Mini-Lecture 8

The Management of HD Catheter Dysfunction

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Hemodialysis (HD) is a life-saving and life-sustaining procedure. In 2006, approximately 330,000 individualsin the United States were receiving HD and according to the Forum of End Stage Renal Disease Networks, 21% of prevalent hemodialysis patients were dialyzing with a CVC for 90 days or longer. This is far greater than the National Kidney Foundation's Dialysis Outcome and Quality Initiative (NKF/DOQI) published recommendations of less than 10% CVC prevalence.

Central venous catheter (CVC) dysfunction has a variety of definitions reported in the literature ranging from decreased blood flow rates, frequent arterial and venous pressure alarms, poor conductance, and poor dialysis efficiency based on urea reduction ratio or Kt/V calculations. The NKF/DOQI published guidelines state that dysfunction is defined as failure to attain a sufficient extracorporeal blood flow of $\geq$300 mL/min with a prepump arterial pressuremore negative than −250 mmHg. There are many causes of catheter dysfunction including patient positioning, mechanical kinking, malpositioning of catheter tip out of the right atrium, leakage, drug precipitation, thrombus accumulation, and growth of a fibrin sheath. Furthermore, thrombosis and fibrin sheath both enhance central catheter-related bacteremia by providing an interface for adherence and colonization. These pathogens then produce the "biofilm" which is impenetrable to systemic antibiotics leading to another cause of catheter dysfunction, subsequent removal, and the attendant increase in morbidity and mortality

Good medical practices for optimizing the management of CVC can be summarized in the following ten commandments: (1) the indications of CVC use you will restrict; (2) the choice of the catheter type and site venous you will discuss; (3) an experienced operator you will choose; (4) validated protocols of use and maintenance of catheters you will respect; (5) caring and nursing staff of the dialysis unit you will train and control; (6) the patients you will educate; (7) monitoring and maintenance care of CVC you will apply; (8) the duration of CVC use you will restrict; (9) specific patient risk factors you will evaluate and correct, and (10) a continuous quality improvement care process for CVC you will establish and apply in your dialysis unit.