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CLINICAL RESEARCH
Prevention and epidemiology

NT-proBNP has a high negative predictive value to rule-out short-term cardiovascular events in patients with diabetes mellitus

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Kaplan–Meyer analysis

The Kaplan–Meyer analysis for NT-proBNP showed differences between patients with values above and below the cut-points of 125 pg/mL. The difference was statistically significant ($P < 0.0001$), through the observation period (Figure 1).

Receiver operating characteristic curve

The area under the ROC curve with respect to the combined end-point unplanned cardiovascular hospitalization and death was 0.785 for NT-proBNP in our study population. Sensitivity, specificity, negative predictive value, positive predictive value, and accuracy for different values of NT-proBNP are depicted in Figure 2.

Discussion

In the present study, we have demonstrated a strong and independent correlation between plasma NT-proBNP levels and short-term prognosis of cardiovascular events for patients with diabetes mellitus. Patients with low levels of NT-proBNP (<125 pg/mL) had an excellent short-time prognosis. This was true despite the fact that they had less background therapy (data not shown). At

pressure, LDL-cholesterol, and kidney function have been evaluated for their potential to predict outcome in diabetic patients and to identify those that need more aggressive management. All of these markers have proved valuable for long-term prognosis, but not for the assessment of imminent threat of major cardiovascular events for diabetic patients. The American Heart Association and the American Diabetes Association recently extensively discussed and questioned the individual predictive role of blood pressure, lipids, or glucose management on outcome.⁸

The reason for the limited aptitude of these traditional markers to predict short-term events might be that they are not functional markers of cardiovascular health but mediators of cardiovascular injury. There is a well-studied dose–effect relationship over time for these modifiable risk factors for large cohorts, and targeted, multifactorial interventions should be undertaken to reduce cardiovascular long-term risk as outlined, for example, in the Steno-2 Study.¹⁹ Notwithstanding this important role, the information about the current, immediate risk for the individual patient is uncertain.

An additional explanation for the shortcomings of cardiovascular markers to predict outcome in this setting might be attributed to the ‘heart failure paradox’. Several studies have linked obesity, hypercholesterolaemia, higher blood pressure, and even higher HbA_{1c} levels, which are well-known risk factors for coronary artery disease, to improved survival of patients with heart failure.^{20–24} The mechanisms of this ‘reverse epidemiology’ are not quite clear.²⁵ However, traditional risk markers of cardiovascular disease might be

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