ation by small numbers of bacteria, and also the need for antibiotic treatment and the difficulty of imposing nursing measures in such units. This approach may only delay the dissemination of resistant bacteria, but we feel justified in our attempts to avoid the wide local dispersal that we have experienced previously. Amikacin has remained for us, in the last two years, an almost unused, reserve antibiotic.

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Single dose treatment of acute urinary infections in women

The useful life of antibiotics could be prolonged by recognizing and selecting agents and regimens which are least likely to promote resistance. There is also a need to ensure that appropriate therapy is employed for the presenting illness. Acute urinary tract infections (UTIs) provide a striking example of how few basic questions on diagnosis, dose, duration of treatment, and resistance have been answered since the introduction of antibiotics.

Every time a patient is treated, antibiotics also act on commensals in the bowel and other sites, to select resistant organisms and promote R-factor transfer (Anderson, Gillespie & Richmond, 1973; Lacey, 1975). Since a significant proportion of UTIs in females are recurrent, these resistant organisms may compromise future antimicrobial therapy. However, antibiotics differ considerably in their propensity to select resistant organisms. To date, conventional doses of agents such as co-trimoxazole (Naft, 1971), and nitrofurantoin (Winberg et al., 1973; Stamey, Condy & Mihara, 1977) have had relatively little effect on the faecal flora in contrast to ampicillin (Anderson, Gillespie & Richmond, 1973; Johnsson, 1973; Anderson et al., 1976, 1979), amoxycillin (Anderson et al., 1979), sulphonamides (Winberg et al., 1973) or tetracycline (Johnsson, 1973). Antibiotics may even differ within a single class, e.g. a 5-day course of ampicillin selected multi-resistant *Enterobacteriaceae* still detectable after 6 weeks, whereas a comparable pivmecillinam regimen did not select resistant organisms (Anderson et al., 1976). Excessive concentration on 'ecologically safe' antibiotics would likely increase resistance to these agents and nullify their present advantages. There are indications that this may already be happening with co-trimoxazole (Towner et al., 1979).

An alternative, and better, approach to resistance problems is to use a minimum effective dose and duration of treatment. Single dose, and short course treatments, for acute UTI offer potential advantages in acceptability, patient compliance, selection of resistant organisms and cost. A 3-day course of amoxyccillin has been shown to be as effective as a 10-day regimen (Charlton et al., 1976). Single dose treatment of acute UTI has given acceptable results (>75% 'cure') with streptomycin plus sulfametopyrazine (Williams & Smith, 1970), sulphormethoxine (Grunberg & Brumfitt, 1967), sulfafurazole (Kallenius & Winberg, 1979), nitrofurantoin (Bailey, 1970), kanamycin (Ronald, Boutros & Mourtada, 1978), co-trimoxazole (Bailey
and amoxycillin (Bailey & Abbott, 1977; Fang et al., 1978; Anderson et al., 1979). Unacceptable results have been obtained with streptomycin, sulfamethopyrazine or sulfadoxine alone (Williams & Smith, 1970) and cephaloridine (Brumfitt, Faiers & Franklin, 1970). Patient populations, and criteria for diagnosis and success differed in these various studies, which did not employ untreated controls. Comparison of the relative merits of successful agents is not therefore possible. There are indications that single doses of sulfafurazole (Kallenius & Winberg, 1979) or amoxycillin (Anderson et al., 1979) may be less likely to select resistance in the commensal flora than conventional treatment—a matter of crucial importance which deserves further study.

Symptoms of UTI may be due to a variety of syndromes with different aetiology, infection site and prognosis. Significant bacteriuria is only found in about 50% of patients with symptoms. There is a strong probability that genuine pathogens fail to grow under conditions currently employed in clinical laboratories (Thomsen, 1978; Maskell, Pead & Allen, 1979). Effective laboratory diagnosis is an obvious prerequisite to treatment and will also avoid unnecessary antibiotics for viral and non-infective causes of symptoms.

The greatest challenge at present is to identify patients likely to respond to short course or single dose therapy. For kanamycin at least, failure of single dose therapy may identify women with upper tract infections requiring investigation and/or intensive treatment. Successful single dose treatment with amoxycillin was at first thought to correlate with the absence of antibody coated bacteria from the urine, and in turn with lower tract infections (Fang et al., 1978). This test, which is not anyway feasible in general practice, may sometimes give false positive or negative results, but is probably the best currently available for adults (Fang et al., 1979). Other tests (Fang et al., 1979; Schardijn et al., 1979) are either unreliable or impracticable for the majority of patients. Since symptoms are not a good guide to infection site (Fairley et al., 1971), simple clinical indications for amoxycillin, and presumably other antibiotics have not been established. In an Australian survey the upper tract was involved in about one-half of women with acute significant infections (Fairley et al., 1971). Single dose treatments would have limited application if this observation applies to other populations. For the moment, women who fail single dose therapy with any agent probably deserve close scrutiny.

Even though up to 59% of consultations in general practice are for symptoms suggesting urinary tract infection (Asscher, 1977), diagnosis, localization, and treatment is less than satisfactory. There has been little success in relating single dose treatment to clinical history, symptoms, and patient population. There have been few attempts to relate therapeutic regimen to the development of antibiotic resistant organisms. Solutions to these problems would benefit individual women, as well as the community, and prolong the effectiveness of antibiotics.

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