LETTER TO THE EDITOR

Novel electrocardiographic indices of arrhythmogenesis and blood lead level

Dear Editor,

We have read with interest the publication by Karakulak et al. that discusses electrocardiographic findings in workers with lead exposure (Karakulak, Yilmaz, Tutkun, Gunduzoz, & Ercan Onay, 2016). The associations between blood lead levels and the duration of QT and PR intervals have been previously examined (Chen et al., 2013). Current study expands the effects of blood concentrations of this heavy metal on to newly introduced markers of arrhythmogenesis. It is implied that the interval from the peak to the end of T wave (Tp-e) is indicative of transmural dispersion of repolarization. In healthy individuals, Tp-e/QT ratio is 0.21 ± 0.03 , and higher value is regarded as novel index of ventricular dysrhythmia (Gupta et al., 2008). Similarly, dispersion of P wave (PWD) has been predictive of atrial arrhythmias (Nussinovitch, 2012). Therefore, the correlation that may exist between the newly described indices and lead levels is worthy of examining. Blood lead levels are expectedly higher in the environmentally exposed group compared to the control group, however, the overall differences in electrocardiographic findings are not quite impressive. Despite higher values of the P wave and QT dispersion in the exposed group, they fall within the normal range of PWD (33.5 ± 9.7 ms) and those of QTD (10–71 ms) in both groups (Malik & Batchvarov, 2000; Nussinovitch, 2012). Accordingly both groups are categorized as normal with regard to PWD, QTD, QT interval, and Tp-e measurements. Whether the statistically differences between two values that both are within normal range will increase the probability of dysrhythmia remains highly speculative. Authors state that in multivariate logistic regression model, none of the laboratory findings including blood lead level is identified as an independent predictor of electrocardiographic findings. Particularly, further attempts to correlate the blood lead level with various electrocardiographic indices in univariate analysis yield only a weak correlation for some of the indices and no correlation whatsoever for the rest. Blood lead levels >10 µg/dl is generally regarded abnormal and associates with cardiovascular, as well as all-cause mortality (Lustberg & Silbergeld, 2002). Interestingly, in this study reported blood lead levels are unusually low in the control group (0.3 µg/dl), and probably not a true representative of population. Studies from the same geographical region on occupationally unexposed population have yielded much higher levels between 3.1 to as high as 8.6 µg/dl (Kirel, Aksit, & Bulut, 2005; Pala, Turkkan, Gucer, Osman, & Aytekin, 2009; Vural & Gulvendik, 1988). Additionally, average blood lead level in the United States among adults has been reported 1.2 µg/dl during

2009–2010. On the other hand, blood levels as low as 4.9 µg/dl are reported in patients with lead exposure, which make this group highly heterogeneous. It would be interesting if the authors perform additional comparison between individuals with blood lead level above 10 µg/dl and those with levels below 10 µg/dl considering abnormal blood lead level as binary variable. With the currently provided information, the study's conclusion of "higher risk of atrial and ventricular arrhythmias for lead-exposed workers" seems too strong and is not well supported.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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