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Antimicrobial Resistance in Indian ICUs

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Infections with resistant organisms have reached alarming proportions in Indian intensive care units (ICUs). Changes in the healthcare system are necessary to control the spread of antimicrobial resistance.

Introduction: The Problem

In order to fully understand the problem, it is essential for individual hospitals and intensive care units (ICUs) in India to track antimicrobial resistance patterns over time. Using overall hospital data orWestern literature to guide antimicrobial therapy in an Indian ICU may be inappropriate. To date, however, there are no systematic, nationwide data on the extent and magnitude of antimicrobial resistance in Indian ICUs. Nonetheless, there are reports of an alarming proportion of infections with resistant organisms in ICU patients. While susceptibility patterns may vary between regions and hospitals, all data indicate that Pseudomonas and extended spectrum beta-lactamase (ESBL)-producing enterobacteriaecae are the major resistant Gram-negative pathogens. In our ICU, in 2004-2005, Pseudomonas aeruginosa, Klebsiella pneumoniae and E. coli accounted for 25%, 14%and 14%of isolates, respectively.There was also a trend towards an increase in Acinetobacter compared to 2002-2003 (12% vs. 9%). Using ceftazidime resistance as the screening criterion, 65% of the Pseudomonas, 68% of E. Coli and 71% of Klebsiella may have been ESBL producers. Fifty percent of Gram-negative organisms were resistant to piperacillin-tazobactam. Methicillin-resistant Staphylococcus aureus (MRSA) constituted 62% of Gram-positive isolates, but only 8% of all isolates. Four isolates of vancomycin-resistant enterococci were seen for the first time in our ICU in 2005 (Myatra et al. 2006), and we have observed an increasing trend since.

A particularly worrying feature is the increasing evidence of carbapenem resistance. Studies from North India (Gupta et al. 2006) and South India (Gladstone et al. 2005) indicate carbapenem resistance ranging from 12% to 37%, with resistance of Pseudomonas to meropenem as high as 54%. In our ICU, 41% of Acinetobacter species and 56% of Pseudominas aeruginosa are resistant to meropenem, and 17% and 61%, respectively, to imipenem.

Contributing Factors

Antibiotic resistance in Indian ICUs results from an aggregate of factors in the community and healthcare system, as well as the practice patterns in individual hospitals and ICUs (see table 1; Sehgal 1999). One unique feature of the Indian healthcare system is that it is completely unregulated. Cheap generics of various classes of antibiotics, fixed combinations of cephalosporins and beta-lactamase inhibitors (cephoperazone-sulbactam, ceftriaxonewww. run by streamlining processes, ensuring reliable and predictable outcomes and adding value in the customer relationship. Waiting for the return on investment, however, requires patience and endurance.

Specific Requirements for the ICU

More than in other healthcare areas, people working in intensive care units (ICUs) are extremely skilled and experienced within their domain. Formalization of their expertise through process descriptions, SOPs or quality manuals helps to make this knowledge transparent,

understandable, re-usable and valuable for others (e.g. trainees, other specialties, patients and relatives).

A successful quality management system in the ICU has a bottom-up approach, as quality issues are often perceived where they first arise. Furthermore, process descriptions should use a breakdown structure to help chop complex problems into smaller chunks that can be dealt with one at a time and later be reassembled into the whole picture. This empowers ICU staff, which may be dedicated to contribute to a quality management system but would not otherwise know where to start or where to go within a complex system.

As ICU processes change rapidly in the face of advancements in science and changes in patient status, ICU process descriptions and SOPs have to be living documents. All pertinent quality documents should be kept in a content management system, which may, for example, be available on the intranet. Fast, central updates by the responsible party are critical to keep the quality management system timely and accurate.

Department heads over physicians, nurses and support staff have to establish a delicate system of shared leadership, encouraging employee feedback and participation. Action and responsibility toward quality improvements must be delegated to the people at the point of service. Inversely, clinical management must co-coordinate, monitor and integrate all initiatives within the quality management system.Without total managerial dedication and involvement, the whole quality management system is doomed to fail. But, with the proper support and systems in place, an ICU is an ideal place to live up all aspects of total quality management.

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