Antimicrobial resistance: Journey without end

The theme for the original articles in this issue is antimicrobial resistance. Scriver et al (pages 76-82) report an in vitro cross-Canada review of activity of selected antimicrobials against nosocomial Gram-negative rods, particularly organisms with inducible chromosomal beta-lactamase. Loo et al (pages 83-87) describe activity of selected antimicrobials against susceptible and initially penicillin-resistant Streptococcus pneumoniae isolated in Quebec. Burdge et al (pages 97-101), in Vancouver, describe eradication of pulmonary methicillin-resistant Staphylococcus aureus (MRSA) with clindamycin and rifampin in two cystic fibrosis patients.

Antimicrobial resistance is here – a current and future challenge for Canadian physicians and their patients. Some comfort is found in observing that the extent of resistance seems less than those reported from other countries. For instance, as Scriver et al demonstrate, Klebsiella pneumoniae plasmid-mediated beta-lactamase resistance is not yet a problem in Canada, and vancomycin-resistant enterococci are not yet established. The emergence of MRSA (1) and penicillin-resistant S pneumoniae (see Loo et al) as important clinical problems has been delayed relative to many other countries. Perhaps our widely scattered population impedes transmission, or our antimicrobial and infection control practices are of a calibre that limits acquisition and dissemination of resistant organisms. There is no reason for complacency; the only realistic future is one of escalating antimicrobial resistance.

How should we respond to reports of increasing antimicrobial resistance in Canada? Generally, a threefold front is suggested (2). First, new antimicrobials that circumvent current mechanisms of resistance may be developed. This, of course, is the history of anti-microbial introduction and resistance development of the past four decades. But in antimicrobial development, the distance between the antimicrobial being sought and the pursuing resistance is ever shortening. There may remain unexploited opportunities for antimicrobial development, but a sanguine expectation of scientific progress may be naive – the extraordinary adaptability of microorganisms is certainly cautionary.

The second approach is to ensure ‘optimal’ use of current antimicrobials. But can we agree on what is optimal antibiotic use? Is it using less of an antimicrobial, as suggested by the experience with vancomycin-resistant enterococcal outbreaks in the United States, or is it using more, as in ensuring full treatment of tuberculosis cases or eradication of MRSA carriage? In some settings, such as high intensity specialty care units in tertiary care hospitals (eg, burn or hematology/oncology units), even optimal antimicrobial use will be associated with emergence of antimicrobial resistance. In addition, available reports describing interventions to modify antimicrobial use are, short of restriction, a saga of failure. Some promising but preliminary initiatives, primarily at the family practice level, are exploring the facilitation of implementation of practice guidelines. These may provide some future models of practice intervention applicable to the difficult problem of achieving ‘appropriate’ antimicrobial use. There are, however, no immediately apparent short term solutions.

The third suggested approach for managing antimicrobial resistance is through strengthening infection control practices. This approach would be targeted to institutional settings, where the goal is to prevent the interpatient transmission of organisms among patients, which is facilitated in the institutional setting. Reports of control of nosocomial outbreaks of multiply resistant tuberculosis and vancomycin-resistant enterococci are convincing evidence that appropriate, intensive, infection control practices are effective in preventing transmission of resistant organisms. These success stories, however, emerge from crisis situations. The dual challenges of resource limitation and of managing human behaviour are substantial impediments, in the noncrisis situation, to the effectiveness of infection control measures in managing endemic antimicrobial resistance.

This is not, however, a time for pessimism. We must get past number counting and handwringing to action and commitment. It is time for a dispassionate, realistic appraisal of the problem, and acknowledgement that we are embarking on hostilities that will shadow the remainder of our professional careers. The measurement of the impact of resistance, in particular, is critical to the development of strategies for management of antimicrobial resistance. How much is it an in vitro phenomenon? What are the clinical morbidity, mortality and cost to our society of antimicrobial resistance? This information is essential to allow us to prioritize competing issues, to measure the impact of interventions, and to understand the trade-offs in clinical management and professional independence necessary in managing this problem of antimicrobial resistance. Our immediate and long term goal is to maintain the...
substantial benefits that effective antimicrobial therapy has provided to our population over the past four decades.

REFERENCES


LE Nicolle MD FRCP C
Health Sciences Centre
Winnipeg, Manitoba