An observational study of empirical antibiotics for adult women with uncomplicated UTI in general practice

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Objectives: Women presenting in primary care with symptoms suggestive of uncomplicated urinary tract infection (UTI) are commonly managed without urine culture. We therefore do not know how successful general practitioners (GPs) are at targeting antibiotic treatment to women who would have had a microbiologically confirmed UTI, or at avoiding antibiotics in those who would have had a negative culture, had all patients with a suspected UTI been sampled. We therefore explored the association between antibiotic prescribing and urine culture results when culture was performed in all symptomatic patients.

Methods: GPs in nine general practices in South Wales were asked to submit urine specimens from all women consulting with clinically suspected, uncomplicated UTI. Patients were followed up 2 weeks later by questionnaire.

Results and conclusions: One hundred and thirteen adult women with a median age of 54 years were included and 61% received empirical antibiotics. There was very low agreement between the decision to prescribe empirically and subsequent culture result (Kappa = 0.04), with 60% of those prescribed empirical antibiotics subsequently found to have a negative culture, and 25% of those found to have a positive culture not prescribed empirical antibiotics. Current strategies to target empirical antibiotic prescribing in clinically suspected, uncomplicated UTI require review.

Keywords: urinary tract infections, cystitis, urine culture, empirical antibiotics

Introduction

Clinically suspected, uncomplicated urinary tract infections (UTIs) in adult women are common in general practice, yet the most appropriate strategy for diagnosis and management is not clear.1 Urinary culture is currently considered the gold standard for diagnosing a UTI. Studies have explored the performance of dipsticks, microscopy and symptom scores in predicting culture results.2–4 A recent meta-analysis found a large variation in the diagnostic accuracy of dipsticks, further illustrated by two subsequent studies in primary care.5,6 Several clinical scoring systems have been proposed. However, clinical scores, even when enhanced with results of dipstick tests, have poor predictive value.5–8 General practitioners (GPs) employ a range of strategies to aid diagnosis and management of suspected UTI.5 Currently, urine samples are not routinely sent for culture on all those with suspected UTIs. It is therefore not known how successful GPs are at targeting antibiotic treatment to women who would have had a microbiologically confirmed UTI, or at avoiding antibiotics in those who would have had a negative culture, had all patients with a suspected UTI been sampled.

The aim of this study was to explore the extent to which empirical antibiotic treatment turned out to be appropriate, based on subsequent urine culture results in a sample of systematically investigated women with a clinically suspected UTI.

Patients and methods

This exploratory study was nested within a larger study examining the epidemiology, aetiology and outcomes of antibiotic-resistant, community-acquired UTI.9 Ten general practices in South East Wales were recruited from within the former Bro Taf Health Authority. All practices in this region were originally stratified by quartiles for prescribing rates, size, Townsend deprivation score and...
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There was an increase of 24% in total urine specimens submitted from all study practices during the period of the main study (average of 6 505 per year in the year preceding the study, and an average of 8 059 per year during the main study). Six hundred and twelve urine specimens were submitted from the nine GP practices during the study month. Of these 152 were specimens from males, 79 were from females aged <18 years, 36 were duplicate specimens, 6 had missing demographic information and 51 specimen results were not received by the research team within 1 month of the specimen date. Questionnaires were sent to the remaining 288. Exclusions and response rates are presented in Figure 1.

Two eligible cases were excluded from the analysis; one had independently submitted a urine sample to the laboratory where she worked and presented to her GP with a positive culture result, and we were unable to obtain adequate information about antibiotic prescribing in the other case. The remaining 111 women contributed data to the analysis.

There was no difference in the proportion of culture positive urines between those who completed a questionnaire and non-responders (χ² = 0.106, P = 0.745). Non-responders were younger (median age 44, IQR 30–64) compared with responders (median age 54, IQR 34–71), however this difference was not statistically significant (Mann–Whitney U = 5 521, P = 0.122).

Table 1 shows the association between antibiotic prescription and urine culture result.

Antibiotics were prescribed empirically in 61% (68/111) cases. Of those prescribed empirical antibiotics, 40% (27/68) were subsequently found to have a positive urine culture and 60% (41/68) were found to have a negative culture.

