multidisciplinar identificando momentos possíveis, pontuais e adequados para abordagens que vão além do aspecto técnico e valorizam o cuidado integral e o engajamento da equipe envolvida no processo transfusional. **Conclusão:** A captação de doadores de sangue no ambiente hospitalar, por meio da sensibilização de familiares e acompanhantes, revelou-se uma estratégia efetiva, especialmente quando conduzida com empatia e interdisciplinaridade. A abordagem humanizada proporcionou não apenas aumento nas doações, mas também contribuiu para a disseminação da cultura da doação voluntária e consciente e a formação de uma consciência social e solidária nos diferentes contextos em que a ação foi desenvolvida. Recomenda-se a continuidade e ampliação desta prática, bem como sua incorporação em políticas institucionais de incentivo à doação de sangue.

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REPLACING A MECHANISTIC BLOOD COAGULATION MODEL WITH MACHINE LEARNING: A BENCHMARK STUDY FOR ACCELERATED THROMBOTIC RISK PREDICTION

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Introduction: Recurrent venous thromboembolism (RVTE) is a major clinical concern due to its high recurrence rate and complex, patient-specific pathophysiology. Recently, hybrid models that integrate clinical data with mechanistic simulations have shown promise in improving risk prediction. One such approach combines artificial neural networks (ANNs) with a system of ordinary differential equations (ODEs) that simulates the biochemical cascade of thrombin generation. However, this hybrid model presents two major limitations: it is not differentiable end-to-end due to the embedded ODE solver, and the numerical integration of stiff ODEs during optimization is computationally expensive. These limitations hinder model scalability and real-time applicability in clinical settings. **Aim:** This study aims to accelerate and simplify thrombotic risk modeling by replacing the mechanistic ODE system with data-driven machine learning (ML) models. Specifically, it benchmarks the performance of different ML regressors as surrogates for the ODE system within the optimization of an ANN-based hybrid model for RVTE prediction. **Material and methods:** Data from 235 patients with a first episode of venous thromboembolism (VTE) were used. The original hybrid model mapped 39 clinical and hematological variables to eight sensitive kinetic parameters via a multilayer perceptron (MLP). These parameters were then input into a system of ODEs to simulate patient-specific thrombin generation and compute the endogenous thrombin potential (ETP), a key biomarker for RVTE classification. In this work, the ODE solver was replaced with ML regressors trained to approximate ETP outputs directly from the kinetic parameters. Ten ML models were evaluated as ODE surrogates, including ANN, Gaussian process regression, support vector regression, random forest, and gradient boosting. Each surrogate was integrated into the optimization pipeline and benchmarked across 192 configurations using eight metaheuristic optimization algorithms (MOAs), including Grey Wolf Optimizer (GWO), Genetic Algorithm, and Particle Swarm Optimization. Metrics included AUC, sensitivity, specificity, and optimization accuracy. **Results:** Replacing the ODE system with machine learning surrogates significantly improved optimization efficiency without compromising performance. The ANN-based surrogate model, combined with the Grey Wolf Optimizer (ANN−Surrogate−GWO), achieved an AUC of 0.89, true positive rate of 0.93, and true negative rate of 0.89 on the test set. This approach reached 97.97% relative accuracy on the optimization objective and reduced computation time by over 95%, while preserving the physiological relationship between kinetic parameters and thrombin dynamics, enabling faster and more reliable RVTE risk prediction. **Discussion and conclusion:** This work demonstrates the feasibility and benefits of replacing computationally intensive mechanistic ODE models of the blood coagulation cascade with machine learning surrogates for clinical prediction tasks. By preserving the physiological mapping from kinetic parameters to thrombin potential, the surrogate approach maintains interpretability while drastically accelerating optimization. The ANN−Surrogate− GWO configuration emerged as a clinically viable and computationally efficient alternative for RVTE risk prediction. These findings suggest that ML-based emulators of mechanistic models offer a scalable path forward for biomedical modeling, enabling broader integration into real-time, patient-specific decision support systems.

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RHOA E RHOC COMO REGULADORES DA SINALIZAÇÃO DE p53/p21 EM CÉLULAS MIELOIDES

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Introdução: A presença de mutações no gene *TP53* é fator prognóstico em leucemia mieloide aguda (LMA) e, apesar de serem encontradas em baixa frequência, mecanismos adicionais de inativação da via de sinalização de p53 são