

Management of upper respiratory tract infection in Dutch general practice

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SUMMARY. A questionnaire, sent to a 10% random sample of Dutch general practitioners ($n = 635$) included descriptions of four cases of upper respiratory tract infections (acute tonsillitis, recurrent tonsillitis, acute otitis media and sinusitis). This was used to study the general practitioners' management of upper respiratory tract infections. A total of 376 doctors responded (59%). The majority of general practitioners would prescribe antibiotics for sinusitis (80% of respondents) but only 29% would prescribe antibiotics for acute otitis media. For acute tonsillitis and recurrent tonsillitis the proportions were 52% and 59%, respectively. The low prescription rate for acute otitis media was in accordance with national standards, such as the standard of the Netherlands college of general practitioners. A penicillin (phenoxymethylpenicillin or phenethicillin) was most likely to be selected for the two types of tonsillitis, amoxicillin for acute otitis media and doxycycline for sinusitis. Other antibiotics such as erythromycin, other tetracyclines and ampicillin, were seldom selected. Most respondents would prescribe antibiotics for seven days, but there was considerable variation. The influence of the characteristics of the general practitioners and their practices on their antibiotic prescribing was small. Only type of practice correlated with antibiotic treatment, in that general practitioners in single-handed practices would prescribe antibiotics more often than their colleagues in health centres. Among those who would prescribe symptomatic treatment nearly all would prescribe nosedrops for acute otitis media and sinusitis. Eighty five per cent of the respondents would refer the patient with recurrent tonsillitis, while 10% would refer the patient with acute otitis media.

The results suggest that some aspects of the prescribing behaviour of Dutch general practitioners might be improved.

Introduction

IN general practice 25% of the cases presented are upper respiratory tract infections^{1,2} and there is great variation in the management of these common diseases. General practitioners vary in the extent to which they prescribe antibiotics³⁻⁷ and there are also differences in the frequency of interventions such as tonsillectomy and adenoidectomy.^{8,9} Psychosocial information not only influences the management but also the diagnosis.^{10,11} In the last decade more attention has been paid to rational prescribing policies for antibiotics.¹²⁻¹⁶

The effectiveness of antibiotics is in doubt in many cases of upper respiratory tract infection.^{4,8,12} Stott found that complication rates for doctors prescribing penicillin in 20% of cases

of upper respiratory tract infection were the same as those for doctors who prescribed penicillin in 60% of cases.¹² Scandinavian and Dutch studies have shown that antibiotics are not essential in the management of acute otitis media^{4,6,17-19} and despite the existence of these studies with high methodological standards the question of whether or not antibiotics contribute to a better outcome in patients with this condition has not been answered adequately. Following the results of studies carried out more than 20 years ago antibiotic therapy is still standard in most countries^{20,21} and many general practitioners prescribe antibiotics in cases where there is a high probability of non-streptococcal pharyngitis.¹⁶

The *Nederlands Huisartsen Genootschap*, the college of general practitioners in the Netherlands, has developed a programme to set standards for diagnosis and management in general practice.²² These standards have been developed by small working groups of four to six general practitioners, judged by a panel of 50 general practitioners and considered for acceptance by the college. The therapeutic guidelines of the board of the *Ziekenfonds* (the Netherlands sick fund) — a semi national health service under which 60% of the Dutch population is insured — are also used by Dutch general practitioners. The aim of this study was to describe general practitioners' management of upper respiratory tract infections in the light of these standards and current research.

Method

In 1987-88 a postal questionnaire was sent to a 10% random sample of Dutch general practitioners ($n = 635$). A reminder was sent to all the doctors in the sample two weeks after the first questionnaire. Three weeks after the reminder had been sent another copy of the questionnaire was sent to those who had not yet responded; another copy was sent to non-respondents a further four weeks later.

Questionnaire

The questionnaire consisted of 20 case histories, four of which were cases of upper respiratory tract infection.

Acute tonsillitis. A 14-year-old boy attends with a sore throat which he has had for two days. He feels ill and in the last 24 hours has developed a fever (38.5 °C). Physical examination reveals 'red throat'; exudation; swollen cervical lymph nodes; no rhinorrhoea.

