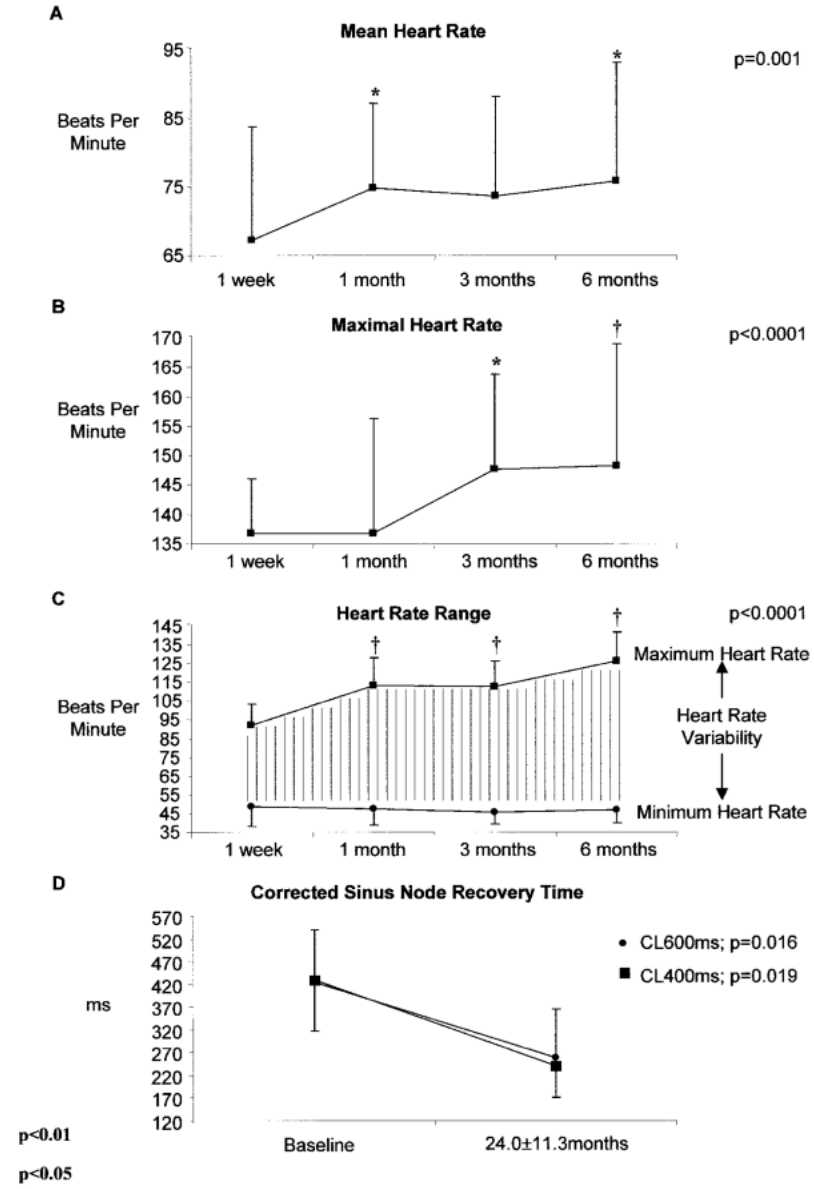
Conclusion: **Rapid atrial pacing for only 10 to 15 minutes, simulating transient atrial tachyarrhythmias, alters sinus node function in humans. Additional studies are needed to evaluate the mechanism, but the clinical implication is that even transient episodes of atrial tachyarrhythmias can cause sinus node remodeling in patients.** *(J Cardiovasc Electrophysiol, Vol. 13, pp. 584-586, June 2002)*

