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The rocky road to rational prescribing

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ABSTRACT

Primary care physicians frequently see simple cases of acute otitis media (AOM), whilst specialists are generally presented with more complicated cases. Despite the high disease burden and high rates of consultation, diagnosis and management of AOM is currently suboptimal. Furthermore, problems with diagnosis and management have a direct impact upon worsening antibiotic resistance. This article discusses the unmet needs in AOM that need to be addressed in order to improve patient assessment and management. There is a need to further educate the public in order to 'demedicalize' this common disease. Effective vaccination is also an important component of optimal management.

1. Introduction

Otitis media (OM) covers a broad spectrum of clinical presentations, from simple acute OM (AOM) to recurrent or chronic disease, with a small proportion of patients experiencing complications, such as mastoiditis and hearing loss. The type and severity of AOM cases seen by physicians vary among different clinical settings. Furthermore, different physicians may see AOM at different points in the disease continuum, and therefore view this condition from different perspectives. For example, community physicians are usually presented with the disease at the milder end of the spectrum whilst ear, nose, and throat (ENT) specialists manage the more serious consequences of this condition. This article focuses on the issues faced in the diagnosis and management of AOM from the perspective of a primary care physician (PCP).

2. Antibiotics in the management of AOM

AOM is commonly treated using antibiotics, and the number of prescriptions written for AOM in many developed countries is thought to be excessive. In the UK, approximately 80% of AOM cases are treated with antibiotics, though overall prescription rates are falling due to a decrease in the total number of consultations for AOM despite a constant level of prescribing [1,2].

Evidence suggests that antibiotics are of limited benefit in the treatment of AOM [3]. For the majority of cases, no immediate response is seen and the effects are not large, as suggested by estimates of their relative benefit. The number needed to treat (NNT) for reduced pain after 2 days of treatment is 15 (i.e. to reduce pain in one patient using antibiotics, as many as 15 patients need to be treated). Furthermore, the use of antibiotics is commonly associated with side-effects, such as diarrhoea and rashes; the number needed to harm is 5–10 (i.e. adverse effects would occur in one patient for every 5–10 patients treated with antibiotics).

3. Issues related to antibiotic use in AOM

3.1. Antibiotic resistance

Antibiotic resistance is a major problem worldwide, and is associated with substantial costs globally. With no new classes of antibiotics in development, serious infections may become untreatable in the future.

Resistance is directly linked to community use of antibiotics. The over-prescription of antibiotics in AOM is a key driver of resistance, as evidenced by studies of antibiotic use and resistance across several European countries [4,5]. In 1990s, a study in Iceland reported an association between antibiotic prescribing and penicillin resistance in *Streptococcus pneumoniae*, a principal causative pathogen in AOM [5]. Until 1988, no penicillin-resistant pneumococcal strains had been identified in Iceland; however, a sharp rise in the number of penicillin- and multi-drug resistant pneumococcal strains isolated from respiratory tract specimens was observed during the study period (1988–1991). These strains were thought to have been spread by children attending day-care centres (preschool children are typically prescribed antibiotics frequently). In a more recent, comprehensive study analysing data from 19 European countries, a particularly strong, statistically significant correlation (Spearman correlation 0.84; 95% confidence interval [CI]: 0.62–0.94; $p < 0.0001$) was demonstrated between penicillin

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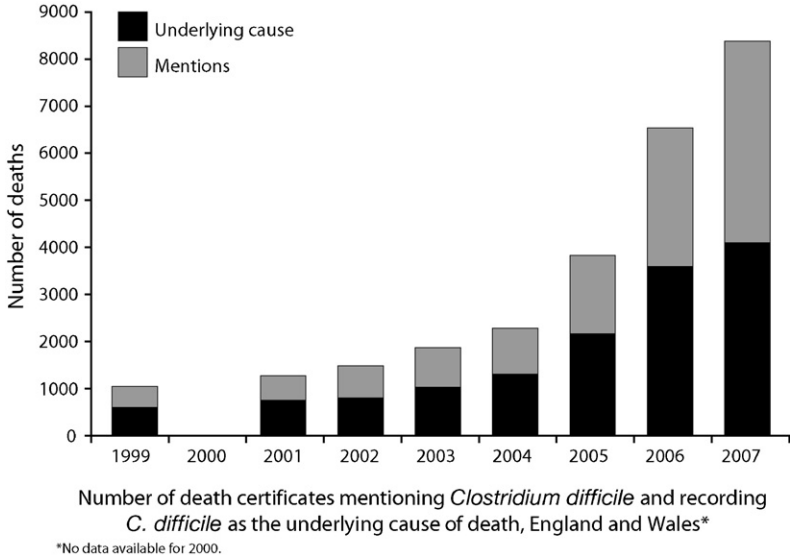

