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A Pragmatic In-Unit Protocol to Achieve Optimal Online Hemodiafiltration: A 2-Month Quality-Improvement Study

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Objectives : The CONVINCE trial highlighted the clinical importance of delivering high-dose online hemodiafiltration (HDF), reinforcing that achieving adequate convective dose is a key implementation gap in routine dialysis care. We evaluated whether a stepwise, dialysis-unit protocol could convert patients receiving suboptimal HDF to predefined optimal HDF targets.
Methods : Optimal HDF was defined as: (1) post-dilution HDF with convection volume >23 L/session or substitution volume >21 L/session, or (2) pre-dilution HDF with convection volume >46 L/session or substitution volume >44 L/session. Patients receiving suboptimal HDF underwent a 2-month protocol: (i) increase blood flow rate (BFR) to the maximally tolerable level (maximum 350 mL/min), (ii) escalate dialyzer pore characteristics with larger surface area when feasible, and (iii) weekly reassessment to confirm achievement of target convection volume.
Results : At baseline (N=106), 35 patients (33.0%) met criteria for optimal HDF; after 2 months (N=101), this increased to 50 (49.5%). Over the protocol period, key prescription parameters increased in both dilution modes. In pre-HDF, mean blood flow rate (BFR) increased from 261.9±23.4 to 285.0±30.6 mL/min and dialyzer surface area from 1.7±0.2 to 1.9±0.4 m²; in post-HDF, BFR increased from 275.7±29.2 to 306.3±40.5 mL/min and surface area from 2.0±0.2 to 2.2±0.3 m². Convection volume increased from 40.2±16.0 to 50.1±21.5 L/session in pre-HDF and from 21.3±4.6 to 31.4±14.6 L/session in post-HDF.
Conclusions : A simple, weekly monitored protocol emphasizing maximally tolerable BFR and dialyzer escalation increased achievement of optimal HDF targets within 2 months in real-world practice.

table 1.png

Table 1. HDF optimization protocol

Step	Intervention	Target/ Rule	Weekly assessment
0	Patient selection	Post-HDF: convection >23 L/session or substitution >21 L/session; Pre-HDF: convection >46 L/session or substitution >44 L/session	Baseline review; enroll eligible patients into protocol
1	Maximize blood flow rate	Titrate BFR to maximally tolerable level (+30ml/min/week, max 350 mL/min)	Record achieved BFR; if target* reached → maintain current settings, if target not reached → proceed to next step
2	Dialyzer escalation	Stepwise escalation of dialyzer surface area	Record dialyzer type and surface area (m²), if target* reached → maintain current settings
3	Re-classification	Assign Optimal vs Suboptimal HDF per prespecified criteria	Reclassify based on achieved volumes; Record limiting factors

*Optimal HDF was defined as meeting either the convection-volume or substitution-volume target per dilution mode: post-dilution HDF convection volume >23 L/session or substitution volume >21 L/session; pre-dilution HDF convection volume >46 L/session or substitution volume >44 L/session.

table 1.png

Table 2. Effect of the 2-month protocol on achieving optimal HDF and key prescription metrics

Variable	Baseline (N=106)		2-months (N=101)	
	Pre HDF (N=43)	Post HDF (N=63)	Pre HDF (N=12)	Post HDF (N=89)
Optimal HDF*, N(%)	12 (27.9%)	23 (36.5%)	6 (50.0%)	44 (49.4%)
Blood flow rate, mL/min	261.9 ± 23.4	275.7 ± 29.2	285.0 ± 30.6	306.3 ± 40.5
Dialyzer surface (m^2)	1.7 ± 0.2	2.0 ± 0.2	1.9 ± 0.4	2.2 ± 0.3
Substitution volume (L/session)	39.4 ± 16.6	19.0 ± 4.4	19.7 ± 5.9	29.0 ± 14.6
UF volume (L/session)	1.9 ± 1.0	2.3 ± 1.0	2.1 ± 0.9	2.4 ± 1.2
Convection volume (L/session)	40.2 ± 16.0	21.3 ± 4.6	21.8 ± 5.8	31.4 ± 14.6

*Optimal HDF was defined as meeting either the convection-volume or substitution-volume target per dilution mode: post-dilution HDF convection volume >23 L/session or substitution volume >21 L/session; pre-dilution HDF convection volume >46 L/session or substitution volume >44 L/session.