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Title **Accuracy of Bacterial DNA Testing for Central Venous Catheter-Associated Bloodstream Infection in Children With Cancer**

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Aim

To improve detection and treatment of central venous catheter (CVC)-associated bloodstream infection in children (aged 0-18 years) with cancer admitted with fever.

Conclusions and results

1) The bacterial DNA test detected two-thirds (95% confidence interval [CI] 44% to 83%) of children classified with probable CVC-associated infection – specificity was 88% (95% CI 84%-92%). Although high bacterial DNA concentrations were associated with subsequent CVC removal and long duration of intravenous (IV) antibiotic treatment, the test did not improve the prediction of these outcomes over and above clinical signs of CVC-associated infection combined with blood culture results. 2) High DNA load was predictive of CVC removal and IV treatment duration, before blood culture results became available at 48 hours after sampling. 3) Limited evidence shows that antibiotic lock treatment reduces the risk of recurrent CVC-associated infection or CVC removal (pooled relative risk 0.7, 95% CI 0.47-1.05), but prophylactic use of antimicrobial locks halved the risk of bloodstream infection (pooled incidence rate ratio 0.43, 95% CI 0.36-0.51). Contrary to this, the national survey of pediatric oncology centers found that locks are being used for treatment rather than prevention, and that problems related to the formulation of lock solutions currently impede a shift to their prophylactic use in children. 4) Most IV treatment days would be saved by early stopping of treatment in children at low risk of infection. Strong evidence supports the use of antimicrobial locks in preventing CVC-associated infection; few of these studies involved children with cancer. The analysis does not support routine bacterial DNA testing on admission to detect CVC-associated infection, but repeated testing (as a marker of microbial load) should be evaluated in high-risk groups. Further research should determine the effectiveness of antibiotic locks in treating CVC-associated infection.

Recommendations

See Executive Summary link www.hta.ac.uk/project/1449.asp.

Methods

The diagnostic accuracy study involved 8 pediatric oncology centers in the UK and was coordinated through the Children's Cancer and Leukemia Group (CCLG). Children aged 0 to 18 years with a CVC or implanted CVC port considered to be required for a minimum of 3 months were invited to participate in the study. Eligible patients were enrolled when they presented with a febrile episode if they had not received IV antibiotic therapy during the preceding 2 weeks. Samples were collected at the time of presentation to hospital with fever for routine blood cultures and for bacterial DNA testing. Clinical data were collected via standard questionnaires at the time of admission and at 4 weeks after presentation. Definitions of CVC-associated infection were agreed before the start of the study, and these allowed classification of fever episodes into probable, possible, unlikely, and unclassifiable groups. The results of the accuracy study have been published [Millar et al. Molecular diagnosis of vascular access device-associated infection in children being treated for cancer or leukemia. Clin Microbiol Infect 2008;14(3):213-220].

Further research/reviews required

For further details see Executive Summary link www.hta.ac.uk/project/1449.asp.

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