Fig. 1. Indirect effect of community use of antibiotics: deaths due to *Clostridium difficile*. *Source*: UK Statistics Authority website: www.statistics.gov.uk [7]. Reproduced under the terms of the Click-Use licence.

use and the prevalence of penicillin non-susceptible *S. pneumoniae* [4]. Indeed, in France, resistance rates of almost 70% have been reported for *S. pneumoniae*, particularly in children [6].

Given the evidence supporting high levels of antibiotic use as a driver of antibiotic resistance, it follows that less antibiotic prescribing would lead to less resistance. As antibiotic-resistant pathogens are an increasing, and ultimately an intractable, public health concern, there is agreement between international expert bodies that it is imperative to reduce antibiotic use where it is reasonable to do so, to prolong their usefulness for serious infections.

3.2. Indirect effects of antibiotic use

The use of broad-spectrum antibiotics can have inadvertent and indirect consequences that are detrimental to the patient and the community. When broad-spectrum antibiotics are used, they may eliminate commensal bacteria in the bowel and allow the growth of pathogenic bacteria. Once variant pathogenic strains of bacteria emerge, they may then spread in communities.

Clostridium difficile is present as one of the commensal bacteria in the bowel in up to 3% of healthy adults. Patients treated with broad-spectrum antibiotics are at greatest risk of *C. difficile*-associated disease. The over-reliance on broad-spectrum antibiotics may be contributing to the marked rise in death rates from *C. difficile* in recent years (Fig. 1) [7]. According to the UK Office for National Statistics, the number of death certificates in England and Wales mentioning *C. difficile* infection has increased each year from 1999 to 2007; in the period 2005–2006 there was a 72% increase, with a 28% rise seen between 2006 and 2007 (increasing from 6480 to 8324 deaths). Most deaths were in the elderly population (aged 85 years and over).

3.3. Medicalization of illness

The use of antibiotics can 'medicalize' a self-limiting illness. It can alter patients' beliefs and intentions to seek out treatment, due to a false attribution of the treatment received 'as the cause' of the cure experienced, even when a natural cure has in fact occurred. This is supported by findings from a study conducted across general practices in the UK, which compared different prescribing practices for sore throats in ~700 patients aged 4 years and over (antibiotic prescription, no prescription, or delayed prescription after 72 h if symptoms were not improving). The study found that patients receiving immediate antibiotics were significantly more likely to think that antibiotics were effective, and were more likely to revisit their doctor in the future if illness recurred (Fig. 2) [8].

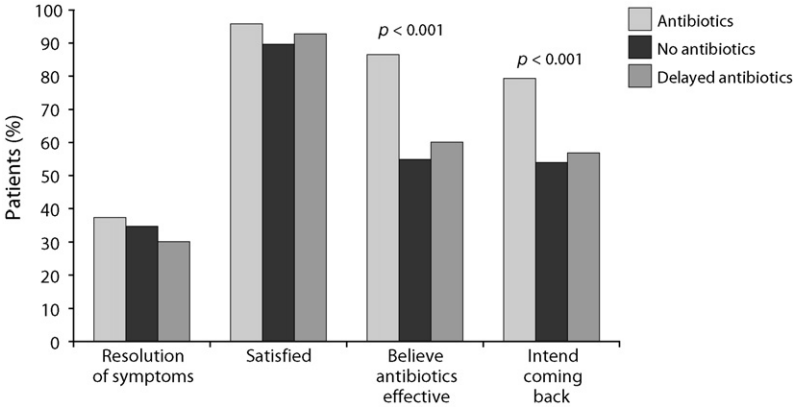

Fig. 2. Comparison of different antibiotic prescribing strategies: outcomes in patients with sore throats given immediate, no or delayed antibiotics [8].