Recurrent tonsillitis. A six-year-old girl attends with her mother. She has a sore throat, difficulty swallowing and has had a fever (38.8 °C) for two days. She looks ill. In the previous two years she has had tonsillitis six times and has been prescribed penicillin on three of these occasions. In the previous year she was absent from school for one month. Physical examination reveals very swollen tonsils; exudation on pharynx and tonsils; no rhinorrhoea; painful cervical and submandibular lymph nodes.

Acute otitis media. A three-and-a-half-year-old girl is seen at her home at 22.00 hours with a fever of sudden onset. She is crying and looks very ill. Her mother suspects acute otitis media. The girl has had rhinorrhoea for two weeks. You diagnosed acute otitis media on two previous occasions, five and 14 months ago.

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Physical examination reveals fever (38.7 °C); red eardrum; mucopurulent rhinorrhoea; swollen cervical lymph nodes.

Sinusitis. A 52-year-old man attends with a headache above the eyes which he has had for a week. The headache began just after a cold and increases on bending down. Physical examination reveals pain with pressure on sinus; purulent rhinorrhoea.

The other cases included neurological and non-specific problems. The diagnostic labels, determined by agreement among four general practitioners, were not included on the questionnaire. The general practitioners were asked how they would manage the hypothetical cases. They were given a list of options to tick, including reassurance, explanation, prescription of drugs, additional investigations and referral to hospital. If they ticked prescription of drugs they were asked to give the drug name, the daily dosage and the duration of treatment. The questionnaire also asked about year of graduation, vocational training in general practice, type of practice and distance to the nearest hospital.

Classification of diagnosis and treatment

The medication recommended by the respondents was classified according to the anatomical therapeutic chemical classification system.²³

To interpret the quality of the answers given by the general practitioners the following criteria, derived from research and national standards, were considered. In the case of acute tonsillitis four criteria should be used to determine whether the patient has a group A beta-haemolytic streptococci infection.²⁴ The two criteria fever and exudation were positive in this case history. The third criterion is swollen anterior lymph nodes. However, as the term 'swollen lymph nodes' was given without the description 'anterior' it could also be interpreted as swollen posterior lymph nodes, suggesting the possibility of infectious mononucleosis. Lack of cough, the fourth criterion, was not reported in the case history. The chance of a group A beta-haemolytic streptococci infection in this case could therefore be estimated at 15–56%²⁴ and the efficacy of antibiotics is in doubt.

In the case of recurrent tonsillitis the general practitioner had to decide whether to refer for a tonsillectomy. The combination of six episodes of tonsillitis in two years and one month's absence from school is an insufficient indication for a tonsillectomy.²⁵

The third case met international standards for diagnosis of acute otitis media.^{26,27} The management of acute otitis media is controversial.^{4,6,17-19,26,27} According to the guidelines in the standard of the Netherlands college of general practitioners children over two years of age should receive antibiotics only in cases where earache has lasted for three days or longer or where fever is one of the symptoms.

In the fourth case the diagnosis of non-acute sinusitis cannot be made definitely.²⁸ The efficacy of antibiotics in treating this condition has not been clearly established.^{29,30}

Analysis

All data were analysed by computer using the statistical package for the social sciences (SPSS). The Kendall rank correlation coefficient (tau) was used for the analysis of the relationship between prescribing behaviour with respect to antibiotics on the one hand and physician characteristics on the other.

Results

A total of 376 general practitioners returned questionnaires (59% response rate). The returned questionnaires were all suitable for evaluation. Responding general practitioners had graduated more

recently and were more likely to have undertaken vocational training in general practice than non-respondents ($P < 0.001$). However, no differences were found with regard to type of practice or distance to the nearest hospital. Five per cent of the data were double coded with almost complete agreement between raters (99%).

