

What we have learned from the European Heart Rhythm Association consensus document on device-detected subclinical atrial tachyarrhythmias

Emin Evren Özcan, Bülent Görenek¹

Department of Cardiology, Faculty of Medicine, Dokuz Eylül University; İzmir-Turkey

¹Department of Cardiology, Faculty of Medicine, Eskişehir Osmangazi University; Eskişehir-Turkey

ABSTRACT

Although various cardiac monitoring methods were developed to detect subclinical arrhythmias, guidelines do not address in detail the management of subclinical atrial fibrillation and tachyarrhythmias. The European Heart Rhythm Association recently published a consensus document that addresses the clinical importance, implications, and management of device-detected subclinical atrial tachyarrhythmias. This paper comprehensively reviews the diagnostic tools to detect subclinical atrial arrhythmias and discusses the pathophysiologic link between device-detected subclinical atrial fibrillation and stroke. In this invited review, in the light of this paper and current scientific data, we aimed to summarize how to manage subclinical atrial arrhythmias. (*Anatol J Cardiol* 2018; 19: 137-9)

Keywords: subclinical atrial fibrillation, device-detected atrial tachyarrhythmias, thromboembolic risk, anticoagulation

Introduction

Atrial tachyarrhythmias (ATs) are very common and atrial fibrillation (AF) is the most common sustained arrhythmia. Many patients with ATs have no symptoms during episodes, and subclinical atrial fibrillation (SCAF) is 12-fold more frequent than symptomatic AF in patients with paroxysmal AF (1). Moreover, both clinical AF and SCAF are associated with an increased risk of thromboembolism. Unfortunately, in many patients, SCAF can only be detected after an ischemic stroke.

Although various cardiac monitoring methods were developed to detect subclinical arrhythmias, guidelines do not address in detail the management of SCAF. The European Heart Rhythm Association recently published a consensus document that addresses the clinical importance, implications, and management of device-detected subclinical ATs with representation from the Heart Rhythm Society, Asia-Pacific Heart Rhythm Society, and Sociedad Latino Americana de Estimulacion Cardiaca y Electrofisiologia (2).

This paper comprehensively reviews the diagnostic tools to detect subclinical atrial arrhythmias and discusses the pathophysiologic link between device-detected SCAF and stroke. It in-

cludes answers to many daily clinical questions on the detection of SCAF and treatment with oral anticoagulants.

Detection of subclinical ATs

The consensus document emphasizes the advantage of cardiac electronic devices in detecting SCAF. In particular, patients with cardiac implanted electronic devices (CIEDs) have an advantage over patients who do not receive continuous arrhythmia monitoring because clinically silent arrhythmias can be detected. In addition, remote monitoring can also provide earlier detection compared with the standard scheduled follow-up.

However, even in automatic detection of AF by devices, false-positive and -negative detections may lead to the misinterpretation of stored data. Therefore, a bipolar atrial lead is crucial for reliable AF detection, and high atrial sensitivity is necessary to avoid intermittent undersensing of AF that can result in an inappropriate detection of persistent AF as multiple short episodes. Most importantly, review of stored intracardiac electrograms to confirm diagnosis and exclude artifacts or reduce the effect of oversensing/undersensing by automated algorithms is recommended by the document.

It is obvious that longer monitoring periods are associated with a greater rate of SCAF detection. Therefore, Holter monitor-

Address for correspondence: Dr. Bülent Görenek, Eskişehir Osmangazi Üniversitesi, Tıp Fakültesi, Kardiyoloji Anabilim Dalı, Meşelik Kampüsü, Eskişehir-Türkiye
Tel: +90 222 229 22 66 E-mail: bulent@gorenek.com

Accepted Date: 19.12.2017

©Copyright 2018 by Turkish Society of Cardiology - Available online at www.anatoljcardiol.com
DOI:10.14744/AnatolJCardiol.2017.8223



ing may be considered for detection of SCAF in high-risk patients with no CIEDs.

The 24-h Holter monitor is the most established but least sensitive device for continuous ECG monitoring. On the other hand, various technologies that provide continuous recording (e.g., longer term Holter monitoring and event recorders) yield a higher detection rate but are more expensive.

Implantable loop recorders are invasive systems. They provide a very long monitoring period, which may be used for AF detection. However, early initiation and interruption of anticoagulation based on remotely detected ATs does not prevent thromboembolism and bleeding (3). We need to wait and see the results of the ongoing studies.

