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Economic Impact of Catheter-Related Bloodstream Infections

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Healthcare-associated infections affect approximately 7-10% of hospitalised patients (Haley et al. 1985). Particularly in the intensive care unit (ICU), patients are, due to their critical condition, more prone to develop such infections (Vandijck, 2006). Of these, catheter-related bloodstream infections (CR-BSIs) compse the third most frequently observed category (Vincent et al. 1995). Accordingly, the clinical and socio-economic impact (e.g. increased morbidity, mortality and costs) adversely affects patients and communities' well-being (Jarvis, 1996).

Salient literature investigating the specific aetiology and clinical outcome of ICU-acquired CR-BSIs is available. However, few studies attempted to estimate those infections' impact on the healthcare budget. When trying to determine CR-BSIs associated costs, a distinction has to be made between direct and indirect costs. The direct costs include longer hospitalisation, staff time, drug treatment and laboratory cultures. Indirect costs are represented by the patients' lost remuneration, loss of productivity on the labour market, relatives' time, and infirmity. For the United States alone, sepsis is accounting for 40% of total healthcare expenditures and costing up to $16.7 billion annually (Halpern et al. 2004). Out of this figure, CR-BSIs are estimated to be responsible for $957,680,000 (Cosgrove, 2006; O'Grady et al. 2002).

Recently, Warren et al (2006) performed a study concerning the effect of CR-BSIs in a cohort of ICU patients of a non-teaching hospital. In this population, no increased risk of death was demonstrated when the patients' course was complicated by a CR-BSI, but the attributable increase in total hospital cost was $11,971, and in ICU and hospital length of stay, it was 2.4 and 7.5 days, respectively. These results were further confirmed by others in teaching ICU settings. A study of our group, which took place between 1992 and 2002, showed an increased stay in the ICU and hospital of 8 and 12 days respectively, and increased total hospital costs of €13,585 (Blot et al. 2005). DiGiovini and colleagues evaluated the effect of primary CR-BSIs and also found a significant rise in costs and length of stay (Digiovine et al. 1999). Rello et al (2000) and Dimick et al (2001) reported similar findings. The study by Laupland et al (2006) supports these previous results, but also reported that ICU patients who develop a CR-BSI suffer excess morbidity and mortality.

In the updated recommendations regarding CR-BSI prevention, the Centers for Disease Control and Prevention (CDC) argue that teaching processmeasure controls and enforcing standards can have a remarkable impact on this preventable infection (O'Grady et al. 2002). The primary aim should be to increase ICU staff awareness, to reduce complexity, to avoid routinely and non-indicated use of intravascular catheters, and to empower all healthcare providers to enforce adherence to evidence-based infection control practices, as well as to ensure that patients receive the therapies they ought to (Berenholtz et al. 2004). However, to enhance the success of such an 'improvement model' and to increase the credibility and visibility of this initiative, it is of utmost importance to have full multidisciplinary commitment of managerial board, physicians, nurses and infectious diseases practitioners.

Three Latin American studies (Higuera et al. 2005; Lobo et al. 2005; Rosenthal et al. 2003) reported a drop of infection rates and substantial reduction of hospital stay after employing low-cost strategies in compliance with the CDC guidelines. In developed countries, these low-tech measures have also been shown successful in reducing total catheter days (Pronovost et al. 2006; Warren et al. 2004). In an extraordinary study by Berenholtz et al (2004), five interventions were implemented: educating the staff concerning standard prevention measures that should be taken into account when inserting or taking care of IV devices; assembling a protocol cart for the house staff; asking staff daily whether catheters could be removed; introduction of a checklist on adherence to evidence-based recommendations; and empowerment of nurses to stop any procedure when in violation with guidelines. CR-BSIs rates were significantly reduced and the authors estimated that in their ICU alone, additional costs of about $2,000,000 were prevented by applying these simple strategies. Other low-cost ways to educate in effective practices for the prevention of CR-BSIs include mandatory self-study modules, scheduled meetings, training sessions, information leaflets and posters directed to the ICU staff.

In critically ill patients, CR-BSIs are associated with a significant clinical and financial burden, emphasising the importance of prevention measures. With fewer novel antibiotics in the pipeline, continuous implementation of low-cost and easy to organise strategies, such as educational programmes, may contribute to decreasing CR-BSI rates and consequently to lowering healthcare expenditures.

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