DIALYSIS

Central venous catheter locks: heparin versus citrate

Use of high-dose (46.7%) sodium citrate locks for central venous catheters (CVCs) being used for maintenance hemodialysis provides no advantage over 5% heparin locks in reducing infections or thrombotic complications, and might increase the risk of adverse events, according to results of a randomized controlled trial reported by Albert Power and colleagues in London, UK.

The use of CVCs for maintenance hemodialysis is complicated by high rates of infection and thrombotic dysfunction. Intraluminal heparin locks are commonly used to prevent thrombosis and maintain catheter patency, but other catheter lock solutions, including sodium citrate, have been studied. Although *in vitro* studies have shown sodium citrate to have an antibacterial effect—which is not seen with heparin—*in vivo* studies have shown conflicting results. Power and colleagues decided to compare the effect of high-dose sodium citrate catheter locks with heparin locks on the risk of catheter-related infection and thrombosis in a hemodialysis cohort dialyzing with the same type of CVC.

Their single-center, prospective study randomly assigned 232 patients who were on long-term hemodialysis using Tesio® (Medical Components, Harleysville, PA) single-lumen CVCs to 46.7% citrate ($n = 132$) or 5% heparin ($n = 100$) catheter locks for 6 months. Cumulative patient survival was 95% at 6 months in both groups. No differences in the rates of catheter-related bacteria or exit-site infections were found between the groups. The results suggested, however, that catheter thrombosis was more common in patients with citrate catheter locks than in those with heparin locks. CVC-related admission rates and new catheter insertion rates were similar between the groups, as were rates of blood transfusion and erythropoietin requirements. No major bleeding episodes were reported in either group. No patients with heparin locks withdrew from treatment as a result of adverse effects. Adverse effects were more common in individuals with citrate locks, however, and 20 of 132 of these patients (15%) withdrew from the study early because of adverse effects such as metallic taste and paresthesiae.

“We conclude that there is currently no convincing evidence to support the use of citrate catheter locks over 5% heparin as a strategy to reduce CVC-related bacteremia,” states Power. To explain their findings, the London-based group plan to look at the influence of catheter locking solution (46.7% citrate versus 5% heparin) on the formation of intraluminal bacterial biofilm. Power also feels that further large, randomized controlled trials are required, comparing different concentrations of citrate catheter lock solutions with 5% heparin locks.

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Original article Power, A. *et al.* Sodium citrate versus heparin catheter locks for cuffed central venous catheters: a single-center randomized controlled trial. *Am. J. Kidney Dis.* 53, 1034–1041 (2009).