In the case of acute tonsillitis, one in four general practitioners would give no treatment at all (Table 1). However, in the other three cases no treatment was the exception. Eighty five per cent of the doctors would refer the patient in the case of recurrent tonsillitis, while the patient with acute otitis media would be referred by 10% of the respondents. None of the doctors would refer the patients with acute tonsillitis or sinusitis.

The percentage of respondents who would prescribe antibiotics was highest for the case of sinusitis (84%) and lowest for the case of acute otitis media (29%) (Table 1). Penicillin was selected by most respondents for tonsillitis (Table 2). Amoxycillin was more frequently selected for recurrent tonsillitis than for acute tonsillitis. In the case of acute otitis media most respondents would prescribe amoxycillin while in the case of sinusitis most doctors would prescribe doxycycline.

In general the dose of antibiotics that would be prescribed agreed with international standards. More respondents would prescribe a relatively high dose of antibiotics in the case of recurrent tonsillitis than in the case of acute tonsillitis. In the former case 59% of respondents would prescribe a relatively high dose (at least 375 mg penicillin per day in three doses for a six-year-

Table 1. Management of the four cases of upper respiratory tract infection by the 376 general practitioners.

Management	% of general practitioners			
	Acute tonsillitis	Recurrent tonsillitis	Acute otitis media	Sinusitis
None	27	3	6	3
Symptomatic medication	24	9	65	17
Antibiotics	52	59	29	84
Referral	0	85	10	0

NB: Some respondents would use more than one category of management.

Table 2. Antibiotics that would be prescribed by the 376 general practitioners, and the duration of antibiotic treatment, for the four cases of upper respiratory tract infection.

	% of general practitioners			
	Acute tonsillitis (n = 196)	Recurrent tonsillitis (n = 220)	Acute otitis media (n = 110)	Sinusitis (n = 314)
<i>Antibiotic prescribed</i>				
Penicillin ^a	92	79	15	2
Ampicillin	0	1	3	0
Amoxycillin	6	16	72	18
Doxycycline	0	0	1	70
Tetracycline	0	0	0	3
Other/not specified	2	4	9	7
<i>Duration of treatment</i>				
5 days	39	20	10	24
7 days	51	56	70	65
10 days	10	24	20	11

n = number of respondents prescribing antibiotics. ^a Phenoxyethylpenicillin or phenethicillin.

old child) and in the latter 32% would prescribe a relatively high dose (at least 1000 mg penicillin per day in four doses for a 14-year-old child).

Antibiotics would most commonly be prescribed for seven days (Table 2). However, up to 39% of the prescriptions were for only five days. Shorter treatment was most likely to be prescribed for acute tonsillitis.

The influence of the characteristics of the doctors and their practices on their prescribing behaviour with respect to antibiotics was small. There was a low correlation between the type of practice and the frequency with which antibiotics would be prescribed (Kendall's tau = 0.16; $P < 0.05$): single-handed general practitioners would prescribe antibiotics more frequently than their colleagues in group practices and general practitioners working in health centres would prescribe antibiotics least often of all. There was no relationship between the doctors' year of graduation, whether they had undertaken vocational training and the distance from their practice to the nearest hospital, and whether or not they would prescribe antibiotics.

The proportion of respondents who would prescribe symptomatic medication increased as the proportion prescribing antibiotics and making referrals decreased (Table 1). Thus, 65% of general practitioners would prescribe symptomatic treatment in the case of acute otitis media. The symptomatic medication prescribed was most commonly an analgesic in both cases of tonsillitis (acute 84%; recurrent 73%). Patients with acute otitis media and sinusitis mostly received nasal decongestants (65% and 85% respectively).

Discussion

The response rate in this study was 59%. In general, a response rate of more than 65% is an unrealistic aim for a postal questionnaire on a national scale. In local or regional samples where a university department or health board may have a relatively close relationship with the general practitioners in the area, higher response rates are likely to be achieved. The responding general practitioners in this study were representative of the total sample except that respondents had graduated more recently and were more likely to have undertaken vocational training in general practice than non-respondents. However, these factors did not influence the respondents' prescribing behaviour with respect to antibiotics and therefore this difference does not limit the external validity of the study.