Overall, 32% (36/111) had a positive culture. Seventy-five percent (27/36) of these women had been prescribed antibiotics.
empirically, whereas 25% (9/36) had not. Of the 68% (75/111) of women who had a negative culture result, 55% (41/75) had been prescribed empirical antibiotics.

The decision to prescribe empirical antibiotics against the target of a positive urine culture had a sensitivity of 75% (95% CI 61–87%), specificity of 45% (95% CI 38–51%), positive predictive value of 40% (95% CI 32–46%) and a negative predictive value of 79% (95% CI 67–89%).

The Kappa measure of agreement showed very low agreement between the decision to prescribe empirical antibiotics and subsequent culture result (Kappa = 0.04).

Of the 50 (45%) women where there was disagreement between empirical prescribing and urinary culture, significantly more had been prescribed antibiotics and subsequently had a negative culture (82%) than vice versa (18%) ($\chi^2 = 19.220, P < 0.001$).

Discussion

It is commonly accepted that patients with symptoms attributable to the urinary tract and who have a positive culture are most likely to benefit from antibiotics. The research effort has focused on developing management strategies to predict positive culture more reliably in order to better target antibiotic prescribing.2,3,10 Our findings suggest that current management strategies are not achieving this goal. Culture positive UTI was not predicted by the empirical decision to prescribe antibiotics. The specificity was low, and the sensitivity was fairly low. GPs were more likely to prescribe empirically for those subsequently found to have a negative culture than to have not prescribed for those who are subsequently found to have positive culture. It remains unclear which subgroup of patients will benefit from antibiotics, and in which (if any) antibiotic treatment will not be worthwhile. A recent study found that patients with negative culture received some benefit from antibiotic treatment.11 However, other studies have shown that many UTIs are self-limiting, improving without treatment even when culture is positive.12 Empirical antibiotics for all those with symptoms of UTI may be the best policy.2,11 Our results may be a reflection that some practitioners are adopting a strategy of prescribing empirical antibiotics for all patients, and have perhaps been influenced by evidence suggesting that antibiotics may benefit some women with suspected UTI who have culture negative urine. The issue of antibiotic resistance also needs to be taken into account when considering which strategy to promote. A recent review paper highlights the fact that the most appropriate management remains unclear.13

Limitations of this study include possible response bias, small sample and the reliance on patient recall of antibiotic treatment in the majority of cases. Responders and non-responders to the questionnaire had similar proportions of positive urine cultures, and there was no statistically significant difference in their ages. We were not able to make judgements about comparability of symptom severity, rates of antibiotic prescribing and outcomes between these groups. With a median age of 54, our study participants were older than we expected, although they were of a similar age to participants of a recent study in Germany (median age 53 years).7 Participants in other studies have tended to be younger. For example participants in a Canadian study, with no upper age limit, had an average age of 44 years. Other studies have used an upper age limit, sometimes as low as 50 years.3,6,11,12 In our study, the prevalence of positive urine culture in clinically suspected UTI was 32%. This is lower than in other similar studies, although estimates of prevalence vary widely amongst studies.2,4,7 The lower prevalence may also be a reflection of the systematic sampling method used in this study.

An important aspect of our study was that health professionals were asked to request specimens from all patients with clinically suspected UTI. However, the extent to which this happened was not easily validated, as practices were not able to keep a log of all patients presenting with UTI symptoms. There was an overall increase of 24% in the number of urine samples sent by practices during the main study period. Extrapolating from our data for 1 month, in which 288 samples were submitted from a population of 26 704 women aged 18 or over, we estimate the annual consulting rate for suspected UTI of 13%, assuming a sample was requested in every case. This estimate is similar to findings in other studies.7,13

Further research is needed to explore the cause of symptoms in patients with negative urine cultures, to clarify which patients with symptoms suggestive of UTI are most likely to benefit from antibiotics, and to develop strategies to treat these patients while continuing to address unnecessary antibiotic prescribing in the light of the problem of antibiotic resistance.

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Transparency declarations

None to declare.

References


