CPD Article

Symptomatic treatment of upper respiratory tract symptoms in children

Green RJ, PhD, Dip Allerg (SA)
Associate Professor, Department of Paediatrics, University of Pretoria

Abstract

Most upper respiratory tract infections are viral and treatment of a viral URTI is symptomatic. Today, with the emergence of antimicrobial resitance, antibiotics must be thought of as contra-indicated. Acute bacterial sinusitis may complicate a viral URTI. All special investigations for diagnosing acute sinusitis are unhelpful. Treatment of pain and fever are usually the only non-specific measures that help. Antimicrobial treatment has become a mainstay of acute sinusitis but there are studies suggesting that antibiotics do not alter the course of the disease. Since hearing loss is a risk of untreated and severe acute otitis media, this conditionis usually treated with antibiotics. However, a recent Cochrane Review has concluded that the number of patients needed to treat with antibiotics for a benefit is 15. The picture of itching, sneezing and profuse rhinorrhoea are classic of early allergic rhinitis but with time, and especially in perennial allergic rhinitis, nasal obstruction is a prominent symptom. It is the pathology which gives rise to both the classic facial appearance of patients (especially children) with perennial allergic rhinitis and the many complications. The most effective therapy of allergic rhino-sinusitis (as the disease should correctly be called) involves the topical nasal steroids.

(SA Fam Pract 2006;48(4): 38-42)

Introduction

What to do for the child with another upper respiratory tract infection is a common practice dilemma. Unfortunately, upper respiratory tract conditions, especially infections, are commonly mismanaged and a common error is the use of antibiotics for viral disease. However, of similar concern is the use of oral corticosteroids, often with antihistamines, for both viral infections and allergic disease. There is a clear place for both antibiotics and corticosteroids in upper respiratory tract disease but these indications are limited to clearly defined states. Unnecessary antibiotic usage can be reduced by careful medical and patient education.[1,2]

Acute rhinopharyngitis

This is the 'common cold' and is the most common type of upper respiratory tract infection (URTI) in children. In fact it is the most common condition in both children and adults.

Most infants and young children have a mean number of 6 such illnesses a year.[3] Almost all 'colds' are caused by viruses.[4] Usually due to the rhinovirus but also coronavirus, respiratory syncitial virus, parainfluenza virus, influenza virus, coxsackie virus and adenovirus.[4] Some new respiratory viruses have recently been described, including Human metapneumovirus and Boca virus. On occasions these viruses cause upper (sinusitis and otitis media) and lower (bronchitis and pneumonia) airway complications. There is much debate about the actual mode of transmission of these viral infections but clearly both aerosol transmission as well as direct contact of contaminated hands with the airway occur.[5] These viruses have an incubation period of 2-5 days and a sick individual is 'contagious' for some hours before to a few days after symptoms.[5]

Symptoms are typical in older children and adults. They include sore throat, runny nose, nasal congestion, sneezing, dry cough and mild fever and some degree of malaise. In infants symptoms may be more subtle and non-specific, including restlessness, crying, anorexia, vomiting, poor sleep and even respiratory distress due to a blocked nose.[5]

Bacterial complications of viral upper respiratory tract infections do occur. Usually acute sinusitis or acute otitis media. Occasionally lower respiratory tract infections occur with respiratory distress. It must always be remembered that viral infections are the most common reason for an acute exacerbation of asthma.[6] Therefore lower respiratory signs are not necessarily due to bacterial super-infection. Likewise the presence of recurrent URTI's and especially symptoms in spring and summer should raise the possibility that the condition is allergic rhinitis and not infective in origin.[7]

Treatment of a viral URTI is symptomatic.[5] Rest and adequate fluid intake is the most helpful strategy. Antipyretic and pain relief medication in the form of paracetamol is usually given and topical nasal decongestants may provide some relief. However, all other therapies have never been proven to work.[8] These include antihistamines, oral decongestants and antitussives and especially combination preparations. Their role is strictly placebo. Both oral corticosteroids (and especially steroid/antihistamine combinations) and antibiotics have no place. Today, with the emergence of antimicrobial resitance, antibiotics must be thought of as contra-indicated. They should not be given routinely to prevent secondary bacterial infection. HIV-positive children are managed no differently. There are also no conclusive studies showing the benefit of vitamin C in either prevention or treatment of URTI's. Only in the United States is routine universal influenza vaccination practiced.[9] Here it is given to all children between 6 and 23 months. Elsewhere influenza vaccination is recommended for high risk children.

