Abstract

Objective(s): Immediate access arteriovenous grafts (IAAVGs), or early cannulation arteriovenous grafts, are more expensive than standard grafts (sAVGs) but can be used immediately after placement, reducing the need for a tunneled dialysis catheter (TDC). We hypothesized that a decrease in TDC-related complications would make IAAVGs a cost-effective alternative to sAVGs.

Methods: We constructed a Markov state transition model in which patients initially received either (1) an IAAVG or (2) a sAVG, and a TDC until graft usability; patients were followed through multiple subsequent access procedures for a 60-month time horizon. The model simulated mortality and typical graft- and TDC-related complications, with parameter estimates including probabilities, costs, and utilities derived from previous literature. A key parameter was median time to TDC removal after graft placement, which was studied under both real-world (7 days for IAAVG and 70 days for sAVG) and ideal conditions (no TDC placed with IAAVG and 1 month for sAVG). Costs were based on current Medicare reimbursement rates and reflect a payer perspective. Both microsimulation (10,000 trials) and probabilistic sensitivity analysis (10,000 samples) were performed. The willingness-to-pay threshold was set at $100,000 per quality-adjusted life-year (QALY).

Results: IAAVG placement is a dominant strategy, both under real-world ($1,201.16 less expensive and 0.03 QALYs more effective) and ideal conditions ($1,457.97 less expensive and 0.03 QALYs more effective). Under real-world parameters, the result was most sensitive to the time to TDC removal: IAAVGs are cost-effective if a TDC is maintained for ≥23 days after sAVG placement. The mean catheter time was lower with IAAVG (3.9 vs. 8.7 months, P < .0001), as was the mean number of access-related infections (0.55 vs. 0.74, P < .0001). Median survival in the model was 29 months. Overall mortality was similar between groups (76.3% vs. 76.7% at five years, P = .33), but access-related mortality trended toward improvement with IAAVG (6.1% vs. 6.8% at five years, P = .052).

Conclusions: IAAVGs come with added initial cost but are ultimately cost-saving and more effective due to a decreased number of catheter-days per patient and consequently a decreased number of access-related infections. This benefit in both cost and effectiveness is primarily driven by early dependence on a TDC and could be mitigated by significant improvements in TDC removal after AVG placement.