Enzymes plus detergent effective in cleaning hemodialysis machines

Total detachment and elimination of BIOFILMS from the inner surface of the tubing of hemodialysis machines is vital for patient safety. Current cleaning procedures use disinfectants. These agents destroy bacteria but dead cells remain, encouraging regrowth of biofilm, production of PYROGENS and development of infections. Now, researchers have developed and validated a new procedure called Pronetron® (Kazieltys Laboratoire, Lyon, France), which combines synergistic products for optimal efficacy.

Pronetron® involves the application of an alkaline detergent after each dialysis session to prevent adherence of most cells and, as a corrective measure every 3–6 months, sequential treatment with a multi-enzymatic mixture and stronger detergent solution to remove accumulated biofilm.

The procedure was tested in both an *in vitro* biofilm model and a working dialysis machine. In all studies, both the preventive and corrective regimens dramatically reduced biofilm coverage, culturable bacteria counts and endotoxin levels compared with untreated controls. The detergent/enzyme treatment even eradicated bacterial colonizations greater than 10^8 CFU/cm^2 that developed after use of contaminated dialysate. By contrast, conventional disinfectants—peroxyacetic acid and citric acid—left 50% biofilm coverage inside some tubing samples.

As Pronetron® leaves no viable cells attached to dialysis tubing, the development of bacterial resistance is unlikely. Other advantages are time-efficiency and lack of odor, plus a non-corrosive and minimally toxic profile.

Rachael Williams

Original article Marion K *et al.* (2005) A new procedure allowing the complete removal and prevention of hemodialysis biofilms. *Blood Purif* **23:** 339–348

Calcineurin-inhibitor-free maintenance immunosuppression

Calcineurin inhibitors (CNIs) such as ciclosporin and tacrolimus are nephrotoxic, and contribute to late dysfunction of renal grafts. New results from two randomized controlled trials, published in the *American Journal of Transplantation*, support a CNI-free maintenance immunosuppression regimen based on the less-toxic drug sirolimus.

In a study of 132 live-donor kidney transplant recipients randomized 1:1 to either sirolimus plus low-dose tacrolimus or sirolimus plus mycophenolate mofetil, Hamdy *et al.* found rates of patient and graft survival to be similar. There was a trend towards less-frequent acute rejection in the CNI-free group. Renal function—measured by serum creatinine and glomerular filtration rate (GFR)—was superior in the CNI-free group after 24 months of follow-up ($P = 0.017$ for serum creatinine and $P = 0.005$ for GFR). This finding was repeated in a trial by Watson and coworkers, in which patients with suboptimal graft function transplanted 6 months to 8 years earlier were randomized to either remain on a CNI-based protocol ($n = 19$) or switch to a sirolimus-based regimen ($n = 19$). At 3 and 12 months, the GFR of patients who had switched to sirolimus had improved, such that it significantly exceeded that of the control group ($P < 0.001$).

Despite reporting a relatively high incidence of adverse events in sirolimus-treated patients—including herpes zoster infection, proteinuria, hyperlipidemia, rashes and mouth ulcers—the authors of both studies contend that long-term follow up of CNI-free immunosuppression in kidney transplantation is warranted.

Rachael Williams

Original articles Hamdy AF *et al.* (2005) Comparison of sirolimus with low-dose tacrolimus versus sirolimus-based calcineurin inhibitor-free regimen in live donor renal transplantation. *Am J Transplant* **5:** 2531–2538
Watson CJE *et al.* (2005) A randomized controlled trial of late conversion from CNI-based to sirolimus-based immunosuppression following renal transplantation. *Am J Transplant* **5:** 2496–2503

GLOSSARY

BIOFILMS
Thin layers of microorganisms which naturally develop on inert surfaces

PYROGENS
Fever-producing substances or agents