A general approach to children with a sore throat is outlined in figure 1.

Acute sinusitis

The vast majority of infectious episodes of sinusitis (or rhino-sinusitis) are viral in aetiology. Acute bacterial infection of the sinuses is commonly due to Streptococcus pneumoniae, non-typable Haemophilus influenzae and Moraxella catarrhalis.[10] Predisposing factors to

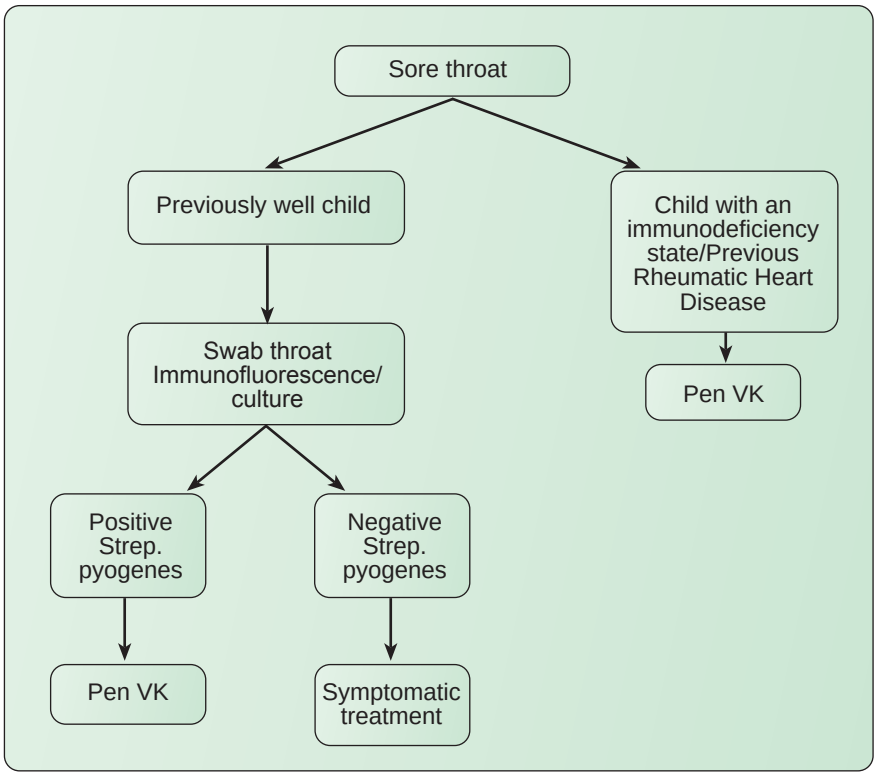
Table I: Indications for antibiotic use in URTI's

Child less than 3 months of age
Primary immunodeficiency states (not routinely in HIV infection)
Proven Strep. throat
Severe symptoms of acute otitis media and
Severe acute rhinosinusitis or disease lasting longer than 7-10 days

Table II: Situations where antibiotics should *not* be routinely indicated

Green mucus
A 'cold'
Pharyngitis
Asthmatics
Recurrent 'colds'
Influenza

Figure 1: Suggested approach to a sore throat



Note: All children with a sore throat must be fully examined for presence of significant disease including checking for fever, post-nasal drip, lymphadenopathy and a pseudo-membrane.

bacterial colonization of the sinuses are viral rhinopharyngitis, allergic rhinosinusitis, adenoiditis, smoking (active and passive), septal deviation, nasal foreign body, immunodeficiency states, cystic fibrosis and diving.[5]

The pointers to acute sinusitis may be subtle but usually nasal symptoms of a viral URTI that persist for more than 10 days or nasal secretions become purulent. Halitosis, fever, cough and headache are variably present (especially in children).[5] All special investigations for acute sinusitis are unhelpful. Nasal swab and culture does not help to identify the organism as there is lack of correlation between sites.[11] Both plain x-ray and CT scan are not helpful for acute disease.[12]

