Reducing inappropriate antibiotic use among children with influenza infection

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Abstract

Question With the influenza season reaching a peak, I see numerous children in my clinic with fever and influenza-like illnesses. Parents are concerned and at times ask for antibiotic treatment in hopes that the treatment will shorten the duration of illness. What strategies can I use in order to minimize inappropriate prescription of antibiotics during the influenza season?

Answer Use of antibiotics for treatment of viral infections such as influenza contributes to the emergence of resistant bacteria strains. Misuse and overuse of antibiotics can be reduced by preventing the infection and its complications through vaccination, point-of-care rapid influenza testing, and early antiviral treatment when appropriate, as well as constantly increasing the knowledge of both physicians and families regarding the appropriate use of antibiotics.

Résumé

Question La saison de la grippe étant à son point culminant, je vois de nombreux enfants à ma clinique qui font de la fièvre et ont des syndromes grippaux. Les parents s'inquiètent et demandent parfois une antibiothérapie dans l'espoir que le traitement raccourcisse la durée de la maladie. Quelles stratégies puis-je utiliser pour minimiser une prescription inappropriée d'antibiotiques durant la saison de la grippe?

Réponse L'utilisation d'antibiotiques pour le traitement d'infections virales comme la grippe contribue à l'émergence de souches de bactéries résistantes. L'utilisation abusive ou inappropriée d'antibiotiques peut être réduite par la prévention de l'infection et de ses complications grâce à la vaccination, aux tests rapides de dépistage de la grippe au point de service, par un traitement antiviral rapide, au besoin, et par une éducation accrue des médecins et des familles au sujet de l'usage approprié des antibiotiques.

Antibiotic resistance to pathogenic bacteria in the community setting has been identified as an emerging threat to public health. For example, 20% to 33% of *Streptococcus pneumonia* isolates are no longer susceptible to penicillin.[1,2] Methicillin-resistant *Staphylococcus aureus* (MRSA) nasal carriage in children has increased dramatically in the past decade. In 2001, data from a large pediatric primary care practice in the United States demonstrated colonization rates of 0.8%. In 2005, a repeat survey in the same pediatric primary care practice found that MRSA nasal carriage exceeded 9%.[3] During the same period of time, nasal carriage of MRSA was reported to be as high as 22% among children admitted to a pediatric hospital in Texas.[4] As the rate of MRSA nasal carriage increases, there is a potential for increased co-infection with influenza virus, resulting in severe morbidity and potential mortality in children.[5]

An important factor in the development of antibiotic resistance is overuse of antibiotics.[6] Of particular concern is overprescription of antibiotics for the treatment of viral upper respiratory infections and influenza-like illnesses.[7] The results of a nationwide US survey published in 2004 showed 38% of more than 6.5 million visits (primary practice, outpatient, and emergency department) by children and adults with a sole diagnosis of influenza were associated with antibiotic prescriptions.[8] Studies limited to children demonstrated even higher rates of antibiotic treatment in children diagnosed with viral infections.[9] Minimizing antibiotics on a national scale can reduce resistance rates. This goal might be achieved by better use of diagnostic tests and antiviral treatment and by enhancing physician and patient education.

Diagnostic strategies

One of the prime factors leading to inappropriate prescription of antibiotics for children with influenza infection is the difficulty in making a reliable and rapid clinical diagnosis. Cough and fever are the most common symptoms, but influenza infection can have an atypical presentation, especially in children, and no single symptom can confirm or exclude influenza.[10] The main challenge for physicians is distinguishing

between the clinical features of influenza and bacterial infections. Laboratory tests such as complete blood count and C-reactive protein measurement might help recognize bacterial involvement but they are not readily available in most community settings. There are several diagnostic tests for influenza. Viral culture and reverse transcription polymerase chain reaction are the criterion standards for diagnosis, but both methods are time-consuming, expensive, and require specialized laboratory facilities.[11] Rapid tests based on immunoassays or neuraminidase activity can detect influenza A and B viruses within 30 minutes. They are of variable sensitivity (median 70% to 75%) and high specificity (median 90% to 95%).[12] Significant false-negative rates were documented during times of high influenza prevalence.[13] Nevertheless, by providing additional support for the initial clinical diagnosis, these assays promote the rational use of antiviral agents and discourage the inappropriate prescribing of antibiotics.[14,15] Given time, cost, and accuracy constraints, rapid testing is the most common and practical way to test for influenza, and has the potential to reduce inappropriate antibiotic use and laboratory tests associated with influenza-like illness in up to 50% of cases.[15]

Vaccinations and antiviral therapy

Preventive measures such as hand washing and vaccination are the most efficient and cost-effective ways to reduce the incidence of infection thus preventing the use of inappropriate antibiotics.[16,17] Expanding vaccination guidelines to infants (aged 6 months or older) can improve antibiotic use for treatment of suspected secondary bacterial infections in young children. Use of live virus vaccines, which have 15% to 20% higher efficacy than inactivated vaccines, could further reduce the burden of influenza.[16]

Antiviral medications as post-exposure therapy or after confirming influenza have been shown to reduce the duration of infection and, when used as recommended, they can potentially reduce the demand for antibiotic treatment.[18] Nevertheless, wide use of antiviral treatment is still controversial.

Physician and parent education

Physicians might overprescribe antibiotics as a response to parents' expectations. A survey of more than 600 practising pediatricians found that 96% had been asked by parents for antibiotics when they were unnecessary. One-third of doctors reported providing the medications, even though they were not indicated.[19] Under pressure, especially during winter months, physicians might lack the time necessary to explain why antibiotics have no clinical effect on viral infections. Patient education programs can reduce the direct and indirect pressures on doctors to prescribe antibiotics. When these programs have targeted those who receive antibiotics most frequently, they have proven successful in reducing patient uncertainty about the necessity of antibiotics.[20] A study by Hemo et al demonstrated how a nationwide campaign based on television programming was an effective way to impart knowledge regarding antibiotic use. Antibiotic purchases following upper respiratory infection diagnosis during the postintervention period decreased compared with the parallel baseline period (odds ratio 0.75). A substantial reduction in antibiotic purchasing was also demonstrated for diagnosed otitis media (odds ratio 0.65).[21] Physician education can also contribute to appropriate antibiotic use; however, changing physician behaviour is a complex task and educational strategies do not always accomplish the desired results.[22]

Conclusion

Misuse of antibiotic treatment of influenza infections and the subsequent emergence of bacterial resistance can be reduced by limiting viral spread through hand hygiene and vaccination, using point-of-care rapid influenza tests, judicious use of antiviral medications, and expanding the knowledge of physicians and parents regarding appropriate use of antibiotics.

Competing interests
None declared

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