sinus node, remodeling, atrial pacing, atrial fibrillation, sick sinus syndrome

J Cardiovasc Electrophysiol, 13-584-586, 2002

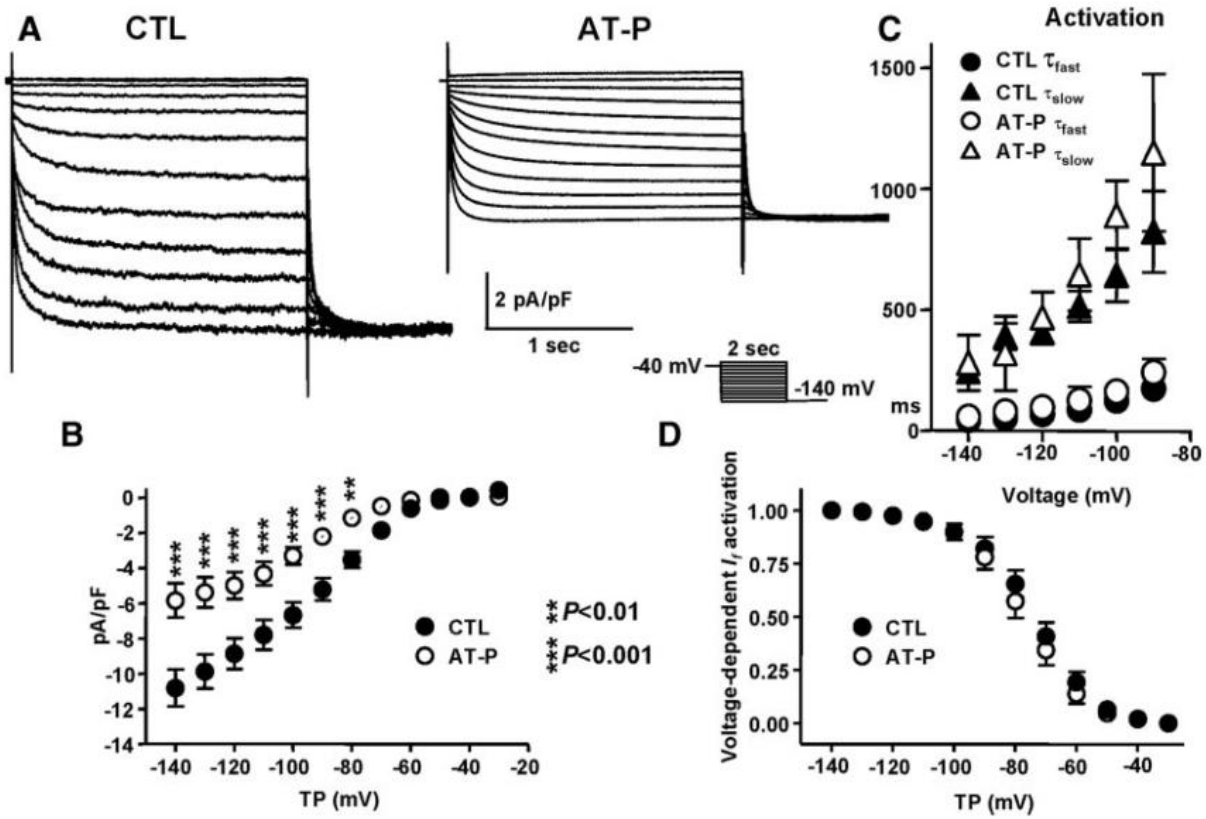
Reverse Remodeling of Sinus Node Function After Catheter Ablation of Atrial Fibrillation in Patients With Prolonged Sinus Pauses