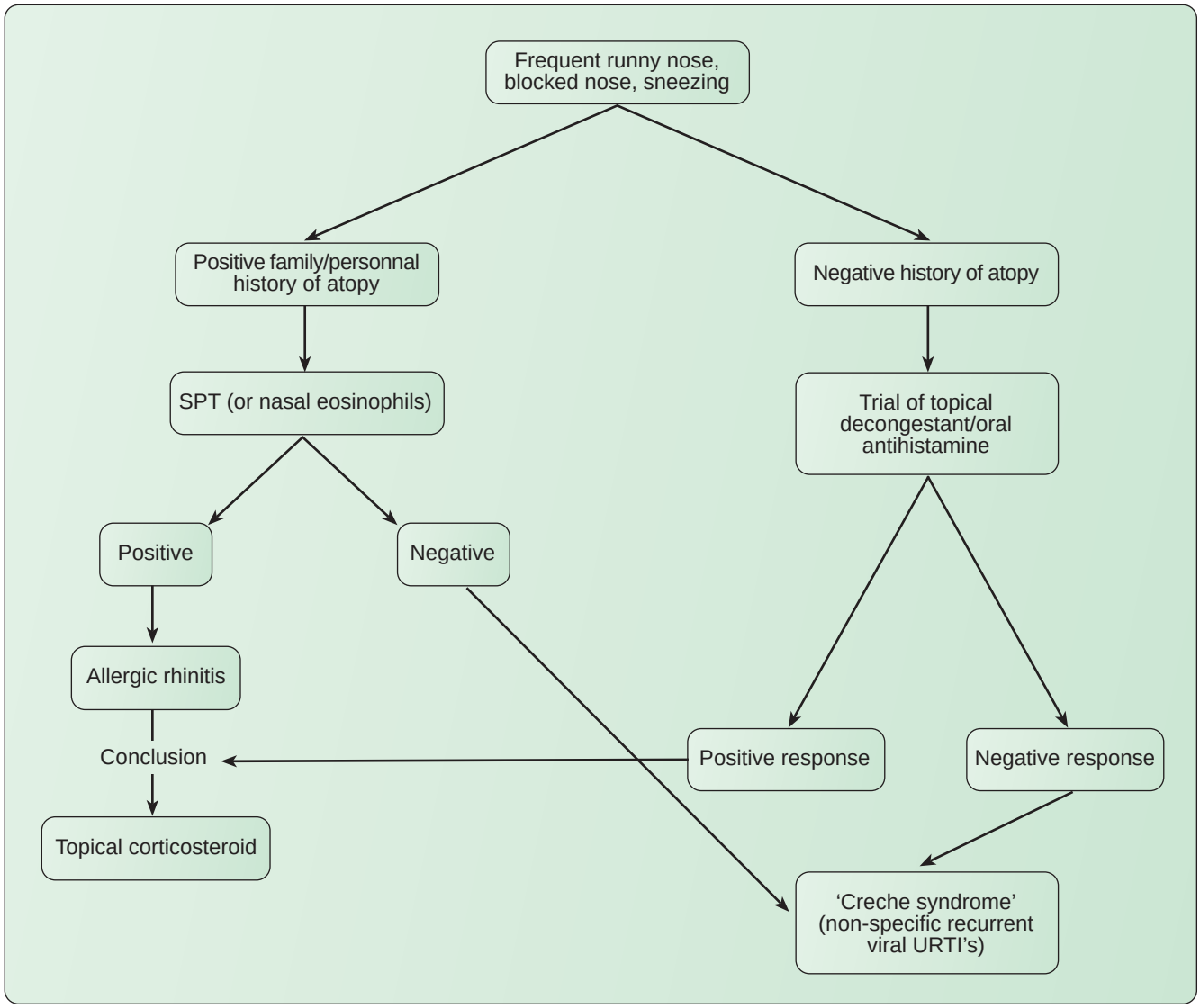
Treatment of pain and fever are usually the only non-specific measures that help. Antimicrobial treatment has become a mainstay of acute sinusitis but there are studies suggesting that these agents do not alter the course of the disease.[13] Amoxycillin (90 mg/kg/day given 8 hourly for 14-21 days) is the drug of choice. Alternatives are amoxycillin/clavulanate, cefuroxime or a macrolide.[11]

