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Frontal QRS-T Angle in Hemodialysis

Hemodiyalizde Frontal QRS-T Açısı

LETTER TO THE EDITOR
EDİTÖRE MEKTUP

To the Editor,

I read with great interest the article by Kaya et al.,[1] who investigated the prognostic value of the frontal QRS-T angle (fQRSTa) in hemodialysis patients and demonstrated its association with long-term mortality. This work addresses a clinically meaningful question, as the fQRSTa represents the vectorial difference between ventricular depolarization and repolarization axes, and increased values have been shown to reflect electrical heterogeneity and arrhythmogenic substrate formation in various cardiovascular conditions, as emphasized by Küçük et al.[2] in non-ST elevation myocardial infarction populations.

However, several methodological aspects merit elaboration. Kaya et al.[1] relied on a single electrocardiogram (ECG) measurement, yet in hemodialysis patients, ventricular repolarization indices, including fQRSTa, QT interval, and Tp-e interval, have been shown to undergo dynamic intradialytic fluctuations influenced by volume status, electrolyte shifts, and autonomic balance. Kalaycı et al.[3] reported that repolarization markers vary in relation to dialysis adequacy, while Korkmaz et al.[4] demonstrated that even the QRS axis may shift during dialysis due to changes in intrathoracic fluid distribution. Thus, a single ECG may not adequately reflect the chronic electrophysiologic milieu of this patient population.

Additionally, the authors evaluated all-cause mortality as the primary endpoint. While clinically relevant, differentiation between arrhythmic and non-arrhythmic death would deepen mechanistic interpretation, considering that fQRSTa reflects repolarization heterogeneity and may indicate vulnerability to malignant ventricular arrhythmias. Prior observations by Kaplan and Kıraslan have highlighted the importance of distinguishing genuine arrhythmic patterns from electrical artifacts when interpreting repolarization abnormalities.[5] Therefore, cause-specific mortality analysis would enhance the understanding of how fQRSTa relates to arrhythmic risk versus systemic disease burden.

Furthermore, renal dysfunction and inflammation have been shown to modulate cardiovascular outcomes in acute coronary syndromes, indicating that the observed prognostic significance of fQRSTa may also be influenced by the underlying cardiorenal-inflammatory pathway.[6] The prognostic value of fQRSTa is not limited to hemodialysis populations. Usalp and Bağırtan demonstrated that elevated fQRSTa was associated with increased total mortality in ischemic stroke patients, suggesting that fQRSTa may serve as a marker of global cardiometabolic stress and inflammatory activation rather than a dialysis-specific electrophysiological phenomenon.[7] Supporting this interpretation, Çoner et al.[8] found that repolarization markers, including the Tp-e interval, may reflect systemic autonomic and inflammatory imbalance, thereby providing prognostic insight across different cardiovascular settings.

In summary, while Kaya et al.[1] contribute valuable data to the literature, future prospective studies incorporating serial ECG assessments and cause-specific mortality analyses are warranted to clarify whether fQRSTa primarily reflects arrhythmogenic risk, systemic disease burden, or both. Such work may refine the use of fQRSTa in risk stratification and clinical decision-making among hemodialysis patients.

In conclusion, while the authors present valuable preliminary findings, prospective studies incorporating serial ECG measurements and stratified evaluation of mortality mechanisms are needed to clarify the applicability of the frontal QRS-T angle as a practical prognostic marker in hemodialysis patients.

Gamze Yeter Arslan

Department of Cardiology, Kepez State Hospital, Antalya, Türkiye

Corresponding author:
Gamze Yeter Arslan
✉ dr.gamzeyeterarslan@gmail.com

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