

# Reuse of arterial and venous tubing as an expense control in hemodialysis

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The high cost of hemodialysis is a limiting factor for large scale home dialysis. While further research for a more effective and inexpensive dialyzer continues, efforts are being made to reduce the cost of present systems. Most cost reductions come from the conservation and reuse of disposable items. One such conserving procedure is that of reuse of commercial connecting tubing.

When patients are first admitted to our Home Dialysis Program, they are not immediately placed on the "Hy-C" kidney.<sup>1</sup> Instead, they are dialyzed using the commercial Travenol coils and connecting tubing. This is done primarily because incoming patients need, at the start, more frequent dialysis and because both patient and accompanying trainee lack the training necessary to operate and manufacture the necessary coils used with the Hy-C kidney.

After the initial week or two, the patients are then dialyzed on the Hy-C kidney. For the first three dialyses we make no effort to reclaim the tubing, and it is disposed as was the tubing when the commercial coils were used.

Discarding this tubing is warranted by two factors:

- (1) *Instruction on procedure to clean and prepare tubing would detract from the training in setting up and operating kidney.*
- (2) *Lines damaged due to constant perforation of syringes used in initial training period.*

Normally after the third dialysis on the Hy-C kidney, both patient and trainee are versed well enough in theory and function of hemodialysis that another important concept of home dialysis can be brought in view—that of expense control. From this time forward, materials conservation is constantly stressed. At this time, reuse of arterial and venous tubing is initiated.

During initial investigation period, various tests and cultures were taken with tests giving satisfactory results and all cultures being negative. In all uses, patients have responded favorably.

## Preservation

Upon termination of the dialysis the arterial tubing<sup>2</sup> is disconnected at the junction with the inlet tubing of coils. The venous<sup>3</sup> connections are disconnected at the outlet tubing of the coils and are connected to the four ends of the arterial tubing which attach to the coils (the arterial and venous lines are made up of Travenol and Cobe sets<sup>4</sup>).

The kidney tank is filled with cold water and the ends of the tubing which connect to the patient, as well as the inlet lead which is located on the pillow of the arterial line, are submerged in the tank.

The blood pump can be turned on at slow speed. If water is being drawn into tubing with no occlusion, the pump may be turned on at full speed. The remaining blood in the line is rapidly flushed from the line into the tank leaving only small amounts trapped in corners of the tubing. With a hemostat the remaining fibrin can be dislodged and flushed from the lines. The tank can then be drained and rinsed with cold water to remove all blood remaining in the tank. The tank is then filled with hot tap water with 300cc Sodium Hypochlorite (Clorox bleach) added as a sterilizing and denaturing agent.

The blood pump is again turned on at full speed and the solution recirculated through the lines into the tank. The tubing at this point becomes very flexible and any remaining fibrin can easily be dislodged. The hot Sodium Hypochlorite bath is allowed to circulate for ten minutes and then is drained. For the final rinse, the tank is again flushed with cold water and

filled with the same. The cold water is circulated through tubing to flush the line free of Sodium Hypochlorite solution.

In the Center the tubing is dried quickly by the aid of compressed air. Our home patients find using hair dryers very successful.

Visual inspection of the tubing should be made with special emphasis taken around all connections.

Cotton filled rubber protectors are placed over all openings leading into tubing that do not directly attach to coils. These protectors allow gas sterilizing agent to penetrate inner surfaces of tubing and also give tubing protection after sterilization until time of use.

Installing the coils to the tubing can now be made with no modifications. When coil to tubing assembly is complete, it is placed in plastic bags for gas sterilization.

Puncturing of the tubing during dialysis has been eliminated by the use of a 3-way valve<sup>5</sup> placed in the inlet lead of the pillow found on the arterial line. A syringe containing the necessary heparin for the duration of dialysis is in one inlet of the 3-way, while the remaining inlet is connected with the Sodium Chloride priming solution. Since the necessary heparinization has been established during the initial 3 weeks when efforts to reclaim tubing were not made, blood samples for clotting times have been eliminated.

## Summary

The reuse of the arterial and venous blood lines seems to be very successful. The patients are given eight sets of tubing to carry them through a 12 month period. By doing so, we have reduced the average cost of home dialysis by \$800.00 to \$1,000.00 per year.

1. C. S. Kwan-Gett, B. K. Kastagir, S. Jacobsen, D. Van Dura, R. Kirkham, & W. J. Kolff "Inexpensive Hypobaric Recirculating Artificial Kidney." *Trans. Am. Soc. Art. Int. Organs* Vol. XV, 1969
2. Travenol Inlet (arterial) set, roller pump type 5M0282
3. Travenol Outlet (venous) set, without filter 5M0283.
4. Cobe et C700 Cat No. 09-200
5. Tamak Three-Way Stopcock. Cat. No. 17108 K-75