

Management of Acute Respiratory Infection in Primary Care

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Abstract

Background: Acute respiratory infections (ARIs) form one of the most common reasons for visits to the primary care physician. In Saudi Arabia, ARI was found to be the most common diagnostic label used in more than half of the prescriptions; antibiotics were prescribed for 53%, anti-cough for 43% and anti-histamine for 20% of patients with ARIs.

Aim: In this review, we will look into the management of acute respiratory infection in primary care.

Methodology: The review is comprehensive research of PUBMED since the year 1985 to 2018.

Conclusion: It is important to continue with public health campaigns to educate the public on the ineffectiveness of antibiotics in treatment of acute respiratory infections, which has been shown to reduce public expectation for antibiotics in such cases. Acute care settings are important targets for reducing inappropriate antibiotic prescribing. Governments should ban all tobacco advertisements, legislate to stop smoking in public places as well as private vehicles, impose higher levies on cigarettes and tobacco products; and use revenue raised from these sources for further public education.

Keywords: Acute Respiratory Infection; Primary Care; Management Acute Respiratory Infection

Introduction

Acute respiratory infections (ARIs) form one of the most common reasons for visits to the primary care physician [1]. In Saudi Arabia, ARI was found to be the most common diagnostic label used in more than half of the prescriptions; antibiotics were prescribed for 53%, anti-cough for 43% and anti-histamine for 20% of patients with ARIs [2].

Acute respiratory illnesses can be classified as upper respiratory tract illnesses (URI) and lower respiratory tract illnesses (LRI) with the larynx as the site of separation of primary pathology. The impact of a respiratory episode varies greatly with the majority being short-lived and confined to the upper respiratory tract [3]. Acute upper respiratory tract infection (acute URTI), which incorporates the term 'upper respiratory infection', includes infections such as otitis media, pharyngitis, sinusitis and acute bronchitis are the most common reasons that adults seek care from their primary health care providers in the United States [4]. Most childhood ARIs have a viral etiology and are self-limiting [5]. Most studies have, however, focused primarily on LRI, in particular, those requiring medical attention or hospitalization, and there is a paucity of community-based epidemiological studies on ARI.

Any episode with runny/blocked nose or dry cough is classified as an URI. Episodes that were associated with wheeze, or cough and rattly chest were considered to be LRI. Wheeze is defined as a high-pitched whistling sound heard coming from the chest, on expiration. LRI were further classified into wheezy LRI and non-wheezy LRI based on the presence of any wheeze reported by the parent or family doctor [6].

For patients, clinic visits are inconvenient, requiring time and costing money [7]. ARI visits also result in antibiotic prescriptions, many of which are inappropriate result in resistance of pathogenic bacteria, and increased burden for families. ARIs account for 50% of antibiotic prescriptions to adults and 75% of antibiotic prescriptions to children [8,9].

To reduce the massive mortality from acute respiratory infections which now occur in children under 5 years of age in developing countries, the improvement and upgrading of clinical management, particularly by primary health care workers, seems to be the strategy of choice. In spite of the lack of precise information, it may still be possible to devise guidelines for effective management within the framework of primary health care, on the basis of the existing empirical knowledge [10].

Etiology of acute respiratory infection

Bacteria and viruses have been reported as the main causes of ARIs. In children under 5 years, ARIs are caused mainly due to viruses; respiratory syncytial viruses (RSVs), parainfluenza viruses, influenza virus A and B, and human metapneumovirus (hMPV) are the most common viruses isolated. In resource-limited countries, bacteria have been the main cause of ARIs. This could be explained by the inaccessibility of molecular diagnostic tools thus leading to inadequate antibiotics prescription and consequently contributed to a rapid increase in antimicrobial resistance among bacteria causing ARIs [11,12]. Since 2001, several new respiratory viruses have been described such as metapneumovirus (HMPV), human coronavirus (HCoV), NL63 and HKU1, and human bocavirus (HBoV) [13-15].

Common bacterial and viral pathogens causing severe respiratory disease, such as pneumococcal disease and seasonal influenza, for which interventions exist, continue to be a threat. Emerging zoonoses causing respiratory disease, such as avian influenza and more recently MERS-CoV, in an immunologically naïve population are a concern for global health security. There are very real epidemiological and economic consequences in the event of uncontrolled transmission of these novel pathogens [16].

In children under 5 years, ARIs are caused mainly due to viruses; respiratory syncytial viruses (RSVs), parainfluenza viruses, influenza virus A and B, and human metapneumovirus (hMPV) are the most common viruses isolated. However, primary infections with viral pathogens can predispose to secondary bacterial infections, and the most frequently isolated bacteria in ARIs include *Streptococcus pneumoniae* and *Haemophilus influenzae* [17,18].

Epidemiology of acute respiratory infection

Nearly 25% of all deaths among children less than 5 years of age in developing countries are caused by acute respiratory infections (ARI). Estimates of annual mortality rates for ARI in infants range from 1.5 per 1000 in North America to from 11 to 15 in 1000 per Central

and South America and Africa. Annual mortality rates for ARI for children 1 to 4 years of age ranged from 0.08 per 1,000 in North America to 1 to 1.5 per 1,000 in Central and South America and in Asia to nearly 5 per 1,000 in Africa [19]. An estimated 1.9 million children die from ARI worldwide annually, 70% of them in Africa and Southeast Asia [20].

