Date of preparation: July 2022

Central London Intestinal Failure Partnership

TAUROLIDINE SECONDARY PROPHYLAXIS FOR RECURRENT CRBSIs IN ADULT HPN PATIENTS

Authors: Members of the Intestinal Failure teams at University College London Hospitals NHS Foundation Trust, Guy's & St Thomas' NHS Foundation Trust, and Bart's Health NHS Trust

---

This document aims to provide guidelines for using taurolodine as secondary prophylaxis for recurrent CRBSI in adult HPN patients.

A. Background

1. Patients on home parenteral nutrition (HPN) and home intravenous fluids (IVF)/parenteral electrolytes require long-term central venous access. The overall prognosis for patients on parenteral support is excellent.

2. The commonest complication for patients on HPN/HIVF is catheter-related blood stream infection (CRBSI). CRBSI can result in septicaemia and be life threatening and necessitates hospital admission. Treatment includes the administration of antibiotics via the central venous catheter or catheter removal.

B. Current CRBSI treatment protocol

3. A first CRBSI in a dedicated Hickman or PICC catheter is treated according to our CRBSI protocol. CRBSI with Staphylococcus aureus, Candida, and Pseudomonas are virtually impossible to treat by the administration of intra-catheter antimicrobial treatment, and urgent removal and replacement of the central venous catheter is required.

4. CRBSI caused by other organisms are treated with 7-14 days of targeted antibiotics (according to sensitivities) and stopping the patient's intravenous nutrition during this period. This protocol enables successful catheter salvage in most CRBSI.

C. Secondary prophylaxis for recurrent CRBSI

5. A minority of HPN patients have recurrent CRBSI. Consider secondary prophylaxis with Taurolidine line locks for HPN patients who have ≥ 2 CRBSI in 12 months. Although NOT an antibiotic, Taurolidine has a broad-spectrum bactericidal activity, and prevents (or reduces) the adherence of bacterial cells to the epithelium by altering the bacterial cell wall structures and

by destroying the fimbriae and flagellae. Anti-adherence is achieved when either the bacterial or epithelial cell is exposed to taurolidine. Chemically derived from the aminosulphonic acid taurine, the drug is metabolized to water and carbon dioxide. Its bactericidal mechanism of action is attributed to reactive methylene iminium ions, the conversion to which occurs in an aqueous medium. Bacteria and fungi cell wall constituents are then methylolated and killing is achieved. Resistance for a vast array of microbes as well as superinfection with the use of taurolidine have never been reported.

6. Daily Taurolidine line locks (TauroLock™, Taurolin, TauroSept) in HPN patients with recurrent CRBSI significantly decrease CRBSI in this high risk group of HPN patients (Jurewitsch & Jeejeebhoy 2005, Taniguchi et al. 2008, Rafferty et al. 2010, Bisseling et al. 2010). They can be used with catheter-based vascular access devices. It is instilled into the device lumen(s) between treatments to make the internal flow passages resistant to clot formation and hostile to bacterial and fungal growth. The line lock solution must be withdrawn prior to initiating the next treatment.

D. Protocol

7. In view of the demonstrated benefit of Taurolidine in reducing infection rates in HPN patients who have frequent and recurrent CRBSI, we propose using Taurolidine in the following situations:

   a. HPN patients who have had ≥2 CRBSI over a 12 month period.

   b. HPN patients who have had ≥2 fungal CRBSI.

   c. Patients who have had one fungal CRBSI, on a background of bacterial CRBSI.

   d. Patients who have had one bacterial CRBSI that has been complicated by septic seeding resulting in endocarditis, lung abscesses, osteomyelitis or discitis.

   e. Patients who develop CRBSI and have problematic venous access.

8. The rationale for earlier introduction of Taurolidine is its efficacy in the prevention of recurrent infection. For patients with fungal infections, serious systemic complications (endocarditis, osteomyelitis or discitis) or problematic central venous access there is a clear need to prevent further infections.

9. Prior to starting Taurolidine, we will ensure that:

   a. There are no other focal points of infection responsible for the CRBI; and

   b. The patient's aseptic technique is reassessed and retraining considered as required; and

   c. The patient is not allergic to taurolidine or any of the other ingredients in the preparation

E. Prescribing Taurolidine

10. The hospital will prescribe Taurolidine on the home parenteral nutrition prescription. This will be signed by a doctor and a pharmacist. The medication will then be supplied to the patient by the homecare company directly to the patient at home.

