Abuse of Antibiotics in Paediatrics

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ABSTRACT   *Antibiotics overuse is a global public health issue in pediatric. Frequent and inappropriate use of antibiotics can cause bacteria or other microbes to change leading to bacterial resistance. Treating these resistant bacteria requires higher doses of medicine or stronger antibiotics. Because of antibiotic overuse, certain bacteria have become resistant to even the most powerful antibiotics available today. Antibiotic over prescribing is a particular problem in primary care, where viruses cause most infections. About 90% of all antibiotic prescriptions are issued by general practitioners, and respiratory tract infections are the leading reason for prescribing. Cephalosporins were mostly prescribed in the youngest children, while macrolides were most frequently used in children over 6 years old. High antibiotic usage is shown in the paediatric population of india. Broad-spectrum antibiotics are predominantly prescribed. Comparison with prescription rates from other countries paediatric populations suggests there is extensive antibiotic overuse in india.*

INTRODUCTION

Antimicrobial resistance is recognized as one of the greatest threats to human health worldwide. The bacterial disease burden in India is among the highest in the world [1]; consequently, antibiotics will play a critical role in limiting morbidity and mortality in the country. As a marker of disease burden, pneumonia causes an estimated 410,000 deaths in India each year [2], and it is the number-one killer of children [3]. Many of these deaths occur because patients do not have access to life-saving antibiotics when and where these are needed. At the other extreme, antibiotics are used in situations where these cannot be expected to improve the patient's condition, particularly as treatment for the common cold and uncomplicated cases of diarrhea.

In the USA almost three-quarters of all outpatient antibiotics are prescribed for acute respiratory infections[4]. A significant proportion of antibiotics prescribed every year in the community are given to children and 50% of prescriptions for children given by general practitioners are unnecessary. In the USA 44% of children with common colds were reported to be treated with antibiotics, 46% of those with upper respiratory infections, and 75% of those with bronchitis, conditions that typically do not benefit from antibiotic treatment[5]. In Canada, 74% of preschool children seeking care for respiratory infections received antibiotic prescriptions; in 85% of these cases such prescriptions were inappropriate[6].

Antimicrobial resistance among *Streptococcus pneumoniae* is rapidly increasing in several countries[7-9], and the single most important factor in the emergence of antibiotic resistance among respiratory bacterial pathogens is selection pressure from antimicrobial agents[10]. Observational and intervention studies from several countries have supported a link between rates of antibiotic prescription and resistance in communities[11]. Thus, reduction of inappropriate use of antibiotics in the community should be considered a major public health issue. The problem of antibiotic abuse has been a concern for many physicians. Several recent publications have demonstrated a rate of inappropriate antibiotic use of 30% to 65% in hospitals[12].

Rising antibiotic use in india

 Antibiotic use has been increasing steadily in recent years in india. Between 2005 and 2009, the units of antibiotics sold increased by about 40 per cent. Increased sales of cephalosporins were particularly striking, with sales (in units sold) increasing by 60 per cent over that five-year period, but some increase was seen in most antibiotic classes. In comparison, a pilot survey conducted at private retail pharmacies in 2004 and a survey in the same areas in 2008 found increased use of cephalosporins, but decreased use of macrolides[13,14].

Resistance to antibiotics

Antibiotic resistance has been a low-priority area in most developing and many developed countries. Compared with the immediate challenges of HIV/AIDS, tuberculosis, malaria, pneumonia, and many other infectious diseases, the loss of antibiotics at some future time does not capture the same attention. Resistance against certain antibiotics is already at high levels in certain places in India (and around the world), but the problem has remained largely unknown because relatively few studies were published and nationwide surveillance was not being carried out. But the issue came to the fore in India when New Delhi metallo-ß-lactamase-1 (NDM-1), first reported in 2009, made front-page news in 2010.

Briefly, NDM-1 is an enzyme produced by the gene *bla*NDM-1; it is named for New Delhi because the Swedish patient in whom it was first identified had undergone surgery in a New Delhi hospital[15]. The gene was carried on plasmids and could be transferred between different bacterial species, in this case between *Klebsiella pneumoniae* and *Escherichia coli*, and most importantly, conferred broad resistance to most antibiotics, including carbapenems. Later studies reported NDM-1 in a tertiary-care centre in Mumbai[16].

A World Health Organization (WHO) study in which *E. coli* was used as an indicator organism at four sites found high levels of resistance, especially in pathogenic isolates[17]. The study measured both antibiotic resistance and antibiotic use over the course of at least one year at all sites.

Patterns of antibiotic overuse

Few city-based hospital studies of antibiotic use suggest that antibiotics are often prescribed in irrational or inappropriate ways in India; that is, the drugs are prescribed

at an incorrect dose, frequency, or duration, are redundant, or have the potential for adverse interactions with other drugs. Some studies on antibiotic use have employed indicators, such as the average number of drugs prescribed per encounter and the frequency with which fixed-dose combinations are prescribed. Other studies have detailed the reasons for prescribing (or purchasing) antibiotics - in particular, for upper respiratory tract infections, an inappropriate indication. Overprescribing and overuse are seen in all settings: public and private hospitals, clinics and pharmacies. For example, depending on where they live and the type of practitioner they visit, 45 to 80 per cent of patients with symptoms of acute respiratory infections and diarrhoea are likely to receive an antibiotic, even though it will not be effective if they have a viral illness rather than a bacterial one.

Why this overuse persists is not so easily determined. The possible reasons, as in other parts of the world, include the following: (*i*) lack of microbiology facilities or unwillingness of patients to undergo tests (*ii*) some doctors' practice of prescribing antibiotics to any patient with a fever, taking it as a sign of bacterial infection, especially when they are concerned that the patient will not return for follow up (*iii*) the patient's expectation of being given an antibiotic over-the-counter (*iv*) incentives for pharmacists to make a profit from drug sales and (*v*) lack of knowledge about the appropriate use of antibiotics in public's [18].

Prescribing fewer antibiotics is needed

A reduction in antibiotic consumption leads to a reduction of resistance. The classical Finnish study focusing on macrolide resistant *Streptococcus pyogenes* clearly showed how a reduction in macrolide use could lead to a reduction in AMR. Antibiotic resistance dropped from 9.2% in 1997 to 7.4% in 2000, with a statistically significant association between regional macrolide resistance and consumption rates[19].

Our goal is not just to reduce the amount of antibiotics use. It is also to promote a rational use of antibiotics by prescribing antibiotics only to patients who are expected to benefit from the treatment. Many studies have been performed to determine the effectiveness of different types of intervention in promoting a more rational use of antibiotics. According to the last Cochrane review on interventions to improve antibiotic prescribing, multifaceted interventions combining physician, patientand public education in a variety of venues and formats were the most successful. Interactive educational meetings were more effective than didactic lectures, but levels of improvement were limited[20].

CONCLUSION

It is know that we can reduce antibiotic prescribing in many of the infections that are currently unnecessarily treated without compromising our patients health. By accomplishing this, we will do less harm. Moreover, we know that antibiotics can stop being effective in the short and medium term. Our duty is to prescribe antibiotics only when they are necessary, i.e. in less than 20% of the infectious seen in primary care.

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