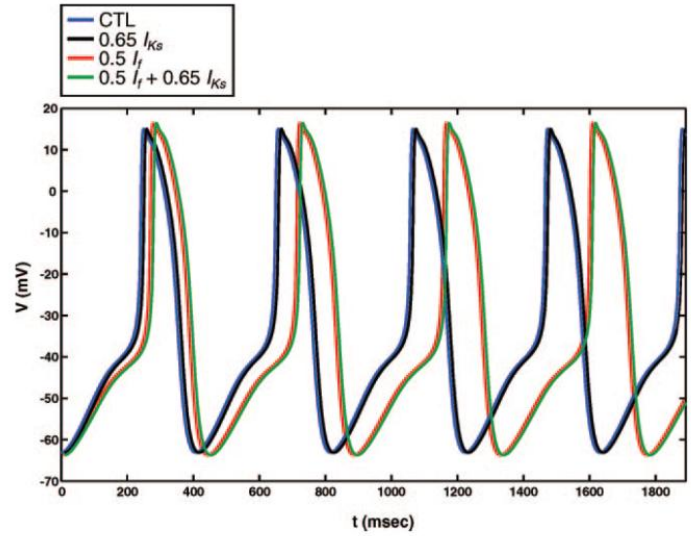




Hocini M. Circulation. 2003;108:1172-1175

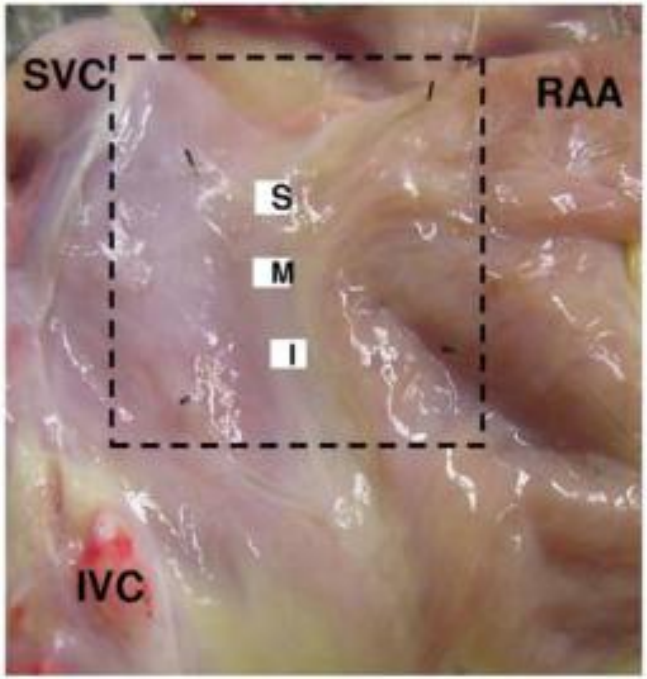
Funny Current Downregulation and Sinus Node Dysfunction Associated With Atrial Tachyarrhythmia



