

PART VI

WORKSHOP ON REUSE OF DIALYSERS AND BLOOD LINES

REUSE OF DIALYSERS AND BLOOD LINES

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The controversial subject of 'Reuse of Dialysers and Blood Lines' presented as a workshop at the Brussels Congress drew a capacity audience and was a forum for interesting presentations and lively discussion.

From its introduction by Shaldon in 1960, haemodialyser reuse has evolved from a primitive technique to newer and automated methods with ever-increasing provisions for quality control. Initially driven by economic considerations, haemodialyser reuse has stimulated clinical and industrial investigation. Observations of patient comfort with reused dialysers have prompted the development of membranes and methods of processing which allow therapy void of symptoms ascribed to first-use. Such progress has occurred even though the exact mechanism prompting such symptoms has yet to be elucidated.

Participants in the workshop included J M Vandembroucke (co-chairman), Universitaire Catholique Louvain, Brussels; R Ahmad, Sefton General Hospital, Liverpool; N Deane, Manhattan Kidney Center, New York; T H J Goodship, University of Newcastle upon Tyne; N Levin, Henry Ford Hospital and University of Michigan, Detroit; R Vanholder, University of Gent, and J P Wauters, Centre Hospitalier Universitaire Vaudois, Lausanne.

Goodship [1] reported the results of his questionnaire-based survey of United Kingdom dialyser reuse practices. Fifty-one of 61 centres surveyed responded. Of those, only 15 were currently reprocessing dialysers. Within two prior years 36 centres had discontinued reuse. Reasons stated were inconvenience, reduction in dialyser cost, and excess time. Ahmad [2] reported effective reuse of blood lines and heparin administration sets, primarily for economic reasons. He did mention that inconvenience rendered the approach less than attractive to some of his staff. Wauters [3] described expected improvement of biocompatibility as manifested by attenuation in drop of neutrophil count with reprocessed cuprophane membrane dialysers (Figure 1). There was no such improvement, however, with cellulose acetate or polysulfone after reprocessing (Figure 2).