The method used in this study is attractive as it allows data to be collected from a large number of subjects and by presenting the general practitioners with identical cases, their answers can be compared. It could be argued that responses to written questionnaires do not represent actual behaviour,³¹ but a previous study has shown a close correlation between the management strategies of general practitioners in response to written simulated cases and in reality.³² When using this method the questions must be carefully phrased to avoid leading the doctor in a particular direction and the range of types of complaints must be limited.³²

The results of this study show that general practitioners' antibiotic prescribing behaviour depends on the type of upper respiratory infection concerned. The type, dose and duration of antibiotics were in approximate agreement with national guidelines but there were some aspects of prescription behaviour, which might be improved. The percentages of doctors prescribing antibiotics for acute and recurrent tonsillitis (52% and 59% respectively) are rather similar to those found in other studies where the range was 44–75%.^{1,33,34} The low prescription rate for acute otitis media is in accordance with the standard of the Netherlands college of general practitioners³⁵ and the results of recent Dutch and Scandinavian clinical trials.¹⁷⁻¹⁹ Dutch general

practitioners have a relatively low prescription rate for acute otitis media (31%) compared with other countries including the United States of America and Belgium.⁶ The high percentage of doctors that would prescribe antibiotics for sinusitis is surprising as the effectiveness of antibiotics has been called into question for this condition.^{28-30,36} The three antibiotics most frequently prescribed were penicillin (phenoxymethylpenicillin or phenethicillin) for acute or recurrent tonsillitis, amoxycillin for acute otitis media and doxycycline for sinusitis. These are appropriate antibiotics for these conditions.^{17,28,37}

Most general practitioners would prescribe antibiotic therapy for seven days. A minority of doctors would prescribe therapy for longer periods, especially in recurrent tonsillitis and acute otitis media. This is appropriate in the case of recurrent tonsillitis but not in the case of acute otitis media. When treating the latter condition short courses (two to three days) of antibiotics at conventional or high doses are equally as effective as longer doses in terms of resolution of symptoms and signs.⁴ The results also show that doctors tend to prescribe higher doses of antibiotics for recurrent tonsillitis than for acute tonsillitis which is appropriate.^{8,37} However, general practitioners tend to prescribe broad spectrum antibiotics (amoxycillin) more frequently for recurrent tonsillitis than for acute tonsillitis which is not appropriate.³⁷

The influence of the doctors' year of graduation, whether they had undertaken vocational training and the distance to the nearest hospital on the policy of prescribing antibiotics was small. The type of practice did, however, seem to be of some importance: general practitioners in single-handed practices would prescribe antibiotics more frequently than their colleagues in health centres. The latter may be restricted by the prescription policies in place in the health centre.

Although no clinical trials have demonstrated the effectiveness of nasal decongestants in acute otitis media and sinusitis, the prescription of decongestive nosedrops for these conditions seems rational on theoretical grounds.²⁶ In the case of sinusitis, improved drainage from the sinus is important to prevent empyema. In acute otitis media one would expect an improvement of the function of the eustachian tube, which can influence the course of the condition.

In this study 85% of the general practitioners would refer the patient with recurrent tonsillitis. This result is striking given the decrease in the number of cases referred for tonsillectomy in the Netherlands and other countries.^{8,9}

From these results it may be concluded that several aspects of the prescribing behaviour of Dutch general practitioners might be improved. The number of prescriptions for amoxycillin, particularly in the case of recurrent tonsillitis, should be reduced; the duration of antibiotic therapy should be limited to five to seven days;⁴ and tonsillectomy should be limited to cases fulfilling the criteria of Paradise.²⁵

The general practitioner needs prospective criteria in order to predict the course of an upper respiratory tract infection as it is useful to be able to decide immediately about possible antibiotic treatment. The criteria developed by Centor and colleagues to detect cases of group A beta-haemolytic streptococci infection are a good example.²⁴ Clinical research into the prognostic factors of upper respiratory tract infections and the effectiveness of antibiotics in these conditions should have high priority.

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