Risk factors of acute respiratory infection

A multiple of social and environmental factors are associated with ARI morbidity and mortality in childhood. Various risk factors associated with ARI are poverty, malnutrition, low birth weight, inadequate breast feeding, complementary foods initiation, overcrowding, poor housing conditions, indoor and outdoor air pollution, seasonality, and lack of access to preventive (including immunization) and curative services. People with heart diseases or other lung problems are more likely to contract an acute respiratory infection. Anyone whose immune system might be weakened by another disease is at risk. Smokers also are at high risk and have more trouble recovering from it [21,22].

Diagnosis of acute respiratory infection

Breath sounds in the lungs are checked for fluid and inflammation. The doctor may peer into the nose and check if the infection is advanced, an X-ray or CT scan (computer tomography) may be needed to check the condition of the lungs. Pulse oximetry, also known as pulse ox, may be used to check how much oxygen gets into the lungs. A sputum (material coughed up from the lungs) sample may be needed to check for the type of virus causing the disease [23].

Management of acute respiratory infection

Acute respiratory tract infections are common reasons for consulting in general practice and assumed responsible for more than 60% of the antibiotic use in this setting. Antibiotic prescribing in primary care steadily increased in developed countries up until the 1990s when it levelled off and then declined by about a third. Antibiotic prescribing puts individuals at risk from side effects, encourages help-seeking behavior for (mainly) self-limiting illnesses, and puts both individuals and society at risk from increasing antibiotic resistance [24,25].

GPs and other primary care doctors are more likely to prescribe antibiotics to patients who expect them or whom they believe expect them. It has been suggested that 'patient expectations' is an all-encompassing phrase that includes other reasons such as limited time, poor doctor-patient communication and diagnostic uncertainty. Doctors may overestimate the pressure to prescribe antibiotics for acute cough or other acute respiratory illnesses, often prescribing antibiotics for patients who did not request them. There is some evidence that patients are less satisfied in general practices that have frugal antibiotic prescribing practices in general [26-29].

WHO has initiated a program for clinical management and control of ARTIs which has resulted in the reduction of ARTI mortality rates by 25% to 67% [30]. Some countries have programmed to recommend guidelines approach to ARTIs [31].

The main emphasis of management is symptom relief of fever, nasal congestion and coughing. A variety of adrenergic agonist, anticholinergic, antihistamine preparations, antitussives and expectorants are marketed for these purposes [32]. Also, herbal remedies have been studied and conflicting results found. Two of the most commonly used and studied herbs are *Echinacea* and *Andrographis paniculata*, both of which are believed to be immune-stimulants. Propolis (bee resin) has also been studied and stimulates antibody production [33].

Saline nasal spray may be beneficial. For example, in a study of Swedish military recruits, daily spraying with physiological saline significantly reduced the incidence of the common cold and nasal symptoms. Although zinc supplementation is ineffective for treatment of URTIs, iron supplementation is remarkably effective in areas where iron deficiency is endemic and easy to implement. The promotion of

hand washing in households significantly reduces the incidence of both respiratory and gastrointestinal infections in children from both impoverished and well-resourced communities [34-36].

Beta-2 agonists for acute bronchitis (mainly oral agents): little evidence for routine use in acute bronchitis in primary care, but if there is evidence of airflow obstruction with the symptoms, some adults may derive some symptomatic benefit. Only two included studies were in children, and there was no evidence of benefit [37].

Vitamin C for preventing and treating pneumonia Review of five trials carried out in extraordinary conditions suggested there may be a benefit at both preventing and treating pneumonia, but possibly only in those with low plasma vitamin C levels [38].

Garlic for the common cold: Only one study was eligible for inclusion and showed that people taking garlic every day for 3 months had fewer colds than those taking placebo, but the duration of a cold was similar in both groups; there have been no trials examining whether taking garlic at the time of a cold reduces severity or duration [39].

A systematic public health approach in the management of ARI to maximize preventive measures such as increased public education to raise awareness about the detrimental effects of ETS, protective effects of breastfeeding, reduced exposure to other children through delaying child care attendance would help to minimize transmission rates to reduce prevalence rates and economic impact [6].

Antibiotic use in ARI remains contentious since more than 90% of the infections are of viral etiology. The reasons cited for prescribing antibiotics include diagnostic uncertainty, socio-cultural and economic pressures, and concern over malpractice litigation and parental expectations of an antibiotic [40]. Antibiotic prescribing puts individuals at risk from side effects, encourages help-seeking behavior for (mainly) self-limiting illnesses, and puts both individuals and society at risk from increasing antibiotic resistance. Many GPs do not link their own prescribing practices with increasing antibiotic resistance and regard resistance as essentially a hospital-based problem [41].

Economic factors play a role because the doctors running general practice clinics are not prepared to risk any treatment failure for fear of losing their patients. Competitive business makes them feel constrained to accede to the patient's desire of an immediate improvement in his symptoms and early recovery. As a result, they excessively use antibiotics and other symptomatic relief drugs such as cough remedies and antipyretics [42].

Conclusion

It is important to continue with public health campaigns to educate the public on the ineffectiveness of antibiotics in treatment of acute respiratory infections, which has been shown to reduce public expectation for antibiotics in such cases. Acute care settings are important targets for reducing inappropriate antibiotic prescribing. Governments should ban all tobacco advertisements, legislate to stop smoking in public places as well as private vehicles, impose higher levies on cigarettes and tobacco products; and use revenue raised from these sources for further public education.

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