

Author's declarative title

General practices that reduce antibiotic prescribing for self-limiting respiratory tract infections by 10% can expect to see one extra patient with pneumonia each year and one peritonsillar abscess each decade

Citation

Gulliford MC, Moore MV, Little P, et al. Safety of reduced antibiotic prescribing for self-limiting respiratory tract infections in primary care: cohort study using electronic health records. *BMJ*. 2016 Jul 4;354: i3410

Context

Unnecessary antibiotic use in the community is a major driver for the development of resistant bacterial carriage.¹ Despite the self-limiting nature of most acute respiratory tract infections (RTIs),² a substantial proportion of consultations in the community result in an antibiotic prescription.³ Clinicians over-prescribe antibiotics partly because non-antibiotic management might result in more complications, and because more serious infections can initially present innocuously.⁴ This study explored whether the incidence of specific infective complications was higher in patients registered with general practices that prescribed fewer antibiotics for self-limiting RTIs.

Methods

This was a retrospective observational cohort study using routinely collected data from 2005 to 2014 in the Clinical Practice Research Datalink (www.cprd.com). The complications included incident events of diagnoses of pneumonia, peritonsillar abscess, mastoiditis, empyema, meningitis, intracranial abscess, and Lemierre's syndrome (internal jugular vein thrombophlebitis). The authors identified first consultations for self-limiting RTIs within a 14-day time window using medical codes recorded during the consultation: upper RTI; sore throat; cough and acute bronchitis; otitis media; and rhinosinusitis.

For each of the 610 CPRD general practices with sufficient data, they calculated the rate of RTI consultation per 1000 registered patients, the antibiotic prescribing rate for RTI per 1000 registered patients, and the proportion (%) of RTI consultations where antibiotics were prescribed and standardised these for age and gender. General practices were divided into quarters according to the proportion of RTI consultations with antibiotics prescribed (high to low). Mixed effects Poisson regression were used to estimate incident rate ratios (IRR) with 95% confidence intervals comparing each fourth of RTI consultation rate, antibiotic prescribing rate or antibiotic prescribing proportion using the lowest fourth as reference. Incidence rate ratios (IRRs) were adjusted for sex, age group, region, deprivation quintile, and clustering by general practice.

Findings

Based on over 400,000 patients, and 45 million patient-years of follow-up, patients in general practices prescribing antibiotics less often for RTIs had slightly higher rates of pneumonia and peritonsillar abscess than those patients in higher prescribing practices (lowest quarter: 38%, 95% range [29% to 44%], vs highest 65% [58-79%]). For general practices in the highest quarter of antibiotic prescribing, the IRR for pneumonia was 0.70 (95% CI 0.59 to 0.82, $P < 0.001$), and for

peritonsillar abscess was 0.78 (0.68 to 0.90, $P < 0.001$) compared with the lowest quarter. The other infective complications were not associated with antibiotic prescribing quarter. Set in the context of relatively high proportion of RTI consultations with antibiotics prescribed in the UK, the authors' modelling concluded that if an average-sized general practice (approximately 7000 patients) was to reduce the proportion of RTI consultations with antibiotics prescribed by 10%, clinicians could expect to see one additional case of pneumonia per year and one additional case of peritonsillar abscess each decade, and that the incidence of certain infective complications (mastoiditis, empyema, meningitis, intracranial abscess, and Lemierre's syndrome) are vanishing small.

Commentary

This well-powered database study addresses valid concerns general practitioners often have about the safety of reducing antibiotic prescribing, or adopting a non-prescribing strategy for RTIs. Accepting the limitations associated with observational data and any causal inference, the research shows that serious infective complications after RTI are rare. These analyses assume that the appropriate antibiotic treatment was prescribed, that GPs who are high antibiotic prescribers code in largely the same way as those who are not, and that there is a certain amount of uniformity about the diagnostic accuracy of complications. In addition, the clinical severity of the outcomes of interest cannot be adequately compared using these data. The authors stress that the results should be interpreted at the general practice population level, and cannot be extrapolated to the individual doctor's prescribing habits, in regions/countries with very low antibiotic prescribing levels, or to individual patients who experience infective complications (the 'ecological fallacy'). Hence, at the level of the individual patient, suppurative complications may still arise with antibiotic treatment, and patients who get complications may present with them already present, with limited opportunity for early antibiotic treatment. Further prospective cohorts are needed to examine the implications of reducing the proportion of antibiotic prescriptions for RTIs for specific higher risk subgroups e.g. older adults.

Implications for practice

While this study, using exemplary epidemiological and statistical techniques, found some statistically significant associations, the clinical implications are consistent with the view that we should not be prescribing for individuals to prevent these rare complications alone. As the authors rightly point out, their modelling was not able to take into account any advantages, say in terms of antimicrobial resistance and improved self-care, that might flow to a practice population from that general practice reducing its antibiotic prescribing.

References

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Competing interests

Chris Butler has done studies of antibiotic use in the community and holds several grants in the field.