SA-PO367
Deep Learning Model for Predicting Intradialytic Hypotension Without Privacy Infringement: A Retrospective Two-Center Study
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Background: Previously developed Intradialytic hypotension (IDH) prediction models used patient clinical variables with potential privacy protection issues. We developed an IDH prediction model using minimal variables, without the risk of privacy infringement.

Methods: Unidentifiable data from 63,640 hemodialysis sessions (26,746 of 79 patients for internal validation, 36,894 of 255 patients for external validation) from two Korean hospital hemodialysis databases were finally analyzed, using three IDH definitions: (1) systolic blood pressure (SBP) nadir <90 mmHg (Nadir90); (2) SBP decrease ≥20 mmHg from baseline (Fall20); and (3) SBP decrease ≥20 mmHg and/or mean arterial pressure decrease ≥10 mmHg (Fall20/MAP10). To predict the IDH events in the previous 40 minutes, segments for the previous 40 minutes from 10 minutes before each time point at which blood pressure was created. Areas under receiver operating characteristic (AUROC)s and precision-recall curves were used to compare machine learning and deep learning models by logistic regression, XGBoost, and convolutional neural networks.

Results: Among 344,714 segments, 9,154 (2.7%), 134,988 (39.2%), and 149,674 (43.4%) IDH events occurred according to three different IDH definitions (Nadir90, Fall20, and Fall20/MAP10, respectively). Compared with models including logistic regression, random forest, and XGBoost, the deep learning model achieved the best performance in predicting IDH (AUROC: Nadir90: 0.905; Fall20: 0.864; Fall20/MAP10: 0.863) only using measurements from hemodialysis machine during dialysis session.

Conclusions: The deep learning model performed well only when monitoring measurement of hemodialysis machine in predicting IDH without any personal information that could privacy infringement.

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Rescue Therapy for an Old Challenging Problem: Droxidopa in the Management of Intradialytic Hypotension
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Introduction: Intradialytic hypotension (IDH) is a common complication affecting 20-30% of hemodialysis patients, resulting in adverse outcomes. Here we describe the effect of droxidopa in our patient with resistant IDH.

Case Description: 72-year-old year old woman with past medical history of end stage kidney disease on HD since 2003, previous failed 2 kidney transplants, failed peritoneal dialysis, aortic and mitral valve replacement, atrial fibrillation on chronic anticoagulation. Her HD sessions were complicated by episodes of symptomatic hypotension for the last 1-2 years. Systolic blood pressure (SBP) ranging in between 60 - 70 mm Hg pre-dialysis. As a result, her HD sessions were cut short, and she was often symptomatic with altered mental status requiring multiple hospitalizations. Her symptoms during interdialytic period were fatigue and exhaustion despite pharmacological measures such as midodrine 15 mg TID and fludrocortisone 0.2 mg on HD. To counter this, her intradialytic temperature was adjusted (cool dialyze), ultrafiltration (UF) goal was limited (different UF profiles were attempted), counseling on interdialytic weight gain and dietary sodium, intake, blood flow and dialysate flow were reduced, dry weight was continuously reassessed, time on HD was increased. Despite above measures, she developed symptoms of volume overload as her HD sessions were continuously interrupted by IDH requiring multiple fluid boluses. Her cardiology and neurology evaluation were unremarkable. No evidence of adrenal insufficiency noted. Eventually she was prescribed droxidopa 100 mg and gradually escalated to 300 mg TID. Patient overall felt better (SBP improved to 110-120s mm Hg) and is currently tolerating UF removal without further interruptions in HD sessions and no further hospitalizations in the last 6 months.

Discussion: Management strategies for treatment and prevention of IDH is challenging. Droxidopa, a synthetic amino acid analogue metabolized to norepinephrine by dopa-decarboxylase increases blood pressure through peripheral arterial and venous vasconstriction. It is currently approved for neurogenic orthostatic hypotension. We propose that Droxidopa can be considered for off label use for symptomatic IDH after work up for other etiologies of hypotension is ruled out, potentially as a rescue therapy failing other pharmacological and conservative measures.