Topical corticosteroids have been shown in at least 3 studies to improve symptoms.[14-16] Some authors are now recommending that topical corticosteroids form the basis of therapy and that antibiotics be reserved for more severe disease, complications or symptoms beyond 7-10 days.[17] Oral corticosteroids may be useful if the sinusitis is complicated by allergic rhinitis and/or asthma.[18] Since acute sinusitis and especially repeated infections are complications of allergic rhinosinusitis children and adults who have episodes of sinusitis should be evaluated for allergy and treated accordingly.[19] This is a useful approach to limiting the cost and quality of life impairment of many patients. Prophylactic treatment of allergic rhinitis with a regular topical corticosteroid often stops further episodes of sinusitis.[19]

Chronic sinusitis is defined as symptoms attributable to the facial sinuses for 2 - 3 months or longer. Intermittently during chronic sinusitis, sinus obstruction and internal metabolic changes lead to bacterial overgrowth and acute infective sinusitis. This acute sinusitis may complicate upper respiratory tract infections in up to 5% of cases.[5]

The anatomical relationships of nasal passages to sinuses, and nose to eustachian tubes, throat, tonsils and adenoids has resulted in the upper airway (nose, sinuses and ears) functioning as an interconnected unit. Therefore, in chronic rhinitis the sinuses and middle ear cavities are often involved. The paired facial sinuses (2 frontal, 2 ethmoid and 2 maxillary) are aircells lined by respiratory mucous membrane. They drain into the nose close to the middle turbinate through the ostiomeatal complex. Likewise the middle ear cavity is continuous with the upper airway through the eustachian tube which opens into the posterior nasal pharynx in the region of the adenoids. Thus it would seem important to describe the pathological process of the upper airway in relation to all structures that may be involved, with a common epithelium which is subject to both intrinsic inflammatory processes

Figure 2: Suggested approach to a child with recurrent rhinitis



SPT = Skin prick test

and also to obstruction by the vascular engorgement and mucous plugging. Many authors would thus believe that, especially in the case of the sinuses, chronic allergic sinusitis always accompanies allergic rhinitis.[20]

Acute otitis media (AOM)

Since hearing loss is a risk of untreated and severe AOM, this condition is usually treated with an antibiotics. However, a recent Cochrane Review has concluded that the number of patients needed to treat with antibiotics for a benefit is 15.[21] US guidelines are recommending a delay in antibiotic use for children over 6 months for this condition and only using antibiotics for severer disease or a more protracted illness. A similar antibiotic selection to that of acute sinusitis is sufficient. Chronic middle ear disease is a risk factor of acute infection and this is more common in allergic children.

Allergic rhinitis

Allergic diseases are becoming epidemic. Of particular interest to the epidemiological trend of rising prevalence of allergic diseases is the so-called "Hygiene Hypothesis" of allergy aetiology. It has now been well documented that improvements in hygiene together with reduction in rates of respiratory infections in infancy are strongly associated with increasing prevalence of atopic diseases in Western countries.[22] The mechanism of this finding is through influence on the Th_1/Th_2 cellular pathways of the immune system. Interferon gamma (IFN-γ) drives Th_1 development; away from the Th_2 or atopic pathway. Greater exposure to bacteria or bacterial products during early life increases IFN-γ, which is normally present in lower circulating levels in atopic infants. Clearly the artificial reduction in bacterial exposure, through improvements in public health and hygiene, changes in infant diets, early use of antibiotics and smaller family size, contributes to a reduction in IFN-γ. The importance of viral infections in protection versus causation of atopy, and especially asthma, is hotly debated. Respiratory viruses may, in fact, lead to significant continuation of the asthma phenotype.[6]

An atopic link between allergic rhinitis, chronic sinusitis and otitis media with effusion has been confirmed in various studies.[23] In infants with chronic or recurrent middle ear disease nasal

metachromatic cells were detected more frequently, and in a long-term follow-up of infants and children in general practice, allergy (family history, spasmodic nocturnal cough, blood hypereosinophilia and maxillary rhinosinusitis) was shown to be an important association.[24] Findings in other studies have been similar.[25]

