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Microbiological characterization of haemodialysis waters in a dialysis centre at Northern Portugal

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INTRODUCTION:

The main therapeutics for chronic renal failure are haemodialysis, peritoneal dialysis and renal transplantation, which seek to replace renal function (Coulliette & Arduino, 2013). The high-flux haemodialysis is a sequential process, constituted of water pre-treatment (Entry-EA, reverse osmosis-AROI, after osmosis 1-DROI, after osmosis and ring return -RAD), and water treatment in patient system (Damasiewicz, Polkinghorne, & Kerr, 2012). To ensure treatment effectiveness, it is necessary microbiological levels within acceptable limits, which depend on optimal operating conditions in central distribution of dialysis and water quality used for dialysate (Damasiewicz et al., 2012; Ministério da Saúde, 2001). This requires water microbiological and chemical parameters analysis and an effective monitoring to verify that it is suitable for high-flux hemodialysis (Damasiewicz et al., 2012; Ministério da Saúde, 2001).

OBJECTIVES:

Characterize the evolution and compliance of microbiological parameters in haemodialysis waters of a dialysis centre at Northern Portugal.

MATERIALS AND METHODS:

We realized a retrospective study of records on water analysis of haemodialysis centre, performed once per month between January and December, at points EA, AROI, DROI, DROII and RAD. Analytic parameters included: endotoxins, fungi, colony-forming unit (CFU) 22°C and 37°C.

RESULTS AND DISCUSSION:

All results are within acceptable limits for the practice of haemodialysis, with the exception of endotoxins values in July (0,036 EU / mL) corresponding to 0,48% of analyses performed on the RAD, points analysis of major importance. 54,167% of the results show higher concentrations in ARO I than EA. In DROII there is an increase of endotoxin in June. The points DROIII and RAD are the most important to assess water quality (dialysate formation), where water must comply with guidelines. Detected noncompliances indicate the need to take preventive measures such as replacing filters and cleaning the entire system. We found one RAD result above limit reference (0.036 EU/ml), yet borderline. The values of endotoxins in the following months were within limits but not near to zero, normalizing after 6 months. This indicates a need for disinfection and possibly changes membrane. We observed an increase in microbiological values from EA to AROI, this may be due to pre-treatment of water using chlorine which enables destruction of the bacteria and release of endotoxins.

CONCLUSION:

Results evidenced that there is a high effectiveness in the use of high-flux haemodialysis presenting as major contaminants of water at an early stage of water treatment CFU at 22°C and endotoxins.

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