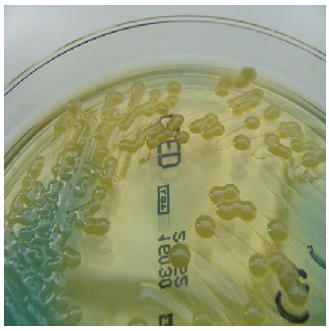
ICU
MANAGEMENT & PRACTICE

Cost of Nosocomial Infections in the ICU



Infections due to multidrug resistant gram negative bacilli (RGNB) in critically ill patients have been reported to be associated with increased morbidity and healthcare costs. A recent study conducted by researchers in Singapore has highlighted the heavy economic burden of RGNB infections to both the patient and hospital.

"Nosocomial acquired RGNB infections increase the total hospital costs in ICU patients. Urgent measures need to be taken to design cost-effective strategies to decrease the spread of these drug resistant infections," the researchers write in a report published in the journal *Antimicrobial Resistance and Infection Control*.

Previous studies, which documented costs of nosocomial RGNB infections, have generally considered site or organism specific RGNB infections and often included all hospitalised patients. Very little has been published addressing the costs of nosocomial RGNB infections in intensive care units (ICUs). The current study by Anupama Vasudevan et al. aimed to estimate the excess cost associated with nosocomial ICU acquired RGNB infection (any site) among critically ill patients.

Methodology

A nested case control study was done for patients at medical and surgical ICUs of a tertiary university hospital in Singapore (August 2007-December 2011) matched by propensity scores. The scores were calculated using the independent risk factors for nosocomial RGNB infection acquired in the ICU identified in the current study by a multivariable logistic regression analysis. Gender was also included in the final model for calculation of propensity scores.

Two groups of propensity-matched controls were selected for each case patient with nosocomial drug resistant gram negative infection: at-risk patients with no gram negative infection or colonisation (Control A) and patients with ICU-acquired susceptible gram negative infection (SGNB) (Control B). Balance checks were conducted between the propensity score matched cases and controls to ensure quality matching so as to decrease the bias.

The costs of the hospital stay, laboratory tests and antibiotics prescribed as well as length of stay were compared using the Wilcoxon matched-pairs signed rank test. Hospital stay from the date of admission to ICU was used in the analysis for those without infection. The authors also compared the length of hospital stay post infection for cases and Control B (SGNB infection).

Results and Discussion

A total of 2,949 patients were enrolled in the study. Excluding patients with a GNB isolate before or within 48 hours of admission to the ICU, any GNB colonisation in the ICU and those with SGNB isolates after discharge from the ICU and non-SIRS patients, a total of 1,539 patients were included in the analysis. Of these, 76 and 65 patients had ICU acquired RGNB and SGNB infection respectively.

The median (range) total hospital bill per day for patients with RGNB infection was 1.5 times higher than at-risk patients without GNB infection [Singapore dollars 2,637.8 (458.7-20,610.3) vs. 1,757.4 (179.9-6,107.4), p0.0001].

The same trend was observed when compared with SGNB infected patients. The median costs per day of antibiotics and laboratory investigations were also found to be significantly higher (nearly 3x higher) for patients with RGNB infection.

The length of stay post infection was not found to be different between those infected with RGNB and SGNB. This suggests that it is the costs of treatment rather than simply the prolonging of hospitalisation that increases the cost of antimicrobial resistance.

Overall, the propensity score matched cost analysis showed that nosocomial multiresistant infections add significantly to the already heavy financial burden of patients in the ICU and their providers in Asia as has been previously reported in Europe and North America.

Conclusions

The economic burden of RGNB infections to the patients and the hospital is considerable. Efforts need to be taken to prevent their occurrence by cost-effective infection control practices. With fewer antibiotics in the pipeline for drug resistant gram negative infections, controlling their incidence and spread becomes even more important.

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