

Learning from serious incidents related to dialysis



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Guidelines for identifying and investigating haemolysis associated with haemodialysis

Reports from renal units in recent months and recent guidance from the NPSA following a reported incident at one trust¹, indicate that haemolysis on haemodialysis has occurred as a result of more than one factor -

1. Due to chemical sterilisation of the water supply, either with hydrogen peroxide¹ or chloramine
2. Mechanical haemolysis from kinking of dialysis lines
3. Unknown cause(s), where so far no common factor has been determined

Haemolysis may present:

- Acutely on dialysis with abdominal pain (with or without clinical pancreatitis), hypertension or chest pain. Breathlessness and cyanosis, with reduced oxygen saturations, but with normal arterial blood gases, is due to methaemoglobinaemia. Two deaths reported recently occurred in patients with known cardiovascular disease.
- In a more chronic form with unexplained anaemia or hyperkalaemia.
- It is not known whether less severe cases might go unrecognised. Therefore any blood sample from a haemodialysis patient reported by the laboratory as being haemolysed should be considered not just as artifactual haemolysis from blood sampling, but that this could also reflect haemolysis associated with haemodialysis.

Clinical suspicion of haemolysis associated with haemodialysis, on the basis of any of the above presentations, should be investigated:

- Cardiovascular and respiratory assessment, including ECG, troponin, oxygen saturations and blood gases
- Discussion with haematology and clinical chemistry, with measurement of laboratory indicators of haemolysis and to exclude autoimmune haemolysis: Full blood count with examination of film for fragmented red cells, Reticulocyte count, Haptoglobins, Direct Antiglobulin Test (DAT), Urea and Electrolytes for potassium, Bilirubin and Liver Function Tests, LDH and Amylase.
- Radiological investigations for pancreatitis, if clinically indicated.
- Determination of whether there has been recent sterilisation of the water supply, by hospital or local water authority. The water supply should be tested for the presence of hydrogen peroxide or chloramine.
- Observation of dialysis lines in situ for any kinking, particularly of the line entering the dialyser or around the pumps. Lines from the affected patient should be stored for subsequent examination for any manufacturing defect causing narrowing of the lumen.
- In all cases, and particularly where there are no obvious precipitating factors, record the clinical circumstances of the presentation for comparison with other reported cases.

We would be grateful if renal units could continue to report any further episodes of haemolysis associated with haemodialysis as patient safety incidents to the NPSA and provide more detailed clinical information to the Renal Association for wider learning. The NPSA has also flagged with DH Estates the need for further work to safeguard water quality standards in relation to haemodialysis patients.

Please submit comments, solutions, and personal experience to:

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¹ National Patient Safety Agency NPSA/2008/RRR007. Risks to haemodialysis patients from water supply (hydrogen peroxide). September 2008