Hemocontrol

Management of Intradialytic Hypotension

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Dialysis Complications

- Cramps (31%)
- Vomiting (1%)
- Headache (18%)
- Hypotension (50%)

Nephrologische Praxen Rostock
1998-1999 Dialysis n=6,508

BP = CO X SVR
Potential Causes of Hypotension

- Intravascular volume depletion
- Lack of vasoconstriction
- Cardiac factors
Prevention of Hypotension

- No BP medication pre dialysis
- Profile ultrafiltration
- Profile sodium
- Evaluation of dry weight
- Isolated or sequential ultrafiltration
- Blood volume monitoring – critical value
- Volume expanders – albumin
Treatment of Hypotension

- Decrease the UF rate
- Decrease the total weight loss
- Extend the treatment
- Cooler dialysis
- Medication: Amatine
- Volume expanders: Albumin
Unconventional Options

- Daily dialysis
- *Physio Dialysis*: Hemocontrol
- Convective therapy: Hemofiltration
  Hemodiafiltration
Why *Physio* Biofeedback?

- Non invasive
- More physiological - Biofeedback
- No added cost
- Easy to use: intuitive
What Is Biofeedback?

Hemocontrol (Gambro)

Blood Volume

Controls UFR

Controls Sodium
What Is The Difference?

Technical Prescription
Dialysis prescription is determined and entered into the machine based on the patient’s previous dialysis treatment.

The UFR and CD are not profiled or profiled.

Profiles are limited by the time intervals

Clinical Prescription
Dialysis UF and CD is controlled every few minutes by the limits and targets programmed into the controller (Integra).

The limits and targets (UF, BV, CD, BV/TWL ratio) are calculated using the averages of 8 to 10 treatments.
The Open Loop Concept In HD

Open-Loop Block Diagram

This is similar to a pilot flying at night without radar assistance. Route, weather conditions?

The situation is exactly the same for dialysis patients. The nurses know the patients very well but some of the pt’s symptoms may force them to deviate from the prescribed prescription.

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The Biofeedback Concept

Closed-Loop Block Diagram

The PHYSIO biofeedback system now provides radar-like information. It will continuously inform the nurse about the pt’s current situation, compare it to the set target and, if necessary, adjust the parameters.

Clinical prescription

TWL
BV
Na

Controller

Dialysis Machine

Patient

Monitoring
Physiological controller for 3 different goals.
Goals of Hemocontrol™

- Blood volume ⇒ Blood pressure stability
- Total weight loss ⇒ Achievement of the target weight
- Dialysate conductivity ⇒ Prevention of a sodium overload
Ideal curve varies with TWL

Total weight loss
2 kg

Total weight loss
3 kg

Total weight loss
4 kg

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Patient Selection

- Hemodynamically unstable: hypotension or cardiac failure
- Over hydration
- Diabetic
- Frequent cramps
- Hypertension
Pre Assessment Monitoring

Monitor BV and TWL for 6 to 10 treatments and calculate the TWL/BV ratio

Assessment form
HC Parameters

• Targets: clinical prescription

• Tolerances

• Limits
1st Step: Targets

- *TWL (varies each treatment)
- Final CD
- Final BV: determined by pre-assessment period, where the mean ratio for BV/TWL is calculated.

When the *TWL is entered into the dialysis machine, the final BV is displayed.
2nd Step: Prescription Limits

Safety limits defined by the nurse

- Sodium **limits**: maximum and minimum based on the final CD
- Maximum UFR
3rd Step: Set Tolerances

- Total weight to be removed: +/- 300 gms
- BV: +/- 3%
- CD: +/- 3mS/cm
The blood volume decreases more sharply during the first hour with Hemocontrol than during standard haemodialysis. While the blood volume in the second half of the dialysis is relatively stable.
Standard HD

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Hemocontrol
Advantages

- Reduction of intradialytic morbid events
- Improved well being post dialysis
- Dialysis efficacy
- Dry weight adjustment
- Better control of hypertension
## Statistics

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How does HC affect you?

Education

- Theoretical background
- How to manage alarms
- Decrease in intradialytic complications
- Less need for nursing intervention
- Re-assessment of patient: q3month
How does HC affect the patient?

- Inform the patient
- Changes in dry weight
- Monitor their sense of well being
- Decrease in BP stabilizing meds
Hemocontrol

- Improves the well being of the patient
- Makes daily routine interesting
- Decrease in nursing interventions
- Free time for better care and communication with patient
## Assessment

<table>
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<tr>
<th>Dialysis Nr.</th>
<th>Date</th>
<th>BV at time of Symptoms/or final %</th>
<th>TWL</th>
<th>Ratio BV/TWL %/kg</th>
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**Average BV/TWL**

Multiply Value in Average BV/TWL by 0.8 (80%) and enter value

**Safety BV/TWL**

Multiply Value in Average BV/TWL by 0.8 (80%) and enter value

Add all values in columns & divide by the number of entries. Insert result below
Safety parameters: Limits

Max Initial WLR

TWL/Time

Min Initial WLR

Max DC

Min DC

WLR max. = average WLR x 1.8

Cond. max. = (Final Cond.) + 1.5 mS/cm
Cond. min. = (Final Cond.) – 0.5 mS/cm
Preset Machine Tolerances

- **Tolerance BV:** ± 3 %
- **Tolerance TWL:** ± 300 gr.
- **Tolerance Cond. (Na):** ± 0,3 mS/cm