Vanholder of Gent presented data collected over two years of automated

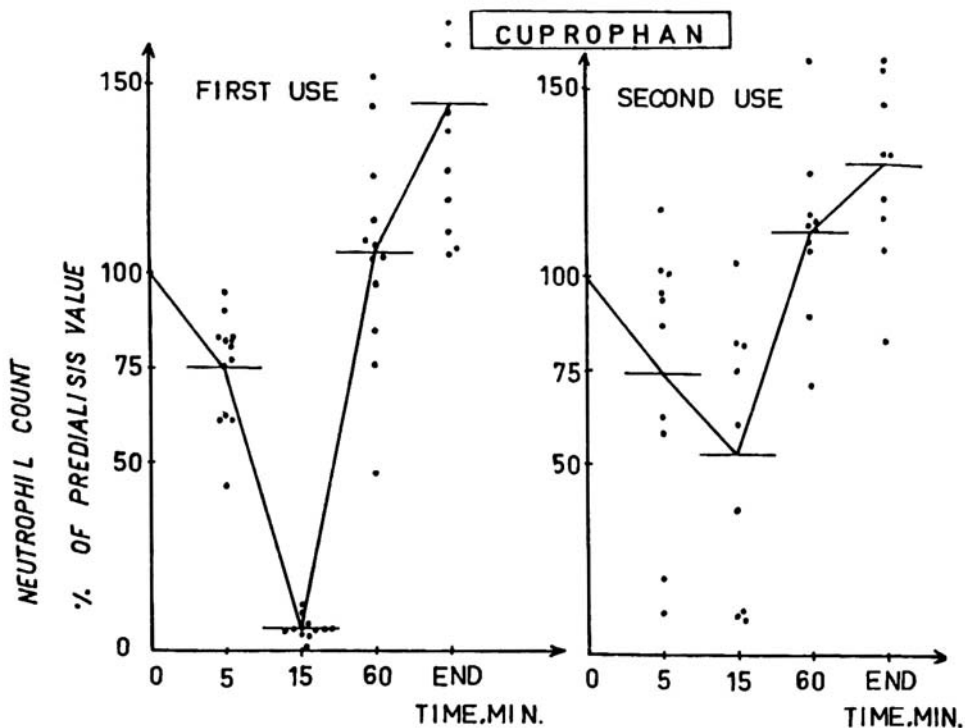


Figure 1

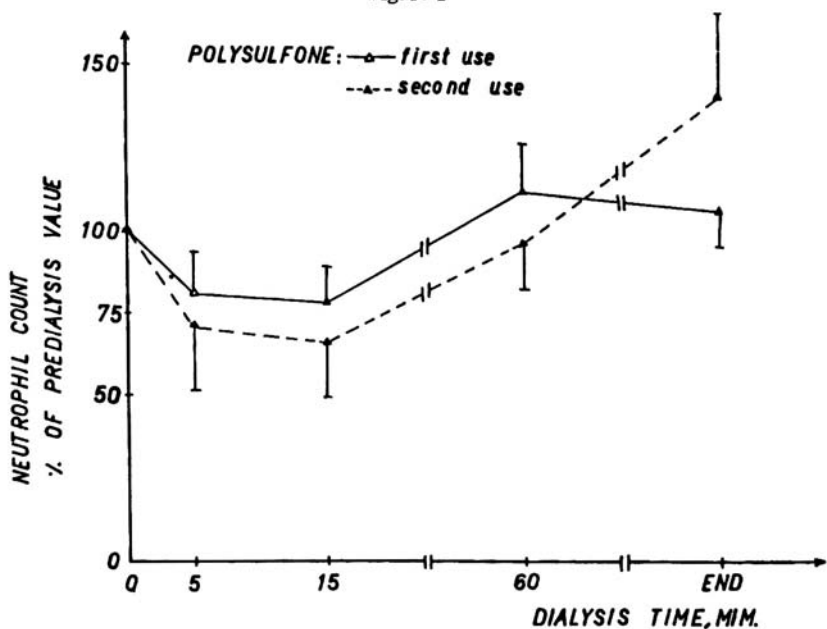


Figure 2

reuse of standard 1.8m² cuprophane and PAN capillary 1.0m² dialysers. His data demonstrated a decrease of 11 per cent in clearances after six uses with cuprophane dialysers whereas there was a 23 per cent decrease with PAN dialysers. He performed kinetic modelling of patients treated with reprocessed dialysers demonstrating adequacy of treatment. Attenuated leucopenia and less of a rise in complement activation were observed with the reprocessed dialysers. Preliminary results showed that the decrease in lung diffusion capacity seen in first use of cuprophane dialysers was lessened with reused dialysers.

Levin of Henry Ford Hospital, Detroit reported the results of a study in which the effects of manual and automated dialyser reprocessing were assessed by intradialytic symptoms, 15-minute WBC decreased, and complement activation increased. He compared manual reprocessing performed using water with reverse ultrafiltration and formaldehyde with automated reprocessing using bleach or peracetic acid. New dialysers and those unused but five times reprocessed with bleach produced significant leucopenia and complement activation, as did bleach reprocessed reused dialysers (Figures 3 and 4).

