Cost-effectiveness analysis of hemodialysis and fomepizole vs. fomepizole alone in the treatment of toxic alcohol toxicity without acidosis

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Background:
Relevant concentrations of ethylene glycol (EG) and methanol can be managed with hemodialysis and/or enzymatic blockade in patients without acidosis or end-organ toxicity.

Research Question:
Does hemodialysis and fomepizole versus fomepizole alone provide a cost-effective strategy for the management of patients with EG and methanol intoxications who do not have acidosis?

Methods:
- Cost analysis study based on charges of 20 recent patients treated at a tertiary care hospital with fomepizole and/or hemodialysis.
- The cost of the room, hemodialysis, catheter, nephrology consult, and averaged.

Two different methods were used to calculate costs:
1. Time-based calculation:
   a. Hemodialysis time required to reach a concentration of 20 mg/dL was calculated based on validated equation of Hour = V(9/10) / Q (where V = Watson estimate of total body water (TBW) in liters, Q = 100 mg/dL, and A = initial alcohol concentration).
   b. When accounting for costs of significant acidosis, dialysis time was doubled for any initial methanol concentrations and for initial ethylene glycol concentrations 100 mg/dL, and greater.

2. Elimination-constant based calculation:
   a. A = initial alcohol concentration
   b. V = Watson estimate of total body water (TBW) in liters
   c. Where
   d. Using validated hemodialysis-time calculations based on a single health system, inability to account for the risk of hemodialysis or other hospital costs (e.g. psychiatric care).

References:
7. Burns AB, Bailie GR, Eisele G, McGoldrick D, Swift T, Rosano TG. Ethylene glycol treatment costs were lower for all initial methanol concentrations with dialysis compared to fomepizole. Figure 1: Methanol concentrations as a function of time and initial concentration.

Limitations:
Limitations of the study include cost calculations based on single health system, inability to account for the risk of hemodialysis or other hospital costs (e.g. psychiatric care).

Conclusions:
Using validated hemodialysis-time predictions, pharmacokinetic modeling, and real-world costs, hemodialysis was cost-effective for all initial methanol and ethylene glycol concentrations in patients without acidosis or end-organ toxicity.