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ORIGINAL ARTICLE

Safety and efficacy of taurolidine/urokinase versus taurolidine/heparin as a tunneled catheter lock solution in hemodialysis patients: a prospective, randomized, controlled study

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ABSTRACT

Background. Taurolidine citrate with heparin (Taurolock/Hep) is a promising central venous catheter lock solution. Despite its universal use among our hemodialysis patients, the prevalence of catheter malfunction was high. We aimed to compare Taurolock/Hep and taurolidine citrate with urokinase (Taurolock/U) as a catheter lock solution in order to identify whether either solution could reduce catheter-related dysfunction.

Methods. In this prospective, randomized, controlled trial, patients were randomized to receive either Taurolock/Hep or Taurolock/U and were followed for 6 months. Episodes of acute catheter thrombosis, requirement of recombinant tissue plasminogen activator (rt-PA) and incidence of catheter-related blood stream infection (CRBSI) were recorded, along with dialysis adequacy (Kt/V), blood flow rates (BFRs) and adverse events.

Results. There were 93 inclusions (85 patients) in the Taurolock/Hep group and 84 inclusions in the Taurolock/U group (79 patients). Three catheters were removed in the Taurolock/Hep group because of acute thrombosis, while no catheter was removed for the same reason in the Taurolock/U group. The total number of all-causes catheter exchange (acute thrombosis and CRBSI) was significantly lower in Taurolock/U group ($P = 0.028$). rt-PA was used significantly less often in the Taurolock/U group than in the Taurolock/Hep group ($P = 0.006$). Moreover, higher BFR and Kt/V were noted in the Taurolock/U group than in the Taurolock/Hep group, although the differences were not uniformly significant.

Conclusion. Taurolock/U is a safe and effective tunneled dialysis catheter lock solution, with a low rate of catheter exchange.

Keywords: catheter lock solution, catheter-related dysfunction, hemodialysis, taurolidine/heparin, taurolidine/urokinase

INTRODUCTION

The use of tunneled catheters in hemodialysis is one of the leading causes of morbidity and mortality among dialysis patients [1]. The drawbacks include recurrent thrombosis, which decreases the delivered dose of dialysis and increases the rate of catheter-related blood stream infection (CRBSI) [2]. Although The National Kidney Foundation Kidney Disease Outcome Quality Initiative (NKF KDOQI) guidelines [3] have recommended that not >10% of chronic kidney disease patients on dialysis should be maintained on catheters, the prevalence of tunneled catheters is still high in most countries, including the USA, where the prevalence is ~18–19% according to the United States Renal Data System 2010 annual report [4]. Among dialysis units in the state of Qatar, the prevalence of tunneled catheter use is high at ~27%, which can be attributed mainly to patient refusal for the creation of an arteriovenous fistula (AVF), as well as the high number of medically unfit patients [5]. Catheter malfunction due to thrombosis is considered as the most frequently encountered complication and is responsible for about two-thirds of all cases of catheter removal among tunneled catheter patients [6].

Studies have shown that recombinant tissue plasminogen activator (rt-PA) is an efficient treatment to restore the patency of the clotted catheter with a high safety margin [7], and this was further confirmed in a meta-analysis [8]. Recently, the incidences of malfunction and bacteremia were shown to be significantly lower with the use of rt-PA once weekly than with the use of heparin thrice weekly as a lock solution for central venous catheters [9]. However, the use of rt-PA will add a further burden on dialysis resources as rt-PA is both expensive and not commonly available in all dialysis units.

Taurolidine citrate in combination with heparin (Taurolock Hep500) is an emerging antimicrobial catheter lock solution

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