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Higher NT-ProBNP Levels and the Risk of Intradialytic Hypotension at Hemodialysis Initiation
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Background: Elevated N-terminal pro B-type natriuretic peptide (NT-proBNP) accompanies cardiac dysfunction and hypervolemia and is a potent predictor of adverse outcomes in patients initiating hemodialysis (HD). These patients often experience intradialytic hypotension (IDH), which partially reflect cardiac dysfunction, but the association of NT-proBNP with IDH is not clear.

Methods: We performed a post-hoc analysis of a double-blind, placebo-controlled, randomized trial that tested mannitol vs. placebo in 52 patients initiating HD (NCT01520207). Pre-HD NT-proBNP was measured in samples obtained prior to the 1st and 3rd sessions (n=87). Mixed-effects models (adjusting for randomized treatment, sex, Black race, age, diabetes, heart failure (HF), catheter use, pre-HD systolic blood pressure (SBP), pre-HD weight, ultrafiltration (UF) volume, sodium, bicarbonate, serum urea nitrogen, phosphate, albumin, and hemoglobin) were fit to examine the association of NT-proBNP with intradialytic SBP decline (pre-HD minus nadir SBP). Additionally, mixed-effects Poisson regressions were fit to determine the association with IDH (≥20 mmHg decline in SBP from pre-HD SBP).

Results: Mean age of patients was 55±6 years and 32% had baseline HF. The median pre-HD NT-proBNP across all sessions was 5498 [2011, 14790] pg/mL. A total of 26 sessions were complicated by IDH. In adjusted models, each unit higher log-NT-proBNP was associated with 5.8mmHg less decline in intra-dialytic SBP (95%CI -9.2 to -2.5, P=0.001). Higher pre-HD NT-proBNP was associated with a 54% lower risk of IDH per log unit NT-proBNP (IRR 0.46, 95%CI 0.23-0.92, P=0.03). There was no evidence for effect modification by randomized treatment (P-interaction=0.68).

Conclusions: In patients initiating HD, higher pre-HD NT-proBNP is associated with lower risk of intradialytic SBP and lower risk of developing IDH. Future studies should investigate if higher pre-HD NT-proBNP levels can help identify hypervolemic patients who may tolerate more aggressive UF.

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Baseline SBP characteristics according to tertiles of NT-proBNP

| Tertile | NT-proBNP (pg/mL) | Characteristic |
|--------|-------------------|----------------|
| Tertile 1 | (0, 38) | Median SBP 140 (IQR 130-150) |
| Tertile 2 | (38, 150) | Median SBP 122 (IQR 110-130) |
| Tertile 3 | (150, 10000) | Median SBP 105 (IQR 90-110) |

SA-PO370
Associations of Body Compositions, Intradialytic Hypotension, and Mortality in Hemodialysis Patients
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Background: Intradialytic hypotension (IDH) is a serious complication of hemodialysis. We studied the relationship among body composition, intradialytic hypotension, and mortality in dialysis patients.

Methods: Subjects were maintenance hemodialysis (HD) patients. The study timeline included the baseline (day 1) exposure assessment period (days 1–22), and outcome assessment period (day 23–3 years). IDH was defined as a nadir systolic blood pressure (SBP) <90 mmHg for at least two of 10 HD sessions during the exposure assessment period. Clinical data at baseline and post-dialysis body composition parameters using bioimpedance spectroscopy in days 1–22 were assessed. Patients were divided into IDH and non-IDH groups. Kaplan-Meier curves and Cox proportional hazard models were used to assess patient survival.

Results: Overall (n=306), age, dialysis duration, and diabetes (DM) prevalence were 63 ±16 years, 10±5.9 years, and 61.8±17.3%, respectively. The IDH group (n=108) showed significantly (P <0.05) lower serum albumin and intracellular water (ICW) (14.7±3.6 vs. 16.2±3.7 L) levels and lower lean tissue index (LTI) (11.7±2 vs. 12.3±2.6 kg/m²).

Key: TH - Thursday; FR - Friday; SA - Saturday; OR - Oral; PO - Poster; PUB - Publication Only
Underline represents presenting author.