Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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[3] and CRTAVO [CRT Optimization Algorithm Validation Study] [4] collected with the same pacing system (FlexStim, Boston Scientific Corporation). All patients provided informed consent to participate, and the local institutional review board approved the study at each study center. Unipolar intracardiac electrograms (IEGMs) were recorded interoperatively and simultaneously from both LV and RV pacing leads and surface lead II. From 6 intrinsic beats, ensemble-averaged (EA) waveforms for RV, LV, and lead II were generated by alignment of the largest R-wave peaks in the RV IEGM channel. The average number of beats in each EA was 312 ± 122 .

The Q* point was measured from the RV IEGM EA waveform, which was defined as the earliest QRS complex deflection from the isopotential line. The LV IEGM EA was used to resolve ambiguous cases. Surface Q was defined as the onset of the first deflection of the QRS complex (positive or negative) on the lead II EA (Figure 1A). The LV point (common to both Q*LV and QLV intervals) was taken to be the earliest large peak on the LV EA IEGM (1). All measurements were performed manually and confirmed by a second blinded observer.

There were 53 CRT patients in this study contributing 60 data sets, with 2 different RV lead locations evaluated in 7 patients. The mean age of the cohort was 65 ± 10 years; 56% had ischemic heart disease, and 76% had New York Heart Association functional class III heart failure. A left bundle branch block (LBBB) was present in 71% of subjects with a QRS duration of 150 ± 22 . The correlation between the QLV and IEGM Q*LV was excellent ($r = 0.985$, $P < 0.0001$). The correlations were similar for patients with an LBBB ($r = 0.975$) and a non-LBBB ($r = 0.954$). The mean Q* was earlier than the surface Q point by 8.6 ± 8.1 milliseconds ($P < 0.0001$) as shown in a plot of the surface QLV versus IEGM Q*LV for each patient (Figure 1B).

This analysis shows that both a surrogate of left ventricular delay (Q*LV) as well as interventricular delay (RV-LV) can be measured from the same intracardiac electrograms. This demonstrates the potential for automation of these measures in CRT devices. The correlation of the Q*LV and QLV was excellent, indicating that the former can be used clinically for the assessment of LV delay. The ability to measure both LV and interventricular delays from the same electrodes is important for patients with a non-LBBB ECG or ischemic heart disease in whom QLV and RV-LV times are not well correlated (2). Further controlled, prospective studies are needed to determine if combining these 2 measures improves clinical outcomes by optimizing patient selection, lead position, and device programming.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

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TO THE EDITOR

COVID-19 and AF

What About the Long Game?

The coronavirus disease-2019 (COVID-19) pandemic has threatened our ability to deliver usual care and presented challenging interactions between coronavirus infection and common diseases.

Using administrative data, Musikantow et al (1) estimated 4% of patients hospitalized with COVID-19 had new-onset atrial fibrillation (AF). In-hospital mortality among the new-onset AF group was significantly higher than in patients without AF (55% vs 26%; $P < 0.01$).

New-onset AF is frequently detected in patients hospitalized for another concern. We prospectively estimated the incidence of new-onset AF in intensive care unit

patients at 18.9% (95% CI: 14.2%-24.3%) (2), much higher than the Musikantow et al group (1). This may be explained by acuity or by the use of continuous electrocardiogram monitoring with AF detection algorithms.

As of April 24, 2021, the COVID-19 pandemic had resulted in approximately 1,767,886 hospitalizations in the United States (3). Assuming an AF incidence of 15%, approximately 265,183 patients have developed new-onset AF and this number will grow. For these patients, a question arises: *was their AF caused by COVID-19?* If so, they would be considered AF-free after recovery. If not, they may have paroxysmal or persistent AF, which increases their risk of stroke and implies that they may benefit from oral anticoagulation. Long-term prognosis of new-onset AF detected during intercurrent illness is unclear. The AFOTS (AF Occurring Transiently with Stress) follow-up study is attempting to clarify the long-term prognosis of patients with new-onset AF during hospitalization for medical illness or noncardiac surgery, who have returned to sinus rhythm at the time of discharge (4). Patients wear 2 14-day Holter monitors over the course of the subsequent 12 months to monitor for recurrence of AF. While we await the results, we urge readers to consider the long-term impact of a new diagnosis of AF during hospitalization for COVID-19 and to reassess the stroke risk of these patients when their illness has resolved.

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