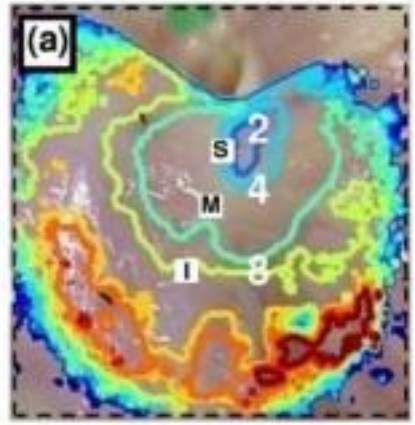


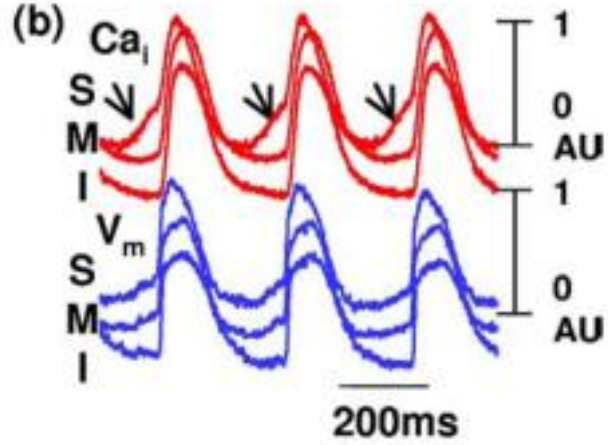
Circulation. 2009;119:1576-1585

Mechanisms of SAN dysfunction in a canine model of pacing-induced AF

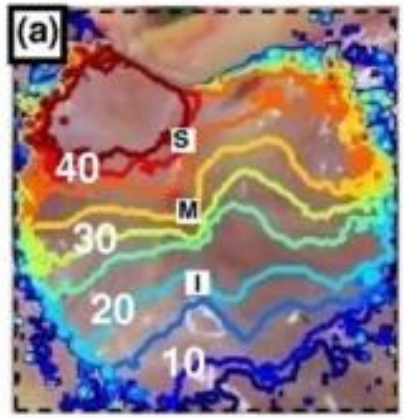


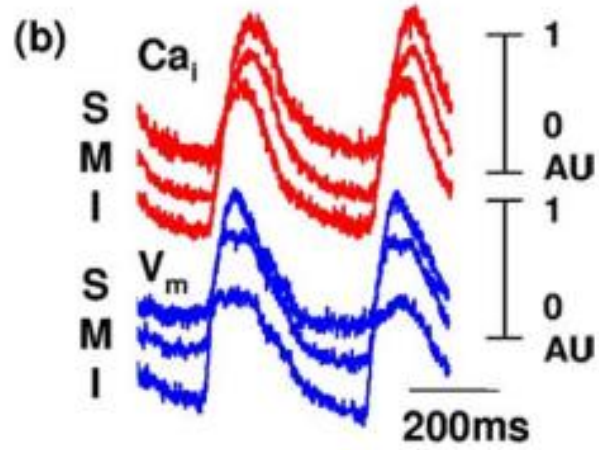
- Normal dogs



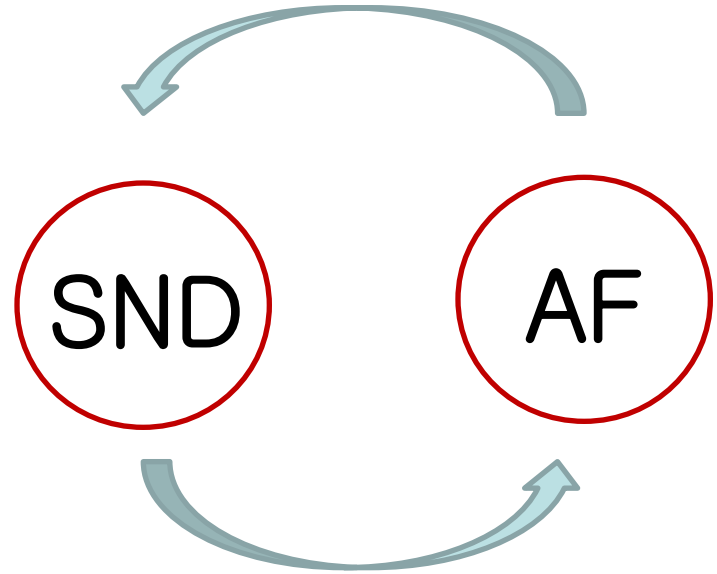


AF dogs

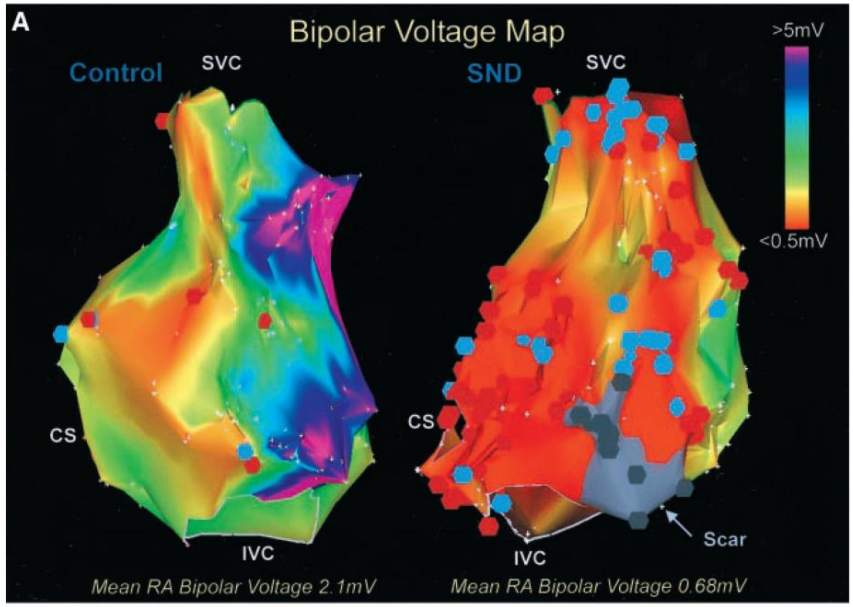


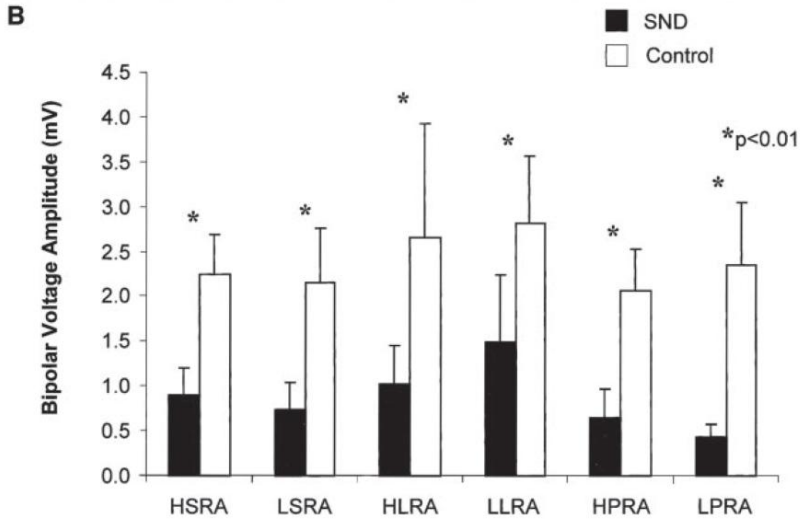


