

Conclusions: Bone fracture incidence in HD patients is high, and its risk increases with hemodialysis vintage and history of a kidney transplant. Assessment of fracture risk and management in dialysis patients at most significant risk requires further study.

No conflict of interest

POS-640

MACHINE LEARNING FOR INTRADIALYTIC HYPOTENSION PREDICTION IN HAEMODIALYSIS PATIENTS



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Introduction: Patients undergoing haemodialysis (HD) are exposed to other morbidities due to their treatment, whether at home or in a clinical setting. Intradialytic hypotension (IDH), the most serious of the adverse effects, is associated with increased mortality. Early intervention of such a dangerous clinical event is highly desirable for prevention, yet no tool for the management and decision making of IDH has been available until now. This study has aimed to investigate the scope of machine learning (ML) techniques in predicting IDH by analysing various standard clinical variables measured by clinicians.

Methods: The dataset consists of 73323 HD sessions with 36662 IDH events. The data have been collected from 3944 patients in 10 centres during 2000-2020. Different data analytics and ML techniques were applied to explore the important variables associated with IDH. The probabilities of having an IDH were investigated using different combinations of variables. The prediction model was built to predict the IDH using various ML algorithms. The dataset was split 80:20 for training and testing purposes. Moreover, to validate the models further, we used a previously unseen validation dataset containing 6304 HD sessions collected from 748 patients from 10 sites during 2020-2021.

Results: Feature analysis using ML techniques (extra tree classifier and correlation matrix with heat map) indicated that pre-and post-systolic and diastolic blood pressure are useful predictor variables for IDH during an HD session. Statistical analysis suggests that IDH patients had significantly lower pre-dialysis systolic blood pressures (124 mmHg compared with 141 mmHg; $p < 0.05$) and demonstrated a more significant percentage drop in their systolic blood pressure (delta systolic) before and after dialysis (9.18% vs 5.33%; $p < 0.05$). Statistical analysis also showed lower pre-dialysis diastolic blood pressures (66 mmHg compared with 73 mmHg; $p < 0.05$) and demonstrated a significant percentage drop in the patients' diastolic blood pressure (delta diastolic) before and after dialysis (4.02% vs 2.31%; $p < 0.05$). Investigation of different combinations of variables shows that lower pre-dialysis systolic blood pressures increase the probabilities of having an IDH. An ML model with random forest (RF) outperformed other algorithms in predicting events with an accuracy of 75.5%. An ML model with bidirectional long short-term memory (Bi-LSTM) outperformed different algorithms in predicting IDH events with an accuracy of 78.5%. The model with the RF algorithm gained a ROC-AUC score of 0.832 in comparison with Bi-LSTM's 0.822. The ML model with Bi-LSTM also performed well on the validation dataset with an accuracy of 74.09%, sensitivity of 74.81%, specificity of 73.37% and ROC-AUC score of 0.816.

Conclusions: A prediction model using ML algorithms offers great promise as a tool in identifying patients at risk of IDH in advance. Moreover, adding the data measured during the dialysis could improve the model further and lead to personalised management and intervention of IDH. Future work will involve building a decision-support system for clinicians and conducting a clinical trial.

No conflict of interest

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DEPRESSION DETERMINANTS IN EGYPTIAN HAEMODIALYSIS PATIENTS



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Introduction: Depression is common in hemodialysis patients. There are many risk factors for depression among ESRD patients. Additionally,

nutrition is likely to influence patients' morbidity, especially, those who suffered from malnutrition. The correlations between depressions together with nutritional assessment among HD patients have been understudied in Egypt to the best of our knowledge hence; we aimed to evaluate the relations between depression and different variables including parameters of nutritional assessment in hemodialysis patients.

Methods: The study was conducted in four renal dialysis units in Dakahlia governorate in Egypt where 262 patients were recruited in the study. The different variables including nutritional assessment parameters were correlated with depression scoring.

Depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D), NIMH. Depression scoring design clarified as the following, zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items is reversed. The possible range of depression scores is zero to 60, with the higher scores indicating the presence of more symptomatology. The used Depressive score represents related mood symptoms referred to as depressive mood rather than physical symptoms avoiding the possible overlap with the medical condition. Nutritional assessment was settled through the following, serum albumin, and creatinine and the subsequent grades of subjective global assessment of nutritional status (SGA) with the following explanation; A - Well-nourished, B - Mildly/moderately malnourished, C - Severely malnourished. In addition, Mini Nutritional Assessment (MNA®) clarified with screening nutritional score (0-14 points) and grades; 12-14 points= Normal nutritional status, 8-11 points= At the risk of malnutrition, 0-7 points=Malnourished.

Results: The total studied group was 262 patients (108 females and 154 males) on dialysis aged between 18- 86 years (mean = 56), giving a response rate of 89% of the depression questionnaire. Depression tertiles and Score frequency showed in table 1. Higher depression score is significantly positively correlated with female gender, diabetics, patients with Ischemic Heart Disease (IHD), and non-smokers, while there are non-significant positive correlations between depression and age, BMI, and dialysis duration. Additionally, the Depression score increased with most parameters indicating malnutrition; the decrease of MNA scoring and serum albumin level, the increase of MNA staging, and SGA staging ($r -0.383, 0.377, -0.175, 0.136$ and $p 0.000, 0.000, 0.012, 0.080$ successively). Furthermore, a decrease in blood hemoglobin could mean more depression. The female gender is older ($p=0.004$), with a longer dialysis duration ($p=0.038$), and has higher dry body weight ($p=0.027$) and lower nutrition score ($p=0.002$). These factors could consequently result in the already present higher depressive score. HCV-Abs positive patients have a trend to be more depressive ($z =1.81, p =0.07$) that might be related to significantly longer dialysis duration in this group.

Table (1)

Depression Score	tertile per cent and frequency	N	%	Mean	SD	Min	Max
Tertiles	The lowest Tertile	78	33.4%	6.13	2.530	0	10
	The middle Tertile	78	33.4%	15.68	3.86	11	23
	The highest Tertile	77	33.2%	33.17	7.623	24	55
Depression Score	Below 20 degree	140	60.1%	9.70	4.76	0	19
	range from 20 to 40 degree	80	34.3%	28.55	5.1	20	39
	above 40-60 degree	13	5.6%	47.31	4.73	41	55

Conclusions: Depression in dialysis patients is associated with Female gender, diabetes, IHD, malnutrition, and lower serum albumin and blood hemoglobin.

No conflict of interest

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A NATIONWIDE SURVEY OF PREGNANCY CHARACTERISTICS AND OUTCOMES OF WOMEN TREATED WITH HEMODIALYSIS BEFORE AND AFTER COMMENCING DIALYSIS



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