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## The Lewis Lead : Making Recognition of P Waves Easy During Wide QRS Complex Tachycardia

Annelies L.M. Bakker, Gerard Nijkerk, Björn E. Groenemeijer, Reinier A. Waalewijn, Egbert M. Koomen, Richard L. Braam and Hein J.J. Wellens

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## The Lewis Lead

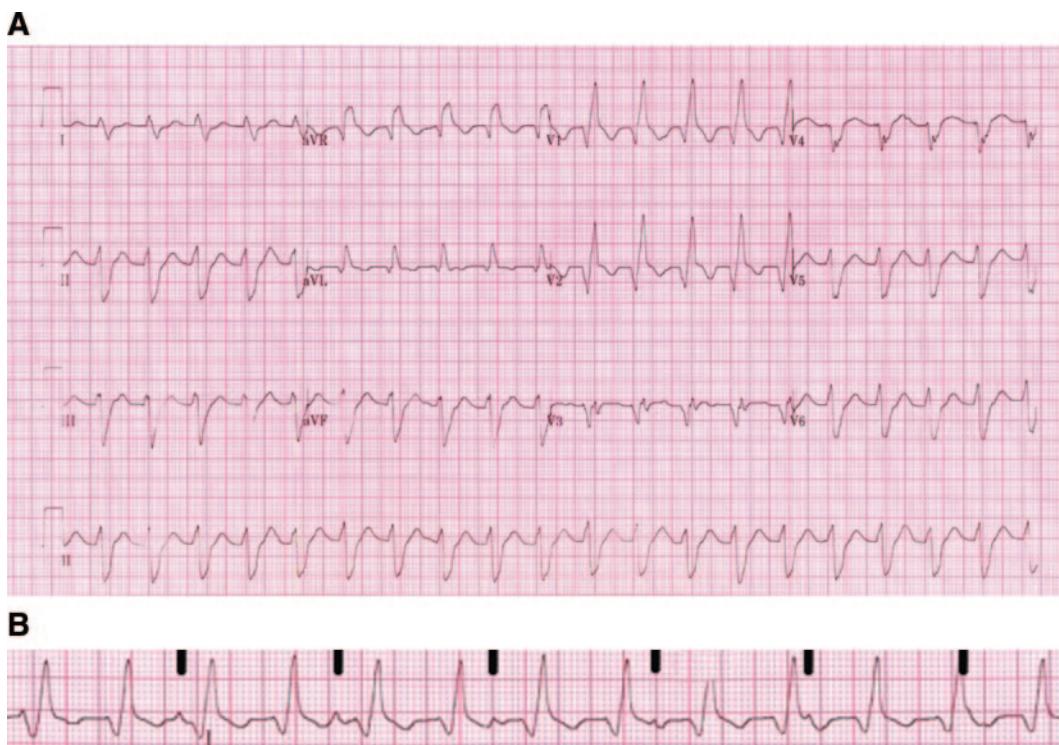
### Making Recognition of P Waves Easy During Wide QRS Complex Tachycardia

Annelies L.M. Bakker, MD; Gerard Nijkerk, BSc; Björn E. Groenemeijer, MD, PhD; Reinier A. Waalewijn, MD, PhD; Egbert M. Koomen, MD; Richard L. Braam, MD, PhD; Hein J.J. Wellens, MD, PhD

**A**n 80-year-old man was admitted to our hospital because of complaints of dizziness and palpitations. His medical history revealed an anteroseptal myocardial infarction 26 years earlier. The patient was hemodynamically stable with a blood pressure of 95/60 mm Hg and a heart rate of 120 bpm. The ECG (Figure 1A) showed a wide QRS complex tachycardia, 120 bpm. The electric axis was northwest. From the tracing, atrioventricular dissociation was suggested but not

readily apparent. QRS morphology in leads V<sub>1</sub> (qR) and V<sub>6</sub> (R/S < 1) was consistent with a diagnosis of ventricular tachycardia.<sup>1</sup>

A Lewis lead (Figure 1B) also was recorded. This is a special bipolar chest lead with the right arm electrode applied to the right side of the sternum at the second intercostal space and the left arm electrode applied to the fourth intercostal space. The recording of the tracing can be seen in lead I.<sup>2</sup> Calibration should be adjusted to 1 mV=20 mm. In Figure



**Figure 1.** A, ECG at admission showing a regular broad complex tachycardia of 120 bpm. B, The Lewis lead configuration with the right arm electrode applied to the right of the sternum at the second intercostal space and the left arm electrode applied to the fourth intercostal space. After recording, this tracing should be interpreted in lead I. The presence of atrioventricular dissociation is indicated by vertical black bars.

From the Department of Cardiology, Gelre Hospitals, Apeldoorn (A.L.M.B., G.N., B.E.G., R.A.W., E.M.K., R.L.B.), and Cardiovascular Research Institute, Maastricht (H.J.J.W.), the Netherlands.

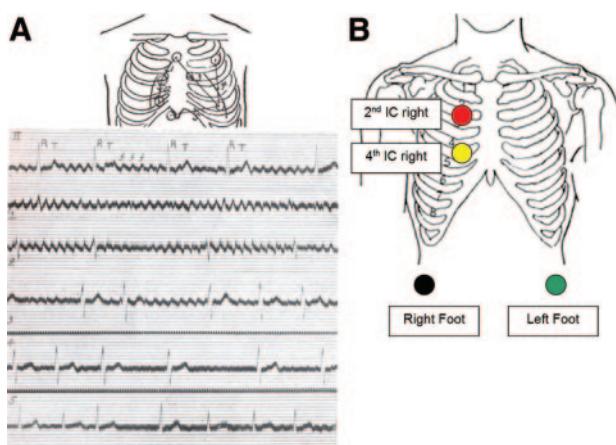
Correspondence to Richard L. Braam, Department of Cardiology, Gelre Hospitals, Postbus 9014, 7300 DS Apeldoorn, Netherlands. E-mail: r.braam@gelre.nl

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**Figure 2.** A, Sir Thomas Lewis' original diagram illustrating the concept of the Lewis lead configuration. From: Lewis T. Auricular fibrillation. In: *Clinical Electrocardiography*. 5th ed. London, UK: Shaw and Sons; 1931:92. Reproduced with permission from the publisher. B, The Lewis lead configuration used to register the tracing shown in Figure 1B. IC indicates intercostal space.

1B, atrioventricular dissociation is obvious, confirming without any doubt the diagnosis of ventricular tachycardia. After electric cardioversion, sinus rhythm was obtained.

The Lewis lead configuration can help to detect atrial activity and its relationship to ventricular activity. This

technique was described by Sir Thomas Lewis (1881 to 1945) in his book *Clinical Electrocardiography*.<sup>3</sup> Sir Lewis developed the lead configuration with the purpose to magnify atrial oscillations present during atrial fibrillation, which he referred to as auricular fibrillation. As shown in Figure 2A, he applied 3 electrodes to the right of the sternum instead of 2, recording the maximal atrial oscillations in the leads indicated by 1 and 2 (Figure 2A).

Atrioventricular dissociation during a wide QRS tachycardia is a hallmark of ventricular tachycardia.<sup>1</sup> Although not used regularly in clinical practice, we would like to promote the use of the Lewis lead configuration (Figure 2B) in those situations in which differentiation between a supraventricular or ventricular origin of an arrhythmia is difficult.

## Disclosures

None.

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