F. Treatment Review

11. We will review the efficacy and side effects of this product in each patient at outpatient appointments (normally 3-4 monthly). We will also continue to audit the outcomes for these patients. For patients who have further CRBSI while on Taurolidine, consider the frequency of infections and the patient's quality of life when considering stopping treatment.

G. References

1. Barbaric, D., Curtin, J., Pearson, L., & Shaw, P. J. "Role of hydrochloric acid in the treatment of central venous catheter infections in children with cancer", Cancer. 2004; 101(8): 1866-1872.

2. De, S. L., Jenkner, A., Milano, G. M., Ilari, I., Fidani, P., Castellano, A., Gareri, R., & Donfrancesco, A. "Antibiotic lock with vancomycin and urokinase can successfully treat colonized central venous catheters in pediatric cancer patients", Pediatr.Infect.Dis.J. 2004; 23(10): 963-965.

3. Bisseling T.M., Willems M.C., Versleijen M.W., Hendriks J.C., Vissers R.K., Wanten G.J. "Taurolidine lock is highly effective in preventing catheter-related bloodstream infections in patients on home parenteral nutrition: a heparin-controlled prospective trial." Clin Nutr. 2010; 29(4): 464-8.

4. Jurewitsch, B. & Jeejeebhoy, K. N. 2005, "Taurolidine lock: the key to prevention of recurrent catheter-related bloodstream infections", Clin Nutr. 2005; 24(3): 462-465.

5. Rafferty G.P., Nightingale J., Small M., Eastwood J., UgarteCano C., Gabe S. The targeted use of Taurolock® to reduce central venous catheter sepsis in a home parenteral nutrition cohort Gut 2010; 59: A35.

6. Lloyd, D. A., Vega, R., Bassett, P., Forbes, A., & Gabe, S. M. "Survival and dependence on home parenteral nutrition: experience over a 25-year period in a UK referral centre", Aliment.Pharmacol.Ther. 2006; 24(8): 1231-1240.

7. Opilla, M. T., Kirby, D. F., & Edmond, M. B. "Use of ethanol lock therapy to reduce the incidence of catheter-related bloodstream infections in home parenteral nutrition patients", J.Parenter.Enteral Nutr. 2007; 31(4): 302-305.

8. Rackoff, W. R., Weiman, M., Jakobowski, D., Hirschl, R., Stallings, V., Bilodeau, J., Danz, P., Bell, L., & Lange, B. "A randomized, controlled trial of the efficacy of a heparin and

9. vancomycin solution in preventing central venous catheter infections in children", J.Pediatr.1995; 127(1): 147-151.

10. Sanders, J., Pithie, A., Ganly, P., Surgenor, L., Wilson, R., Merriman, E., Loudon, G., Judkins, R., & Chambers, S. "A prospective double-blind randomized trial comparing intraluminal ethanol with heparinized saline for the prevention of catheter-associated bloodstream infection in immunosuppressed haematology patients", J.Antimicrob.Chemother. 2008; 62(4): 809-815.

11. Schwartz, C., Henrickson, K. J., Roghmann, K., & Powell, K. "Prevention of bacteremia attributed to luminal colonization of tunneled central venous catheters with vancomycin-susceptible organisms", J.Clin Oncol. 1990; 8(9): 1591-1597.

12. Taniguchi, A., Eastwood, J., Davidson, A., Nightingale, J. M. D., & Gabe, S. M. Factors contributing to the successful treatment of catheter related bloodstream infection in home parenteral nutrition patients. Clinical Nutrition 3 (Suppl 1), 120-121. 2008a.

13. Taniguchi, A., Eastwood, J., Davidson, A., Nightingale, J. M. D., & Gabe, S. M. Taurolock™ is effective in preventing recurrent catheter related bloodstream infections in home parenteral nutrition patients. Clinical Nutrition 3 (Suppl 1), 118-119. 2008b.

14. Worthley, L. I. "Treatment of central venous silastic catheter infections using hydrochloric acid", Anaesth.Intensive Care. 1982; 10(4): 314-318.