A 79-year-old man was referred for coronary angiography because of atypical chest pain. The patient’s medical history included a myocardial infarction 5 years previously and well-controlled arterial hypertension. Three months before this admission he reported atypical chest pain, sometimes associated with palpitations lasting seconds up to a few minutes. Hence, he underwent ambulant 24-hour ECG, which revealed frequent atrial premature beats but no other arrhythmia.

On admission, the patient was in sinus rhythm. Echocardiography showed normal ventricular function without structural heart disease. After successful percutaneous transluminal coronary angioplasty, the patient was included in a study to investigate esophageal long-term ECG. Therefore he underwent rhythm monitoring with simultaneous surface and esophageal leads. The scheduled 7-day ECG had to be stopped after 20 hours because of unbearable itching caused by the skin electrodes. The surface ECG showed 122 atrial premature beats per hour. In addition, the esophageal ECG unmasked 64 of these atrial premature beats to be atrial runs of at least 3 consecutive atrial depolarizations (mean duration ± SD 0.81±0.29 seconds) (Figure). Furthermore, prolonged esophageal rhythm monitoring during 21 hours also revealed 1 episode of atrial fibrillation lasting 97 seconds.

**Discussion**

This report illustrates possible challenges to diagnosing atrial arrhythmias. In our patient, the diagnosis of paroxysmal atrial fibrillation (PAF) was delayed for the following reasons: A previous long-term ECG showed isolated atrial premature beats but was not diagnostic otherwise. Because palpitations were rare, prolonged rhythm monitoring would have been needed, which was not possible because of skin irritation.

![Figure](ECG showing an esophageal channel (top) with atrial (A) and ventricular (V) activity and the synchronized surface ECG (middle). The surface ECG shows 2 atrial premature beats whereas the synchronized esophageal ECG reveals an atrial run of 4 beats. A second esophageal ECG trace shows the onset of atrial fibrillation (bottom).)
It has been shown that frequent atrial premature beats can be a marker for individuals who are at risk of developing or have PAF.\textsuperscript{1} Moreover, we know that atrial premature beats precede most PAF episodes in 24-hour ECG recordings.\textsuperscript{2} However, analysis of standard long-term ECG usually relies on automatic QRS detection to select irregular heartbeats, and therefore atrial premature beats serve as a surrogate for true atrial activity. Automatic detection of masked atrial signals is very challenging and has not yet been realized in clinical ECG devices.\textsuperscript{3} Our findings illustrate that QRS detection–based description and quantification of atrial activity by conventional long-term surface ECG may underestimate true atrial activity.

However, the significance of the atrial runs detected by esophageal ECG in our case is unknown. We hypothesize that some of the atrial premature beats observed in patients with suspected PAF might be atrial runs. Such episodes may serve as triggers for PAF induction and be an indicator for the presence or development of PAF. They can be revealed easily with esophageal long-term electrocardiography.

Disclosures
None.

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Esophageal Long-Term ECG Reveals Paroxysmal Atrial Fibrillation
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