Historically the clinical picture of allergic rhinitis has focused on the direct symptoms and signs in the nose. The picture of itching, sneezing and profuse rhinorrhoea are classic of early allergic rhinitis but with time and especially in perennial allergic rhinitis, nasal obstruction is a prominent symptom.[26] It is the pathology which gives rise to both the classic facial appearance of patients (especially children) with perennial allergic rhinitis and the many complications.[26]

The "allergic facies" arises as a result of a blocked nose and is characterised by:[26]

- pallor - often appearing remarkably pale;
- allergic shiners - bluish discoloration of the lower eyelids (arising from obstructed venous drainage from this area of the face by boggy nasal mucosa);
- mouth breathing;
- long-face syndrome - of maxillary and dental disordered development, controversially attributed to nasal blockage;
- allergic mannerisms - `allergic salute'- performed in an attempt to open the airway.

Complications of allergic rhinitis include those described earlier: chronic sinusitis and acute infective sinusitis, otitis media with effusion, long-face syndrome, and probably the most troublesome of all, impaired quality of life.[26]

Sleep disturbances caused by allergic rhinitis include sleep-disordered breathing, periodic breathing, hypopneic and hypoventilation episodes and increased micro-arousals. These symptoms have been attributed to increased upper airway resistance. Disturbed sleep can result in a chronic fatigue syndrome which impacts heavily on patients' quality of life by resulting in limitations of activities, emotional problems and impaired learning ability in children. The appropriate treatment of allergic rhinitis will improve sleep quality and thereby quality of life.[27]

The foregoing discussions can be summarised by a fairly sweeping statement that allergic rhinitis (and other chronic rhinitides), are seldom limited to the nose. Therefore, in the examination and investigation of a patient with suspected allergic rhinitis, the entire upper airway should be examined (sinuses, ears, throat). Clinical examination of the ears, as well as tympanometry frequently reveals middle ear disease. X–ray examination of the sinuses, although often performed, is limited in its ability to demonstrate chronic inflammation.

It must be stated that although the relationship of sinuses and nose seems obvious and worth treating as a single entity, there is a strong relationship between upper airway allergy and asthma. More than 75% of asthmatic children have co-existing allergic rhinitis.[27] Chronic sinusitis should therefore be considered in cases of asthma resistant to treatment, as this has frequently been shown to be associated.[27]

The most effective therapy of allergic rhino-sinusitis (as the disease should correctly be called) involves the topical nasal steroids.[27] Other therapeutic modalities play a role either in relieving acute symptoms or treating complications. The use of antibiotics should be restricted to acute sinusitis or otitis media, but adequate prevention should render this unnecessary. It is interesting to note that topical steroids do not predispose to, or aggravate, an infective process.[26]

Figure 2 outlines the approach to recurrent rhinitis.

URTI's are common but so is allergic rhinosinusitis. There is a limited role for antimicrobial agents in upper airway disease. There is also a very limited role for oral corticosteroids. Antibiotics should be used cautiously and correctly for specific acute bacterial infection and not prophylactically and corticosteroids (preferably topically) will solve many of the problems of allergic upper airway disease. It is useful to think of allergy in the child who is getting repeated upper respiratory tract 'infections' especially when symptoms occur through summer.