Hand-held electrocardiogram devices are offered as inexpensive and noninvasive tools for screening of SCAFs, particularly in patients with ischemic stroke or TIA without a history of AF.

Device-detected ATs and thromboembolic risk

All major studies regarding the thromboembolic risk of SCAF in patients with CIEDs show significant increases in stroke rate associated with device-detected atrial high-rate episodes (AHRE) (4-10). However, the minimum duration of episode or AT/AF burden (longest total duration of AF on any given day), which confers increased thromboembolic risk, is not precisely defined. In all of these studies, the AF threshold cut-points were either arbitrarily chosen or were the results of the data itself (i.e., median values). Thus, the minimum duration of device-detected AF that increases thromboembolic risk is not certain; it may be as brief as 5 min to several hours.

Another confusing finding is the lack of a distinct temporal association between device-detected atrial arrhythmias and the occurrence of stroke. Related studies revealed unexpected findings: there was no AF on the device recordings in the majority of patients (73%–94%) in the 30 days prior to the thromboembolic events (3, 10-12). The lack of distinct temporal association between AHRE and the actual event suggests that the mechanism of stroke is not related to the AF episodes. AHRE could simply be a risk marker for stroke or reflect an indirect mechanism related to multiple comorbidities associated with stroke.

Interestingly, excessive supraventricular ectopic activity is also associated with a risk of incident AF, stroke, and mortality in selected populations depending on the frequency of ectopic beats on Holter (13, 14). The authors also note that excessive supraventricular ectopic activities documented by Holter monitoring can be considered to be a surrogate marker for paroxysmal AF.

Following a comprehensive discussion, authors ask four important questions and highlight the gaps regarding the relation between device-detected atrial arrhythmias and stroke.

1- Pathophysiologic link between AHRE and stroke is not clear. Are subclinical tachyarrhythmias the cause or just a marker of increased stroke risk?

2- Is there a threshold of tachyarrhythmia duration leading to an elevated stroke risk?

3- Can oral anticoagulation reduce stroke risk in patients with SCAF?

4- Do usual schemes for stroke risk stratification (e.g., CHA₂DS₂-VASc) in this setting work equally well as in patients with overt AF?

Device-detected ATs and oral anticoagulation

Despite several uncertainties, the consensus report makes valuable recommendations for daily practice, particularly for oral anticoagulation therapy. Recommendations for treatment of SCAF with oral anticoagulation are as follows:

- For patients with two additional CHA₂DS₂-VASc risk factors (i.e., ≥ 2 in males and ≥ 3 in females), oral anticoagulation is recommended for AF burden >5.5 h/day. Lower duration may merit oral anticoagulation if multiple risk factors are present.

- It is important to recognize that the risk is similarly increased by a mere 5-min episode, but it is reasonable to follow-up a patient with only a single 5-min episode to observe their AF burden over time before committing them to life-long oral anticoagulation.

- Consider oral anticoagulation for AF burden of >5.5 h in patients with one additional CHA₂DS₂-VASc risk factor (i.e., score = 1 in males or 2 in females).

- Consider no antithrombotic therapy for any patient with CHA₂DS₂-VASc score of 0 in males or 1 in females irrespective of AHRE.

- The presence or absence of symptoms has no bearing on determining the need for anticoagulation.

Conclusion

Silent atrial arrhythmias are becoming more visible with the developing technology and widespread use of cardiac devices. We believe that this document and ongoing studies will guide those who deal with cardiac devices and arrhythmias.

Conflict of interest: None declared.

Peer-review: Internally peer-reviewed.

Authorship contributions: Concept – E.E.Ö., B.G.; Design – B.G.; Supervision – B.G.; Literature search – E.E.Ö.; Writing – E.E.Ö., B.G.; Critical review – E.E.Ö., B.G.

