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HIGH PROGNOSTIC IMPACT OF DIALYSIS ADHERENCE AND CARDIOVASCULAR FACTORS ON SURVIVAL IN HEMODIALYSIS PATIENTS

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Abstract

During follow-up of patients receiving maintenance hemodialysis, it was observed that not all studied parameters were available for every patient, which necessitated an individual-factor analytical approach. Receiver operating characteristic (ROC) analysis was therefore applied to assess the prognostic value of demographic, clinical, and dialysis-related factors influencing patient survival [1,5]. ROC curves of individual predictors are presented in Figure 1.

The analysis demonstrated that missed dialysis sessions, chronic heart failure, and the use of a central venous catheter were the strongest negative predictors of survival, whereas several metabolic and demographic factors showed moderate prognostic performance. Dialysis duration, in contrast, acted as a protective factor. Similar findings have been reported in previous observational and registry-based studies [3,9,11].

Keywords: Hemodialysis; survival; ROC analysis; dialysis adherence; vascular access; chronic heart failure; prognosis.



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Objective

To evaluate the prognostic significance of individual demographic, clinical, and dialysis-related factors affecting survival in maintenance hemodialysis patients using ROC analysis [6].

Materials and Methods

Due to incomplete availability of all variables in every patient, ROC analysis was performed separately for individual predictors of survival. The analyzed factors included patient age, sex, diabetes mellitus, arterial hypertension, coronary heart disease, chronic heart failure, body mass index (BMI), vascular access type (central venous catheter or arteriovenous fistula), dialysis session adherence, and dialysis duration [2–4,7].

Predictive performance was assessed using the area under the ROC curve (AUC). An AUC value of 0.50–0.60 was interpreted as low, 0.60–0.70 as moderate, and >0.70 as high prognostic accuracy [6]. Statistical significance was defined as $p < 0.05$.

Results

As shown in Figure 2, missing dialysis sessions demonstrated the strongest negative impact on patient survival (AUC = 0.77; $p < 0.001$), confirming that non-adherence to dialysis schedules is a major determinant of mortality in hemodialysis populations [1,5]. Chronic heart failure also showed high prognostic value (AUC = 0.76; $p < 0.001$), consistent with evidence indicating that cardiovascular disease accounts for up to 40–50% of deaths in dialysis patients [3,9].

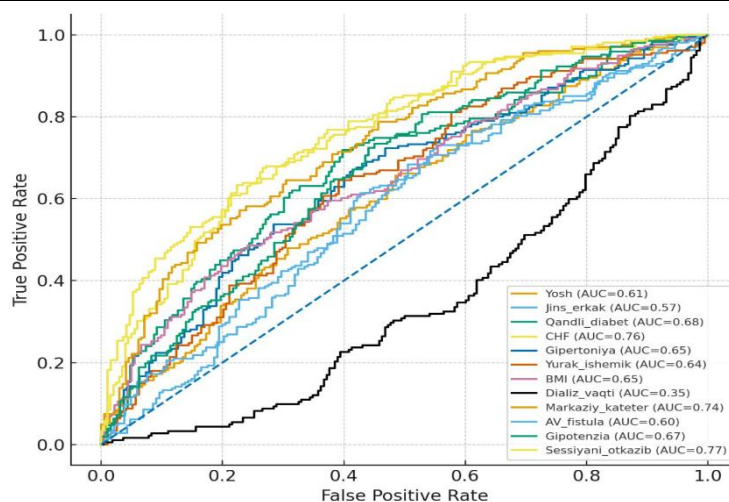


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The use of a central venous catheter was identified as another strong negative predictor of survival (AUC = 0.74; $p < 0.001$), reflecting its well-documented association with infectious and thrombotic complications [2,14].

Diabetes mellitus, arterial hypertension, coronary heart disease, body mass index (BMI), patient age, and the presence of an arteriovenous fistula were classified as moderate prognostic factors (AUC 0.60–0.68; $p < 0.05$), which aligns with previously published cohort studies [3,9].

In contrast, dialysis duration demonstrated an inverse association with mortality risk and acted as a protective factor (AUC = 0.35), suggesting improved survival among patients who tolerate long-term dialysis therapy [1,5].

Conclusions

1. Individual demographic, clinical, and dialysis-related factors show heterogeneous prognostic value for survival in hemodialysis patients [1,3].
2. Missed dialysis sessions, chronic heart failure, and central venous catheter use are the strongest negative predictors of survival [2,9].



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3. Dialysis duration appears to exert a protective effect on patient survival [5].
 4. Careful monitoring and correction of modifiable risk factors may significantly improve life expectancy in patients receiving maintenance hemodialysis [1,6].

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