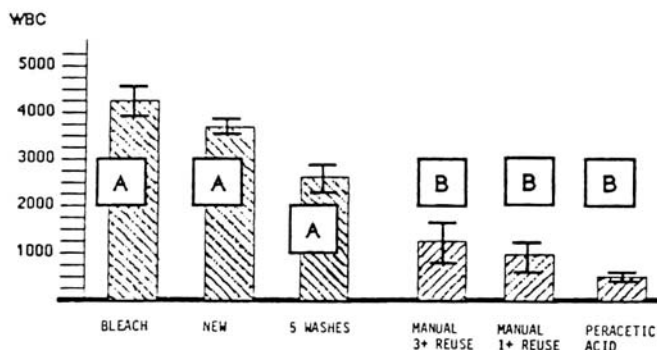


Figure 3. Dialyser reprocessing study. Fall in WBC by reuse group

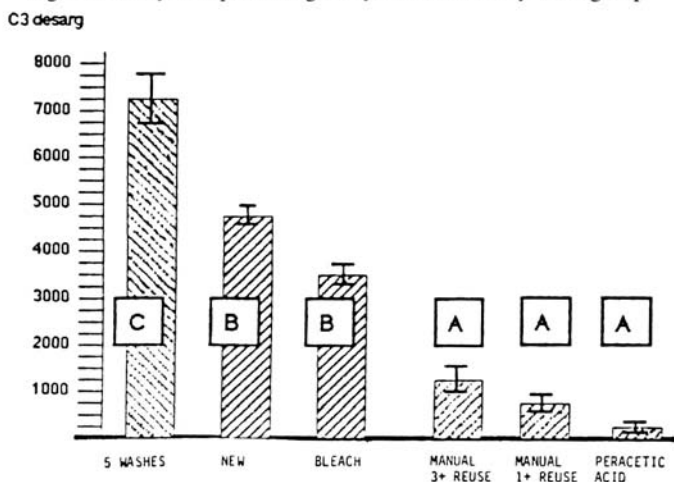


Figure 4. Dialyser reprocessing study. Complement activation by reuse group

Note that columns with the same letters in Figures 3 and 4 are statistically indistinguishable (Duncan's multi-range test). Dialysers reprocessed both manually and with peracetic acid showed significantly less effect on leucocytes and activation of complement, intradialytic symptoms, though less dramatic, showed the same trend with most symptoms seen with bleach and least with peracetic acid. Despite their effects on complement activation, bleach reprocessed dialysers were associated with fewer symptoms than new ones, the extent of these symptoms being indistinguishable from those for manually reprocessed dialysers which did not activate complement (Figure 5).

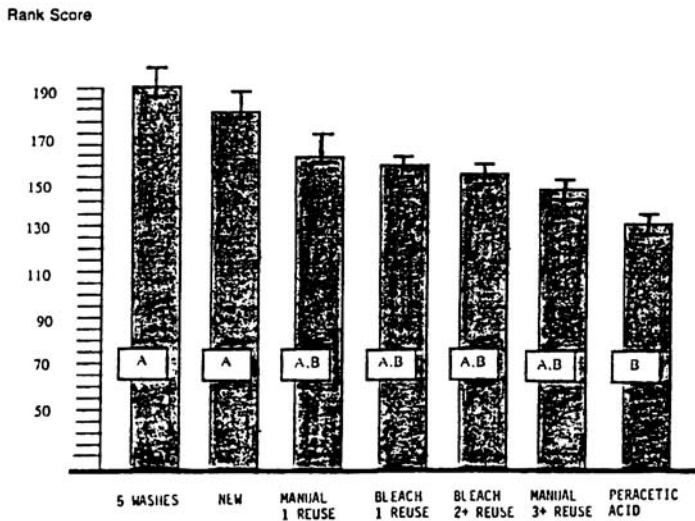


Figure 5. Dialyser reprocessing study. Sum of all ranked symptom scores

Deane, of the Manhattan Kidney Center, New York, principal investigator of a United States National Institutes of Health survey of dialyser reprocessing, stressed the ever-increasing acceptance of dialysis reprocessing in the United States. Currently over 60 per cent of United States patients are being treated with reprocessed haemodialysers. A committee of the American Association of Medical Instrumentation, made up of physicians, representatives from industry, and other interested parties, has formulated guidelines for dialyser reprocessing stressing quality control.

Deane's presentation prompted questions as to the ultimate reduction of dialyser price which would obviate the economic incentive for dialyser reprocessing. No specific figure was forthcoming from the participants. Discussion centred on the comment that the low price of dialysers in the United Kingdom probably was a major incentive for the reduction in dialyser reprocessing in that country, as reported by Goodship.

The workshop audience gave both supportive and opposing views of dialyser reprocessing. The potential hazards of dialyser disinfectants were addressed by the panellists. When properly performed, flushing of formaldehyde results

in minimal residual concentrations acceptable for safety under applicable United States guidelines, as reported by Gotch [1]. From the audience, Swenson of Stanford, Palo Alto reported preliminary results of an effective non-toxic sterilant for dialyser reprocessing.

Dialyser reprocessing prompted and nurtured for financial considerations led to an awareness of greater patient comfort with reprocessed artificial kidneys. This in turn propelled investigators to attempt to define blood membrane interaction and biocompatibility in extracorporeal treatment. Also, reuse has led to reduction in dialyser cost and improved membranes for haemodialysis. Its continued practice will depend upon inconvenience, cost of providing reprocessed dialysers, and improved quality standards. Whether such reprocessed filters become more costly or troublesome than new ones will determine the future of reuse dialysers and blood lines.

Reference

- 1 Gotch FA, Keen ML. *Trans ASAIO 1983; 29: 396*

Papers presented

- 1 Goodship THJ, Hoenich NA, Ward MK. *Dialyser reuse in the United Kingdom*
- 2 Ahmad R, Large B, Livesley P, Redman D, Goldsmith HJ. *The reuse of blood lines and heparin administration sets (BLHA) in regular dialysis treatment (RDT)*
- 3 Heierli C, Markert M, Wauters JP, Lambert PH. *Does dialyser reuse improve membrane biocompatibility?*