References

1. Page RL, Wilkinson WE, Clair WK, McCarthy EA, Pritchett EL. Asymptomatic arrhythmias in patients with symptomatic paroxysmal atrial fibrillation and paroxysmal supraventricular tachycardia. *Circulation* 1994; 89: 224-7. [CrossRef]
2. Gorenek B, Bax J, Boriani G, Chen SA, Dagues N, Glotzer TV, et al. Device-detected subclinical atrial tachyarrhythmias: definition, implications and management-an European Heart Rhythm Association (EHRA) consensus document, endorsed by Heart Rhythm

- Society (HRS), Asia Pacific Heart Rhythm Society (APHRS) and Sociedad Latinoamericana de Estimulación Cardíaca y Electrofisiología (SOLEACE). *Europace* 2017; 19: 1556-78. [\[CrossRef\]](#)
3. Martin DT, Bersohn B, Waldo AL, Wathen MS, Choucair WK, Lip GY, et al; IMPACT Investigators. Randomized trial of atrial arrhythmia monitoring to guide anticoagulation in patients with implanted defibrillator and resynchronization devices. *Eur Heart J* 2015; 36: 1660-8. [\[CrossRef\]](#)
 4. Glotzer TV, Hellkamp AS, Zimmerman J, Sweeney MO, Yee R, Marinchak R, et al; MOST Investigators. Atrial high rate episodes detected by pacemaker diagnostics predict death and stroke: report of the Atrial Diagnostics Ancillary Study of the MOde Selection Trial (MOST). *Circulation* 2003; 107: 1614-9. [\[CrossRef\]](#)
 5. Healey JS, Connolly SJ, Gold MR, Israel CW, Van Gelder IC, Capucci A, et al; ASSERT Investigators. Subclinical atrial fibrillation and the risk of stroke. *N Engl J Med* 2012; 366: 120-9. [\[CrossRef\]](#)
 6. Capucci A, Santini M, Padeletti L, Gulizia M, Botto G, Boriani G, et al; Italian AT500 Registry Investigators. Monitored atrial fibrillation duration predicts arterial embolic events in patients suffering from bradycardia and atrial fibrillation implanted with antitachycardia pacemakers. *J Am Coll Cardiol* 2005; 46: 1913-20. [\[CrossRef\]](#)
 7. Botto GL, Padeletti L, Santini M, Cappucci A, Pulizia M, Zolezzi F, et al. Presence and duration of atrial fibrillation detected by continuous monitoring: crucial implications for the risk of thromboembolic events. *J Cardiovasc Electrophysiol* 2009; 20: 241-8. [\[CrossRef\]](#)
 8. Glotzer TV, Daoud EG, Wyse DG, Singer DE, Ezekowitz MD, Hilker C, et al. The relationship between daily atrial tachyarrhythmia burden from implantable device diagnostics and stroke risk: the TRENDS study. *Circ Arrhythm Electrophysiol* 2009; 2: 474-80. [\[CrossRef\]](#)
 9. Shanmugam N, Boerdlein A, Proff J, Ong P, Valencia O, Maier SK, et al. Detection of atrial high-rate events by continuous home monitoring: clinical significance in the heart failure-cardiac resynchronization therapy population. *Europace* 2012; 14: 230-7. [\[CrossRef\]](#)
 10. Boriani G, Glotzer TV, Santini M, West TM, De Melis M, Sepsi M, et al. Device-detected atrial fibrillation and risk for stroke: an analysis of >10,000 patients from the SOS AF project (Stroke preventiOn Strategies based on Atrial Fibrillation information from implanted devices). *Eur Heart J* 2014; 35: 508-16. [\[CrossRef\]](#)
 11. Daoud EG, Glotzer TV, Wyse DG, Ezekowitz MD, Hilker C, Koehler J, et al; TRENDS Investigators. Temporal relationship of atrial tachyarrhythmias, cerebrovascular events, and systemic emboli based on stored device data: a subgroup analysis of TRENDS. *Heart Rhythm* 2011; 8: 1416-23. [\[CrossRef\]](#)
 12. Brambatti M, Connolly SJ, Gold MR, Morillo CA, Capucci A, Muto C, et al; ASSERT Investigators. Temporal relationship between subclinical atrial fibrillation and embolic events. *Circulation* 2014; 129: 2094-9. [\[CrossRef\]](#)
 13. Binici Z, Intzilakis T, Nielsen OW, Køber L, Sajadieh A. Excessive supraventricular ectopic activity and increased risk of atrial fibrillation and stroke. *Circulation* 2010; 121: 1904-11. [\[CrossRef\]](#)
 14. Larsen BS, Kumarathurai P, Falkenberg J, Nielsen OW, Sajadieh A. Excessive atrial ectopy and short atrial runs increase the risk of stroke beyond incident atrial fibrillation. *J Am Coll Cardiol* 2015; 66: 232-41. [\[CrossRef\]](#)