Dialysis water quality

sampling and reporting

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Introduction

- Routine water sampling – QHFSS
- Changes to practice – missing sample
- Additional water sampling – in-centre
- Drawing samples
- Reporting results
- Monitoring and validating systems
- Chlorine dioxide dosing
- Terms and definitions
- International standards
Sampling

The frequency of sampling will depend on the configuration of the water treatment system.

*However, every haemodialysis facility should have written procedures defining what samples should be obtained, for what analysis, and at what frequency.*

The procedure should incorporate criteria for action, such as disinfection, cleaning, and equipment replacement.
Routine water sampling

- Feed water
- Post softener water
- Post carbon water
- Post R/O permeate
- Dialysis fluid
- Distribution loop permeate
Feed water

- Reticulated
- Non – reticulated
- DSWA — standard water analysis × 10 days
- DHMSA — heavy metals ✓ 5 days
- DWPEST — pesticides/organics ✓ 4 weeks
- THM — trihalomethanes ✓ 2 weeks
- WDIA — heterotrophic plate count ✓ 3 days (HPC)
Post softener water

- DCAMG — calcium & magnesium × 5 days
- WDIA — heterotrophic plate count ✓ 3 days

Post carbon water

- DCLNH — free chlorine / chloramines × 2 days
- THM — trihalomethanes ✓ 2 weeks
- WDIA — heterotrophic plate count ✓ 3 days
Post R/O permeate

- **DPRO** — anions/cations/pH/cond  ✗ 10 days
- **DROHM** — heavy metals  ✓ 5 days
- **ALROW** — aluminium  ✓ 5 days
- **DWPEST** — pesticides/organics  ✓ 4 weeks
- **WDIA** — HPC – pure grade  ✓ 3 days
- **WDIAHS** — HPC – ultra pure grade  ✓ 7 days
Distribution loop permeate

- **WDIA** — (HPC – pure grade) ✓ **3 days**
- **WDIAHS** — (HPC – ultra pure grade) ✓ **7 days**

Dialysis fluid

- **WDIA** — (HPC – pure grade) ✓ **3 days**
- **WDIAHS** — (HPC – ultra pure grade) ✓ **7 days**
Container and preservative change

- WDIA and WDIAHS

Sample container change from a 120mL bottle containing 15mg of sodium thiosulphate preservative.

To a 250mL bottle containing 25mg of sodium thiosulphate preservative.
The missing sample

- **HGFW & HGRO** — mercury analysis
  
  A 200mL dark glass with a preservation chemical of 2mL Nitric Acid 70% & 2mL Potassium Dichromate 50mg/mL

- **DHMSA** — heavy metals
  
  The mercury sample can now be collected in the DHMSA bottle as the additive preservation chemicals contain Nitric Acid (Conc) + HCl + AU 5mL
Additional sampling

- Endotoxin
- Free chlorine
- Combined chlorine
- Total chlorine
- Chloramine
- Hardness

Difference in the levels between FREE Cl₂ & TOTAL Cl₂ = Chloramine Level
Drawing samples

- Spray disinfection on sample port
- Flush sample port of residual spray
- Draw mid-stream sample to desired volume
- Recap and process paperwork
Reporting results

- Water samples are taken at monthly frequencies by dedicated staff.
- Ensuring they are collected, stored and transported as per guidelines.
- Samples sent to appropriate organisation for processing.
- Water results that do not meet guidelines are fed back immediately to medical director.
- Appropriate action to be taken with regards to re-testing and disinfection of equipment.
- Water results within range are fed back to the medical director of the renal service at monthly quality meetings.
Monitoring

The key to any monitoring program is the consistency and frequency of testing. In addition, the actual collection and periodic review of the data is critical. By carefully entering the data, problematic trends can be identified and corrective action can be taken.
Monitoring and validation

• R/O and distribution loop - TOTAL Cl$_2$ sampling prior to each patient shift – registered nurses.
• Pre-treatment monitoring of;
  1. HARDNESS – post softener
  2. FREE / COMBINED and TOTAL Cl$_2$ – post carbon beds
  3. Check UV is operating
• Post R/O
  4. TOTAL Cl$_2$ – post R/O and distribution loop
  5. HEAT DISINFECTION and record all alarm situations
Chlorine dioxide dosing

• Building # 2 – ClO₂
• 3 x feed water supplies
• Endoscopy – S/S loop
• Renal – mains supply
• Sampling DHMSA and WDIA – weekly
Terms and definitions

There was a copy of terms and definitions attached to the ‘Routine water sampling’.

The contents of the document was drawn from the ISO and AAMI Standards.

I recommend that one should become familiar to the change of terms as this workshop and associated documents reflect these standards.
International standards

- ISO 11663:2014 — Quality of dialysis fluid for haemodialysis
- ISO 13958:2014 — Concentrates for haemodialysis
- ISO 13959:2014 — Water for haemodialysis
- ISO 26722:2014 — Water treatment equipment for haemodialysis applications
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