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HICKMAN-BROVIAC CATHETER-RELATED INFECTIONS IN CHILDREN WITH MALIGNANCY

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Purpose. Central venous access using Hickman-Broviac (H-B) catheters are widely used in children with malignancies or immunodeficient diseases. Advantages of these catheters are reduction of chemotherapy-induced dermatitis and improvement of the children’s quality of life avoiding recurrent venipuncture. However, uncuffed central venous catheters have been reported to be complicated with catheter-related infections (at least 3 per 1000 catheter-days). To prevent these infections, H-B catheters have an exit site on the skin surface, are anchored with subcutaneous Dacron felt cuff, and a subcutaneous tunnel entering the venous system. Moreover, the Guideline for Prevention of Intravascular Device-Related Infections was proposed by the Centers of Disease Control and Prevention (CDC). In the children whose catheters were inserted and cared these catheters according to this guideline, we analyzed incidence of catheter-related infections (CRI) during this period and discussed the etiology of bloodstream infections (BSI).

Methods. We inserted 162 H-B catheters in 145 children with malignancy or immunodeficiency between 1996 and 2001. All catheters were inserted through subclavian or external jugular vein by pediatric surgeons who wore masks, sterile gloves, and surgical gowns and cared by a special group of nurses. The sites were dressed with translucent sheets to be inspectable and reclained when these dressings were removed. Bloodstream infection was defined as isolation of the pathogen from blood at least once, while other catheter-related infections were defined as isolation of a pathogen with clinical local symptoms. In these children, we analyzed the incidence, risk factors, and pathogens of CRI, especially BSI.

Results. During the overall 43877 catheter-days, 35 catheter-related infections (0.80 per 1000 catheter-days) occurred, including 25 bloodstream infections (0.52 per 1000), 9 exit-site infections and one tunnel infection. In 17 of 25 episodes of bloodstream infections, antimicrobial treatment controlled the infections without catheter removal. No difference was found between the patients with and without CRI, among the age at insertion, the duration of indwelling catheter, the frequency of manipulation, the incidence of prior radiation therapy, leukopenia, or hypalbuminemia, except for mechanical complications of catheter. Gram-positive cocci including MRSA caused 8 of 10 exit and tunnel infections, while gram-negative organisms were isolated from 14 of 25 blood samples of the patients with BSI.

Conclusions. These results indicated that the incidence of CRI in H-B catheters were significantly low because Dacron cuff was effective to prevent BSI followed by exit site or tunnel infections. In the immunocompromised children with indwelling H-B catheters, the organisms of bloodstream infections may be sometimes translocated from other sites, especially gastrointestinal tracts, suggesting that bacterial translocation is one of the critical causes of BSI in the children with immunodeficiency.