

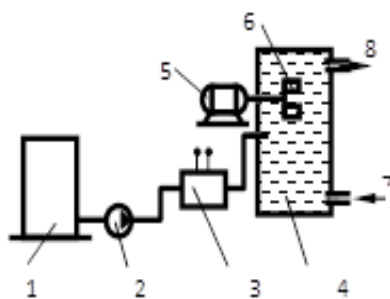
Safety aspects of the water treatment systems for medical utilization

A quality and safety strategy brings many benefits. It is needed to ensure that the right actions are taken for the circumstances and that these actions are continued and renewed over time. The basic problems needed to be clarified in case of the water treatment systems for medical utilization are: the parameters which assure the quality of the service, the risks which can appear for the patients and the minimization of these risks.

In the opinion of the author for a good management of safety it is necessary to identify and control the risks and the quality parameters of the service (the water treatment system in this case) in the same time. So to be able to answer to the problems specified in the introduction it is necessary to study the principles and the specificity of the water treatment systems for medical utilization. One of the most important water treatment systems is used in the dialysis process, since the dialysis machine use treated water to prepare the dialysate [2]. For this type of water treatment system the quality requirements are specified in the literature [2, 3].

To meet these quality requirements for the water in medical utilization it is necessary to realize specific water treatment system which structure is presented in Fig. 1. One of the most important safety aspects for water transport and treatment systems is the formation and presence of biofilm. Biofilm is formed when a surface has a growth on it of a community of active microorganisms. [2]

A prevention way against biofilm formation is the replacement of standard polyvinyl chloride distribution loop with materials such as chlorinated polyvinyl chloride, cross-linked polyethylene, teflon, stainless steel [3], and possible combined with preventive disinfection using ozone. The ozonisation of water can be realized by mixing the water with ozonized air in a preparation and mixing installation, as presented in Fig. 2.[2]



The ozone generator system has the following components: ozonation tank (4), air dryer (1), ozone generator (3), the mixing system (5, 6) and the access points to the inlet water (7) and ozonized water (8).

If the mixing system is placed in the top of the tank and has attached some brushing elements it may be also a preventive solution for biofilm formation.

Conclusions:

It is necessary to underline that the presence of biofilm cannot be efficiently determined by analyzing water samples since the biofilm is on the surface of the tanks or pipes. To detect the presence of biofilm it is necessary to realize a surface analysis with a cotton swab or test pieces in the system which are in the interior of the pipes or tanks and can be removed and sent to analysis. If we can detect biofilm in water samples by microbiological analysis that means that biofilm has already contaminated the water and the biological risk is high. So it is recommended to be proactive and prevent the formation of biofilm.

Selected publications on the topic:

1. Ianosi Endre: *Métrie et qualité en dialyse* (Metrology and quality in dialysis), Compiègne, France, Université de Technologie de Compiègne – 2001.

2. Ianosi Endre: *Principii de tratare a apei in procesul de dializa* (Water treatment principles in the dialysis proces), Ed. Politehnica Timisoara, 2007, ISBN 978-973-625-304-1.
3. Nicholas A. Hoenich, Robert Levin, Claudio Ronco: *Water for Haemodialysis and Related Therapies: Recent Standards and Emerging Issues*, 2010, Blood Purif 2010;29:81–85.