Lisbeth Andersen and Berith Kummerfeldt for technical assistance.

Transparency declarations

None to declare.

References


Journal of Antimicrobial Chemotherapy
doi:10.1093/jac/dkm262
Advance Access publication 10 July 2007

Antibiotic-lock therapy and erythromycin for treatment of catheter-related Candida parapsilosis and Staphylococcus aureus infections

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Keywords: candidiasis, macrolides/azalides, catheter-related infections

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Sir,

Since antibiotic-lock therapy (ALT) was first proposed in 1988 as a solution to catheter-related biofilm infections, its value for treating catheter-related fungal infections has been disputed due to its relatively high failure rate. This report describes the use of ALT to treat catheter-related Candida parapsilosis candidaemia. Additionally, a catheter insertion site infection by Staphylococcus aureus was successfully treated with ALT by adding erythromycin after antistaphylococcal antibiotics had failed. Although in vitro studies have demonstrated that macrolides may be able to inhibit biofilms in catheter-related infections, this is the first proof of its use in a patient.

A 13-year-old female suffered short bowel syndrome after surgical treatment for Hirschsprung’s disease. After insertion of a Hickman catheter for home total parenteral nutrition, the patient suffered recurrent Hickman catheter infections with multiple pathogens. To control the infections, the Hickman catheter was replaced six times. No evidence of immunodeficiency was noted by immunological tests.

On 24 June 2006, the patient was hospitalized with fever. Due to her infection history, ampicillin/sulbactam, gentamicin and fluconazole were used empirically. Cultures of four blood specimens from the Hickman catheter on 25, 26, 27 and 30 June revealed growth of C. parapsilosis, indicating that systemic fluconazole could not eradicate the infection.

ALT was started on 1 July with 2.5 mg/mL amphotericin B in 5 mL of normal saline containing no heparin. The solution was retained for 24 h each day. Intravenous amphotericin B at a dose of 1 mg/kg/day was also given and total parenteral nutrition was infused through a peripheral venous line. Acute renal failure with a serum creatinine level of 2.5 mg/mL occurred on 7 July. Because systemic amphotericin B was the suspected cause of the renal dysfunction, the drug was replaced by intravenous fluconazole at a dose of 6 mg/kg/day. Culture for C. parapsilosis was negative throughout the 20 days of ALT. Fever and inflammatory changes at the catheter insertion site were noted 3 days after the completion of ALT. Blood drawn from the Hickman catheter and peripheral vein grew methicillin-susceptible S. aureus. Before the antibiotic susceptibility results were available, vancomycin was given at a dose of 28 mg/kg/day. Subsequent blood culture showed no growth of pathogen. However, the local lesion showed no improvement after 3 days. Antibiotic treatment was shifted to intravenous oxacillin and oral rifampicin, but no therapeutic effect was noted. After 5 days, 40 mg/kg/day of oral erythromycin was given. Surprisingly, local erythema and tenderness improved on the next day and local inflammatory changes completely subsided 2 days after adding erythromycin despite any drug susceptibility reference. Follow-up cultures 3 months later showed no growth of either S. aureus or C. parapsilosis.

In such a patient with repeated catheter reinsertions, any possible means of eradicating the pathogen and preserving the catheter should be considered. Although ALT is not a recognized option for treating catheter-related candidaemia in the 2001 Infectious Diseases Society of America (IDSA) guidelines for the management of catheter-related fungaemia, we chose to try ALT in this patient.

Previous reports have demonstrated that most failures to treat catheter-related infections are due to the biofilm formed by invading pathogens. As for the highly potentized pathogen in patients receiving parenteral nutrition and with a catheter device, C. parapsilosis exhibits significantly less biofilm growth than the more pathogenic Candida albicans. This may explain why C. parapsilosis catheter-related infection has been reported to be associated with a better prognosis.

Notably, ALT may be more successful for treating catheter-related fungaemia when duration of treatment is longer. Conversely, some failures have been observed in studies administering ALT over shorter periods. These experimental findings indicate that the total duration of treatment may be a key factor for successful ALT. In refractory cases such as
these, sufficient retention time and duration of treatment is necessary.

Macrolides are known to inhibit or destroy biofilm formation, including those formed by fungi or bacteria.2,5,7 Adding substances such as macrolides to pierce the biofilm has shown promise.2,7 The cure of the second episode of catheter insertion site infection by adding erythromycin suggests that adding macrolides may be helpful when combating refractory catheter-related infections. These experiences may shed light on the optimal management of such infections. However, further studies are needed to confirm these observations.

**Funding**

This study has received no financial support.

**Transparency declarations**

None to declare.

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