Corrosion of stainless steel dialysate line couplings

A male and female LV type dialysis line connector have showed signs of corrosion, with the following equipment:

Inspection showed localised corrosion and pitting in three areas.
1. At the contact point between hose and hose tail.
2. On the stainless surfaces where the static o-ring seals the body of the connector with the end connection.
3. On the stainless surfaces where the o-ring seals the female and male half of the coupling.
Internal bore, valve springs and valves showed no sign of corrosion.

Review of all the couplings in use showed corrosion present (though not as severe) in 50% - which had been fitted only 8 weeks previously.

It is concluded that the type of corrosion is possibly “Crevice Corrosion" which is a problem with stainless steel parts usually in applications where there is low PH such as salt water. Chlorides pit the passivated surface and in areas which are lacking in oxygen these fail to re-passivate causing corrosion to continue. This explains why the corrosion is only evident in areas where there is contact between the stainless steel and the tube or rubber seals as these are oxygen restricted areas.

The main potential implications of corrosion with these couplings are as follows -
- Dissolved metal fed directly to the patient as this is post R.O.
- Contamination of the precision ceramic-chambered concentrate feeding pumps causing to jam / fail.
- Air leakage causing various faults with machine e.g. several conductivity-related; failure to achieve degassing pressure; general failure to pass function-check processes

Other dialysis units in the UK we believe are using similar connectors on concentrates without problem therefore there maybe further factors such as the cleaning /disinfecting method which may also be affecting the results which would require further investigation.

Action:
The manufacturer has recommended that:
1. All stainless connectors in contact with the concentrated solution on the dialysis machines be removed until a satisfactory solution can be found.
2. Male connectors on the central supply panels should be checked to see if they also showing signs of corrosion.

Please submit comments, solutions, and personal experience to:

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