The Impact of Early Detection of Atrial Fibrillation on Stroke Outcomes

Todd T. Tomson, MD[a], Philip Greenland, MD[b], Rod Passman, MD, MSCE[a,*]

KEYWORDS

• Atrial fibrillation • Stroke • Cardiac monitoring

KEY POINTS

- Early detection of atrial fibrillation (AF) before an AF-related stroke occurs could potentially allow for the initiation of preventive therapy.
- The often asymptomatic and paroxysmal nature of AF makes early detection of this disease complex.
- Despite the difficulties surrounding the detection of AF, early detection of AF has been shown to be possible in the general population, in patients with implantable cardiac monitoring devices, and in patients after cryptogenic stroke.
- However, data showing that early detection of AF leads to improved stroke outcomes are still being gathered.

INTRODUCTION

Early detection of any disease before a related adverse event is an intuitively appealing goal of medical care. However, early detection is only useful when the disease itself is serious, when treatment before event onset is more effective than treatment rendered after an adverse event occurs, and when the prevalence of the disease during the detectable preclinical phase is high. In view of the growing prevalence of atrial fibrillation (AF), the increased risk of stroke associated with the disease,[1] the proven efficacy of anticoagulation in preventing thromboembolic events,[2–5] and the significant morbidity and mortality of AF-related strokes,[6–8] AF seems to be an ideal target for screening strategies. Additionally, because stroke is the first manifestation of the arrhythmia in a quarter of all AF-related strokes,[9] early detection has major public health implications.

Although logical in theory, defining what early AF detection entails is quite complex. In regard to stroke, early detection implies finding and treating AF in patients who would otherwise not be diagnosed with the arrhythmia before stroke occurrence. Thus, early detection involves screening of patients who are at risk for both AF and AF-related thromboembolic events but who have not yet had the arrhythmia detected. The issues surrounding the screening process itself are particularly complicated. An ideal screening test should be inexpensive, easy to administer,

Disclosures: No disclosures (T.T. Tomson and P. Greenland). Medtronic, consultant, research support, speakers bureau; Boehringer Ingelheim, speakers bureau; Janssen Pharmaceuticals, speakers bureau; Pfizer/BMS, speakers bureau; UpToDate, author royalties; NIH, research support (R. Passman).

[a] Department of Preventive Medicine, Bluhm Cardiovascular Institute, Northwestern University Feinberg School of Medicine, 676 North Street Claire, Suite 600, Chicago, IL 60611, USA; [b] Department of Preventive Medicine, Bluhm Cardiovascular Institute, Northwestern University Feinberg School of Medicine, 680 North Lake Shore Drive, Suite 680, Chicago, IL 60611, USA

* Corresponding author.

E-mail address: r-passman@northwestern.edu

Card Electrophysiol Clin 6 (2014) 125–132

http://dx.doi.org/10.1016/j.ccep.2013.10.008

1877-9182/14/$ – see front matter © 2014 Elsevier Inc. All rights reserved.

reliable, and valid. However, given the often paroxysmal nature of AF and the uncertainties surrounding the burden of AF worthy of detection, long periods of monitoring could potentially be required to detect brief and infrequent paroxysmal AF.

This article discusses whether early detection of AF is possible and whether such detection can improve outcomes. Although AF is associated with early mortality, congestive heart failure, and dementia, this article focuses solely on the outcome of stroke. Methods of detecting AF and the early detection of AF by population screening are discussed first. Early detection in the subset of patients with implantable cardiac rhythm management devices is discussed next. The evidence that early detection leads to improved stroke outcomes is then evaluated, followed by a discussion of AF detection in patients with cryptogenic stroke. Finally, areas of uncertainty and future directions for research are presented.

HOW TO SCREEN FOR AF

The diagnosis of AF requires documentation of the arrhythmia by ECG or reliable surrogate. Though physical examination and self-assessment of pulse, either through palpation or smart phone-based technologies, are expected to detect some AF, paroxysmal AF may be most reliably found with cardiac monitoring. With the duration of monitoring needed to detect AF inversely proportional to the AF burden, long periods of monitoring or frequent short monitoring periods may be necessary to detect infrequent paroxysmal AF. In patient with infrequent paroxysmal AF, the sensitivity of a single ECG is likely low, although true sensitivity cannot be determined without continuously monitoring the population of interest. Short-term external monitors, such as 24-hour Holter or 30-day monitors, are expected to have a better sensitivity for detecting paroxysmal AF than a single ECG. Unfortunately, the sensitivity of these approaches for detecting paroxysmal AF seems modest. This fact was demonstrated in a study of 574 permanent pacemaker (PPM) patients with a known history of atrial arrhythmia.[10] A statistical simulation was performed and showed that the sensitivities of a single annual 24-hour Holter for paroxysmal AF was only 31.3%, quarterly 24-hour Holter monitoring was 54.2%, and monthly 24-hour Holter monitoring was 71.0%. Seven-day and 30-day monitoring had sensitivities of only 48.9% and 64.6%, respectively. The negative predictive value of each of these methods of monitoring was 21.5%, 29.2%, 39.4%, 26.9%, and 34.7%, respectively.

In contrast to short-term external monitors, implantable cardiac rhythm management devices, including PPMs and implantable cardioverter-defibrillators (ICDs) with transvenous atrial leads, have the capability to monitor the cardiac rhythm continuously, and they have been shown to be highly accurate for detecting AF.[11,12] Although these patients clearly have different comorbidities than the general population, they are a source of important information concerning the relationship between AF burden and stroke, and they provide a unique opportunity to evaluate the feasibility and impact of early AF detection and treatment. Several studies have demonstrated that a substantial proportion of patients with these devices have a high burden of AF, even if they have no clinical history of the arrhythmia before implant. Between 10% and more than 50% of patients with PPMs or ICDs and no known history of AF before device implantation have device-detected asymptomatic AF.[13–19] Furthermore, these device-detected AF episodes of durations spanning minutes to hours are associated with a two to three times increased risk of stroke, regardless of the presence or absence of symptoms.[15–17,19,20]

Although PPMs and ICDs are only indicated in a minority of the population at risk for AF, leadless subcutaneous implantable cardiac monitors (ICMs) can provide long-term, continuous rhythm monitoring in patients without other device indications. These devices are highly accurate for detecting AF with an overall accuracy reported at 98.5% for total AF duration compared with external monitoring.[21,22] Currently, these devices are indicated for patients with clinical syndromes or situations that increase the risk of cardiac arrhythmias or in patients who experience transient symptoms such as dizziness, palpitations, syncope, or chest pain that may suggest a cardiac arrhythmia. In the future, they could prove useful in detecting AF in a wider range of patients.

POPULATION SCREENING FOR AF

Although short-duration ECGs and short-term external monitors have limited sensitivity for detecting asymptomatic paroxysmal AF, using these noninvasive devices to screen for AF makes intuitive sense given that strokes, which could have been prevented by anticoagulation, may occur in patients with AF even in the absence of prior symptoms.[17] However, a fundamental question surrounding early detection of AF is who in the general population should be screened. Ideally, screening should be performed in patients who are at risk for AF and who would benefit from intervention if AF were detected. Epidemiologic studies

Download English Version:

https://daneshyari.com/en/article/2897134

Download Persian Version:

https://daneshyari.com/article/2897134

Daneshyari.com