Diabetes, Metabolic Syndrome and Obesity

Dovepress
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LETTER

Nomogram for Predicting Early AVF Failure in Elderly Diabetic Patients: Methodological and Clinical Considerations [Letter]

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Dear editor

As physicians specializing in vascular surgery, we have reviewed a recent article focusing on the development of a nomogram to predict early failure of arteriovenous fistulas (AVFs) in elderly diabetic patients.[1] The article presents some innovative methodologies and results; however, several aspects, including methodology and clinical applicability, warrant further discussion.

Data Collection and Sample Selection

Firstly, regarding data collection and sample selection, while the sample size of 548 patients is considerable, it remains relatively limited when compared to the vast global population of elderly patients with diabetes and end-stage renal disease (ESRD). More importantly, the study includes cases from a single center, which may limit the generalizability of the findings across different regions and healthcare settings. Although the exclusion criteria help control variables, they may also exclude clinically challenging cases, thereby affecting the model's predictive ability in complex clinical environments. For instance, patients with severe co-morbidities, advanced age, or a history of multiple failed AVF attempts are often among the most challenging to treat and may be underrepresented in this study. This could affect the model's predictive ability in these complex clinical environments, where accurate risk assessment and tailored interventions are most crucial. Furthermore, the article does not explicitly address the handling of missing data, a common issue in medical research that, if not managed properly, can lead to biased results.[2]

Internal Validation and External Validation

Secondly, internal validation was performed using the bootstrap method with 1000 resamples, yielding promising results with an AUC of 0.912. While the bootstrap method is robust, it relies heavily on the original dataset and may not fully capture the variability and complexity of real-world clinical scenarios. Crucially, internal validation cannot substitute for external validation, which entails testing the model on a fully independent dataset, preferably from a different geographical location, time period, or patient subgroup.[3] This is vital because patient populations can vary considerably in demographics, comorbidities, and treatment strategies. Regrettably, the predictive nomogram developed by Liu et al lacked external validation, a limitation that future research should strive to rectify.

Clinical Applicability and Limitations

Thirdly, regarding clinical applicability and limitations, the nomogram model comprising five variables, although relatively easy to obtain in clinical practice, poses challenges when integrating them into a user-friendly predictive

Received: 8 February 2025
Accepted: 25 February 2025
Published: 28 February 2025

tool. Non-vascular surgery specialists may find it difficult to understand and apply this model. Although the model's predictive performance is good in both training and validation datasets, it does not discuss differences among various patient subgroups (eg, gender, age, duration of diabetes). Furthermore, the model does not consider non-biological factors affecting AVF maturation, such as surgical technique and postoperative care.[4] Ethical and cost-effectiveness considerations, including balancing costs and benefits of preventive measures for high-risk patients, have not been addressed in the model's clinical application.

Suggestions

We suggest expanding the sample size and incorporating multi-center data to enhance the model's representativeness and generalization ability. Advanced statistical methods, such as Bayesian networks or random forests, can be explored for variable selection and model construction, followed by rigorous external validation to assess the model's true performance.[5] Prospective studies should be conducted to evaluate the model's application in clinical decision-making and explore its integration with existing healthcare processes to improve patient care quality. Future research can address these limitations and provide a more reliable and practical predictive tool for clinical use.

Disclosure

The authors declare no conflicts of interest in this communication.

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https://doi.org/10.2147/DMSO.S521525