

StreamLine™ Airless System Optimizes Dialysis Adequacy with Reduced Costs

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INTRODUCTION

Bloodlines are not generally thought of as performance devices capable of improving dialysis efficacy. We studied the StreamLine™ Airless System (SL) bloodlines (Medisystems, Seattle, WA) which are designed to have a lower internal volume, lower resistance to flow, and lower weight and therefore less medical waste generation (Chart 1). The LockSite™ needleless access ports in the SL also eliminate direct needle access into blood in the tubing set, improving staff safety. Because there is no venous air chamber and so no blood/air interface we hypothesized that less heparin would be needed with this new bloodline, and that clotting would be lower.

OBJECTIVE

To determine the clinical and economic benefits of the StreamLine Airless System Set in the outpatient hemodialysis setting.

METHODS

SL was compared to ReadySet® (RS) bloodlines in a cross-over study of 117 patients (56% male, mean weight 76.2 kg). Following optimization of blood flow (Qb) and pressures, data were collected with RS, and after again optimizing Qb, pressures, and heparin (Chart 2), data were collected on SL over a 6 week period. Machines, dialyzers, and needles were identical in both arms of study. Data collected included Qb, Ap, Vp, Kt/V, URR, total machine alarms, saline usage, acid/bicarb concentrate usage, potable and RO water usage, TP/syringe/needle usage, heparin usage, storage, waste removal, treatment time, and nursing hours. Staff and patient surveys were conducted.

RESULTS

Because of the improved Qb we were able to reduce dialysate flow rate (Qd) and/or dialysis time (Td) and still achieve the target Kt/V of ≥ 1.4 in 98.3% of patients with SL vs. 77.6% with RS. 10 of 18 patients with Td ≥ 4 hours were able to reduce their treatment times by 30 minutes (Chart 3).

Machine alarms requiring staff intervention were decreased dramatically with SL from 0.72 alarms per treatment to 0.34, with most of the difference in pressure alarms (Chart 4).

Heparin was reduced in 85% of patients, with an average reduction of 28.1% (p<0.0001), from 5,667 units/Tx to 4,076 units/treatment (Chart 2).

Staff was positive on SL performance, with most feeling that it performed better than traditional sets on pressures, alarms, rinseback, and clotting (Chart 5). In addition, patient surveys also recorded a higher percentage of patients feeling good post treatment (64% vs. 37%).

Costs per treatment reduced by \$3.00, mostly in labor and dialysate savings, but also from hazardous waste disposal, TP savings, and heparin savings (Chart 6). Staff overtime was reduced by 50%.

CONCLUSION

SL maintained or increased dialysis dose to patients at significantly lower cost vs. traditional bloodlines, with other benefits including reduced heparin usage and medical waste.