See CPD Questionnaire, page 52

Ⓟ This article has been peer reviewed

References

1. Razon Y, Ashkenazi S, Cohen A, et al. Effect of educational intervention on antibiotic prescription practices for upper respiratory infections in children: a multicentre study. J Antimicrob Chemother 2005; in press
2. Dollman WB, LeBlanc VT, Stevens L, O'Connor PJ, Turnidge JD. A community-based intervention to reduce antibiotic use for upper respiratory tract infections in regional South Australia. MJA 2005; 182: 617-620
3. International Rhinitis Management Working Group. International Consensus report on the diagnosis and management of rhinitis. Allergy 1994; S1 - S32
4. Herendeen NE, Szilagy PG. Infections of the upper respiratory tract. In: Behrman RE, Kliegman RM, Jenson HB, editors. Nelson Textbook of Pediatrics. 16th ed. Philadelphia: W.B. Saunders Company; 2000: 1261-66
5. Pitrez PMC, Pitrez JLB. Acute upper respiratory tract infections: outpatient diagnosis and treatment. J Pediatr 2003;79 Suppl 1: S77-S86
6. Holgate ST. Exacerbations. The asthma paradox. Am J Respir Crit Care Med 2005; 172: 941-942
7. Green RJ, Davis G. The burden of allergic rhinitis. Current Allergy Clinical Immunology 2005;18: 16-18
8. Taverner D, Bickford L, Draper M. Nasal decongestants for the common cold. Cochrane Database Syst Rev 2000; (2): 1953
9. Teo SS, Nguyen-Van-Tam JS, Booy R. Influenza burden of illness, diagnosis, treatment, and prevention: what is the evidence in children and where are the gaps? Arch Dis Child 2005; 90: 532-536
10. van Cauwenberge P, Ingels K. Effects of viral and bacterial infection on nasal and sinus mucosa. Acta Otolaryngol 1996;116: 316-21
11. Brink AJ, Cotton MF, Feldman C, et al. Guideline for the management of upper respiratory tract infections. S A Med J 2004; 94: 475-483
12. Conrad DA, Jenson HB. Management of acute bacterial rhinosinusitis. Curr Opin Pediatr 2002;14: 86-90
13. Garbutt JM, Godstein M, Gellman E, Shannon W, Littenberg B. A randomized, placebo-controlled trial of antimicrobial treatment for children with clinically diagnosed acute sinusitis. Pediatrics 2001;107: 619-25
14. Barlan IB, Erkan E, Bakir M, Berrak S, Basaran MM. Intranasal budesonide spray as an adjunct to oral antibiotic therapy for acute sinusitis in children. Ann Allergy Asthma Immunol 1997;78: 598-601
15. Yilmaz G, Varan B, Yilmaz T, Guarakan B. Intranasal budesonide spray as an adjunct to oral antibiotic therapy for acute sinusitiis in children. Eur Arch Otorhinolaryngol 2000;257: 256-9
16. Meltzer EO, Charous BL, Busse WW, Zienreich SJ, Lorber RR, Danzig MR. Added relief in the treatment of acute recurrent sinusitis with adjunctive mometasone furoate nasal spray. The Nasonex Sinusitis Group. J Allergy Clin Immunol 2000;106: 630-7
17. Meltzer EO, Bachert C, Staudinger H. Treating acute rhinosinusitis: Comparing efficacy and safety of mometasone furoate nasal spray, amoxicillin, and placebo. J Allergy Clin Immunol 2005;116: 1289-1295
18. Green RJ, Oral steroids in lower respiratory tract disease. Update 2005; 21: 46-49
19. Green RJ, Five steps to optimizing asthma control for children. Update 2004;
20. South African Allergic Rhinitis Working Group. Allergic Rhinitis in South Africa, Diagnosis and Management, S Afr Med J 1996; 86 (Part 2): 1313-1328
21. Arroll B. Antibiotics for upper respiratory tract infections: an overview of Cochrane reviews. Respir Med 2005; 99: 255-261
22. Strachan DP. Hay fever, hygiene, and household size. BMJ 1989; 299:1259-1260
23. Scadding GK, Alves R, Hawk L, Darby Y, Navas-Romero J, Martin JAM. Medical management of serous otitis media. Clin Exp Allergy (Suppl) 1993; 23: 14
24. Irander K, Borres MP, Björksten B. Middle ear diseases in relation to atopy and nasal metachromatic cells in infancy. Int J Pediatr Otorhinolaryngol 1993; 26(1): 1 – 9
25. Shapiro GG. Role of allergy in sinusitis. Pediatr Infect Dis 1985; 4 (6 Suppl): 555-559
26. Green RJ Critical factor in the management of children with inflammatory airway disease (PhD thesis). University of the Witwatersrand 2003: Johannesburg
27. Green RJ, Quality of life, allergic rhinitis and anti-histamines. Paediatric Review 2004;3: 39-47