Joung B. Heart Rhythm 2010;7:88 –95


SND
AF

Electro-anatomic Characterization of the Atria in SN Disease





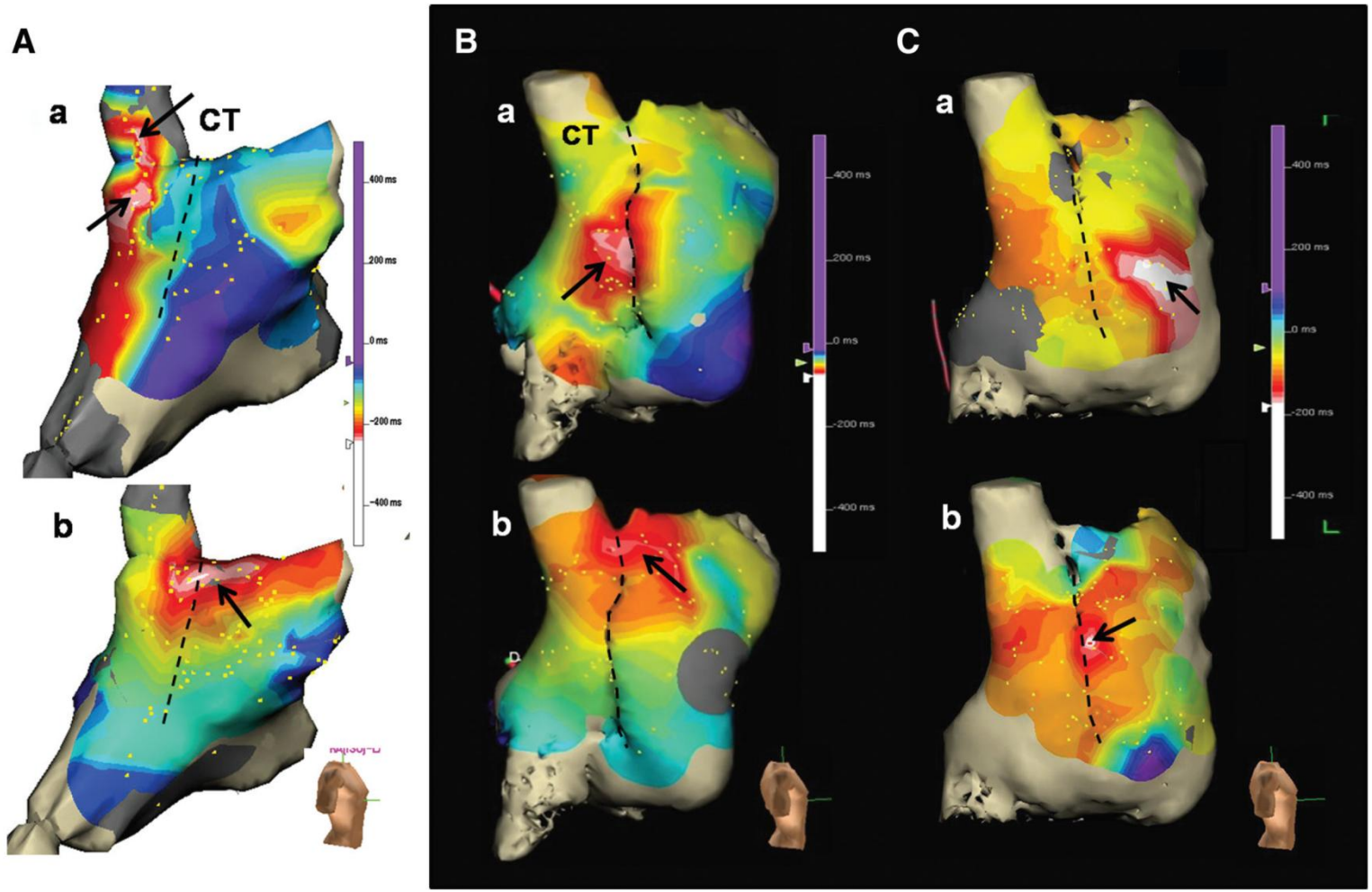
Sinus node complex
More often unicentric,
Localized to the low crista terminalis
at the site of the largest residual voltage

Bipolar voltage amplitude
Increased in atrial ERP,
Increased atrial conduction time,
Increased number and duration of double potentials.

