

## **Machine learning-based outcome prediction for patients with acute poisoning receiving continuous renal replacement therapy**

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**Background:** Continuous renal replacement therapy (CRRT) is an effective treatment modality for patients with acute poisoning from various sources. The present study aimed to apply machine learning to predict outcomes among patients with acute poisoning receiving CRRT based on common clinical and laboratory test results on admission.

**Methods:** Data from a total of 147 patients with acute poisoning receiving CRRT during January 2018 to December 2022 were retrospectively identified and randomly assigned to the training set (n=103) and validation set (n=44). Overall, 3 machine learning algorithms were employed to predict the survival status, and patients were grouped into survivors and non-survivors based on the 90-days follow-up outcome. The Shapley (SHAP) plot was utilized for interpreting the models.

**Results:** The 147 patients included 78 males and 69 females with a median age of 42 years. Common sources for acute poisoning included organophosphate poisoning (n=41), snake bite (n=21), rodenticide poisoning (n=25) and bee sting (n=18). At 90-day follow-up, a total of 52 (35.37%) patients died. The machine learning-based models, composed of patients' age, source of poisoning, serum creatinine, urine volume, lung/liver injury severity, and time from poisoning to CRRT treatment, were able to predict death with an area under the curve ranging from 0.87 to 0.94 in the training set and from 0.75 to 0.84 in the validation set. The significance of contributions from all predictors in the LightGBM model were visualized by the SHAP plot. **Conclusions** Machine learning-based models could provide acute and rapid predictions for outcomes in patients with acute poisoning receiving CRRT treatment.

**Keywords:** Machine learning-based, prediction, acute poisoning, continuous renal replacement

### **Biography**

Jiang Maochun, female, born in 1971.1.5, bachelor, mainly engaged in the department of nephrology rheumatism immunology, main research interests of kidney disease, hemodialysis, vascular access establishment (renal dialysis).

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