Antibiotic resistance is increasing and beginning to affect the outcome of empirical antimicrobial therapy of urinary tract infections. Associated resistance, i.e. the fact that a bacterium resistant to one antibiotic is often much more likely to be resistant to other antibiotics, drastically decreases our chances of getting a second empirical attempt right. To increase the use of narrow-spectrum antibiotics, which are considered to be less selective for resistance, we need to develop new strategies from the laboratory to support our clinical colleagues. We suggest that ‘pre-emptive culturing’ of urine (i.e. a culture obtained before empirical treatment is instituted) will prevent clinicians from making a second improper empirical choice or having to resort to expensive broad-spectrum antimicrobials, which may drive resistance further. This strategy will be especially important in settings with high levels of resistance.

Keywords: antibiotic resistance, associated resistance, future strategies

Antibiotic resistance is increasing and beginning to affect the outcome of empirical antimicrobial therapy of urinary tract infections (UTIs). The importance of ‘getting it right’ in antibiotic treatment has been emphasized in several articles, although increasing resistance of important pathogens, here exemplified by *Escherichia coli*, has made this a true challenge in an increasing number of countries. Treatment failure because of antibiotic resistance inside and outside hospitals results in increasing mortality, morbidity and economic costs. The use of broad-spectrum antibiotics not only promotes antibiotic resistance but also contributes to increasing problems with antibiotic-associated infections, such as those caused by *Clostridium difficile*. These developments have encouraged many countries to develop strategies to increase the use of narrow-spectrum antibiotics as a first-line empirical treatment.

The diagnostic challenges in the ‘post broad-spectrum antibiotic era’ were recently highlighted by Gopal Rao and Patel in their discussion on narrow-spectrum treatment of UTIs in the elderly. Baglioni also highlighted important aspects of the high frequency of asymptomatic bacteriuria in this patient group, complicating UTI diagnostics even more. The problem of associated resistance, meaning that irrespective of species, isolates resistant to one drug have an increased likelihood of being resistant to other drugs, is often overlooked in discussions on treating patients with UTI. Associated resistance does not affect the primary empirical choice of treatment but dramatically reduces the chance of getting the second attempt of empirical therapy right.

The advantage and increasing importance of culturing prior to instituting primary empirical therapy (‘pre-emptive culturing’) in order to safeguard correct therapy if the first choice failed is exemplified by the fact that in an area with resistance rates in *E. coli* of 20% to trimethoprim and 10% to fluoroquinolones (representing low figures for many parts of the world today), the risk of failure due to resistance following empirical trimethoprim therapy is 10% (conservatively estimated since some UTI will clear without treatment). Because of associated resistance, the ciprofloxacin resistance in trimethoprim-resistant *E. coli* is not the expected 10% but 25%–40%, depending on the reporting country. Thus, the chance of succeeding with a second empirical choice is markedly reduced.

Without another strategy, we will either subject these patients to a risky second attempt, choose a ‘safe’ broad-spectrum antibiotic or decide to culture the urine at this stage and delay appropriate therapy for several more days. ‘Pre-emptive culturing’ will allow us to choose a more precise and ecologically sound alternative.

Empirical first-line treatment of uncomplicated UTI should preferably be with an antibiotic to which resistance is low and
which has a low capacity for co-selection of resistance and a low impact on the normal intestinal flora. Short courses (≤ 5 days) of nitrofurantoin, pivmecillinam and fosfomycin meet these criteria in most European countries. However, as one or several of these are not available in all countries, we propose that a culture should be performed prior to instituting empirical therapy. It will not affect the first choice of antibiotic, but will provide a solid basis for a non-empirical choice if therapy fails due to resistance. In addition, this approach will improve the basis for empirical therapy.

We work in a country where resistance is still lower than in most places in the world, and report modest, increasing levels of resistance in *E. coli*. Like many other places in the world, we are seeing an increasing number of multiresistant, extended-spectrum β-lactamase (ESBL)-producing *E. coli*, especially in the elderly with UTI. We are now introducing the concept of ‘pre-emptive culturing’ in elderly patients in nursing homes in our area. However, one has to address a few initial questions with this concept—is it cost-effective in this setting and are there logistic problems related to laboratory capacity or sample transportation to solve? To address some of these problems, it can be introduced for a certain patient population, age group or in a limited area.

The major shortcoming of clinical microbiology in an era of increasing antimicrobial resistance is the fact that culturing is time-consuming and susceptibility testing adds to that. Nonetheless, we believe that ‘pre-emptive culturing’ is one way of ‘staying ahead’.

**Transparency declarations**

None to declare.

**References**