Conclusions—SND is associated with structural change, conduction abnormalities, and increased right atrial refractoriness. There was a change in the nature of sinus pacemaker activity with loss of the normal multicentric pattern of activation, caudal shift of the pacemaker complex, and abnormal and circuitous conduction around lines of conduction block.

Sanders P. Circulation. 2004;109:1514-1522

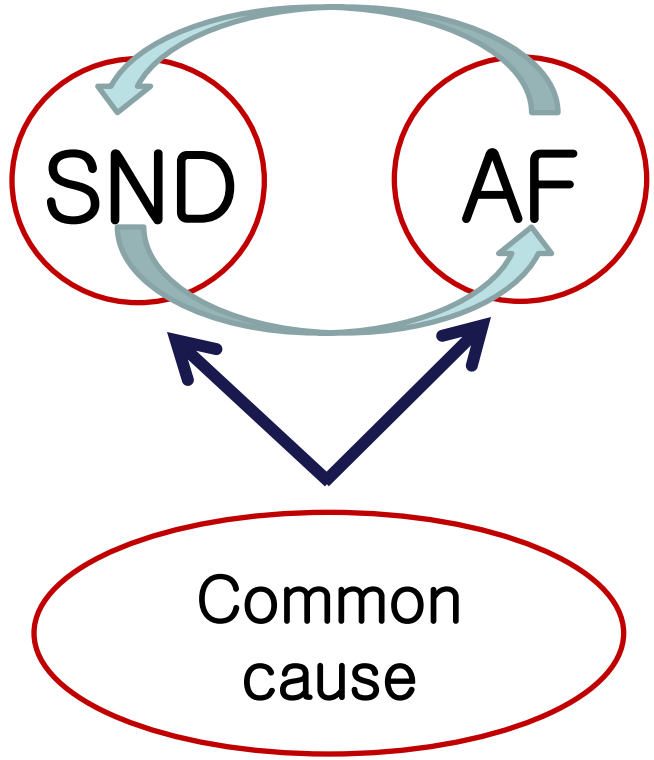
Abnormal Response of Superior SAN to Sympathetic Stimulation Is a Characteristic Finding in Patients with AF and Symptomatic Bradycardia



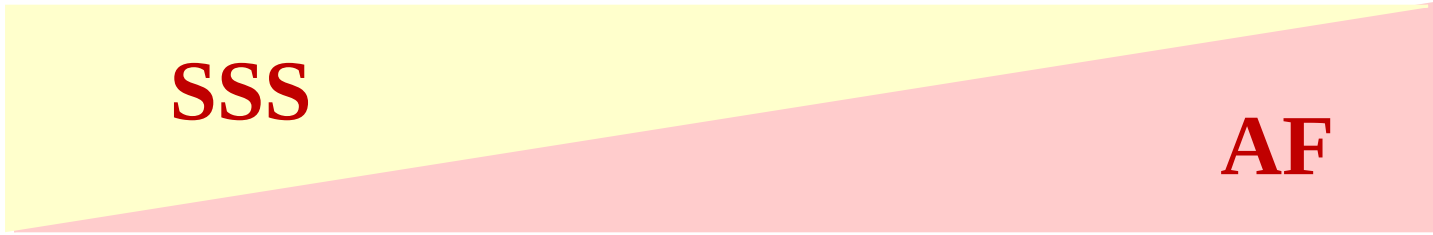
Control **AF without SAN dysfunction** **AF without SAN dysfunction**

Joung B. *Circ AE* 2011;4:799-807

Conclusions



Genetic
Acquired (aging, CHF etc)



Conclusions

1. **SND → AF, AF → SND**

2. **Common pathologic background**

   – different manifestation (spectrum)