

ORIGINAL RESEARCH

Management of rhinosinusitis in Dutch general practice

*Ruth Hoffmans^a, Tjard Schermer^b, Chris van Weel^b, Wytske Fokkens^a^a Department of Otorhinolaryngology, Academic Medical Centre, Amsterdam, The Netherlands^b Department of Primary and Community Care, Nijmegen Medical Centre, Radboud University, Nijmegen, The Netherlands

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Abstract

Aims: To determine whether general practitioners (GPs) distinguish between the management of acute rhinosinusitis (ARS) and chronic rhinosinusitis (CRS), especially with regard to prescription of antibiotics and nasal steroids.

Methods: A questionnaire on the management of rhinosinusitis was sent to 1000 GPs in the Netherlands.

Results: Ninety-six percent discriminated between ARS and CRS. However, the definition of ARS and CRS varied. The percentage of GPs prescribing antibiotics rose as rhinosinusitis severity increased. The prescription rate of nasal corticosteroids was highest for CRS (88.6%). Prescribing nasal corticosteroids in ARS was not very common.

Conclusions: Most GPs discriminate between ARS and CRS and 54% accepted (the EP3OS-defined) 12 weeks as the division between ARS and CRS. Antibiotics and nasal steroids are commonly used agents, but the management of rhinosinusitis is not always consistent with guidelines.

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See linked editorial by Levy on pg 11

The full version of this paper, with online Appendix, is available at www.thepcrj.org**Introduction**

Rhinosinusitis is defined as a sudden onset of two or more symptoms, one of which should be either nasal blockage or nasal discharge (anterior or posterior nasal drip). Other symptoms are facial pain or pressure, and impairment or loss of smell. When these symptoms are present for less than 12 weeks, this defines acute rhinosinusitis (ARS). When symptoms are present for more than 12 weeks, this represents chronic rhinosinusitis (CRS). ARS can be divided into two groups: common cold/acute viral rhinosinusitis (symptoms disappear in less than 10 days); and acute non-viral/bacterial rhinosinusitis (increase of symptoms after five days or persistent symptoms after 10 days).¹⁻³

In the Netherlands, general practitioners (GPs) generally use the rhinosinusitis management guidelines from the Dutch

College of General Practitioners⁴ which does not distinguish between ARS and CRS. Treatment is based on the severity of symptoms and the risk of developing complications. The guideline advises treating symptoms initially and states that antibiotics are not indicated for a normal course of rhinosinusitis. Local steroids can be tried in patients with an abnormal course or recurrent complaints.⁴

The European guideline, The European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) advises distinguishing between ARS and CRS and basing management on the severity of the disease. Depending on severity, the recommendation for mild ARS (common cold) is to treat symptoms, with nasal steroids being advised in moderate cases. Antibiotics are added only when there are severe symptoms (fever >38°C, severe pain). The first choice treatment in the management of CRS is local steroids.^{1,2}

In a cross-sectional study covering 174 GPs from 89 general practices in the Netherlands, 50% of antibiotic prescriptions were prescribed for respiratory disorders.^{5,6} Twenty-two percent of the antibiotics for respiratory tract infections (RTIs) were

* **Corresponding author:** Mrs Ruth Hoffmans, Department of Otorhinolaryngology, Academic Medical Centre, Meibergdreef 9, Amsterdam, 1105 AZ, The Netherlands. Tel: +31205663789 E-mail: r.hoffmans@amc.uva.nl

prescribed for rhinosinusitis.⁶ The prescription rate in sinusitis-like complaints was 67-70%.^{7,8} In another study, the antibiotic prescription rate in rhinosinusitis was 80%,⁹ and prescription rates for sinus infection in the UK are 91% - 92%.^{10,11} Dutch prescription percentages for outpatient antibiotic use are relatively low compared with international figures.¹²⁻¹⁴

It has been theorised that, by reducing the inflammatory response and mucosal swelling, a topical steroid may promote drainage and increase aeration of the sinuses, hasten the elimination of infectious organisms, and reduce the frequency and severity of recurrences.¹⁵ Several studies have concluded that nasal steroids (in combination with antibiotics or alone) are beneficial in ARS and equally or more effective than antibiotics.¹⁵⁻¹⁸ Furthermore, nasal steroids are the treatment of first choice in CRS.^{2,19}

Recently available data are based on general practice registries in which no distinction is made between ARS and CRS. As a result, we are not able to determine whether GPs distinguish between ARS and CRS.²⁰

The objective of this study, therefore, was to determine whether GPs distinguish between the management of ARS and CRS, and how Dutch GPs manage these two diseases (especially with regard to the prescription of antibiotics and nasal steroids).

Methods

Study design

The Netherlands institute for health services research (NIVEL) was contacted for a random sample of 1000 Dutch GPs (the total GP population on 1 January 2007 was 8,673²¹). A questionnaire on the management of ARS and CRS was developed by the authors of EPOS and sent to these 1000 GPs. All the GPs were given an ID number to determine which GP returned the questionnaire. When GPs did not respond to the first mailing, a second questionnaire was sent three weeks later.

Questionnaire (see Appendix A at www.thepcrj.org)

The questionnaire consisted of three parts:

1. GP characteristics (kind of practice, age etc.)
2. A question on whether the GP differentiated between ARS and CRS
3. Two different questionnaires about the management of rhinosinusitis:
 - a) One for GPs differentiating between ARS and CRS
 - b) One for non-differentiating GPs

GPs were asked to fill out parts 1 and 2 and, depending on the answer to question 2, either part 3a or 3b.

The questionnaire consisted mainly of multiple-choice questions to facilitate participation. The questions about management of rhinosinusitis were sub-divided into questions about three categories:

- Mild rhinosinusitis: symptoms present for less than five

days or improving thereafter

- Moderate rhinosinusitis: persistent symptoms after 10 days or worsening symptoms after five days
- Severe rhinosinusitis: persistent symptoms after 10 days or worsening. The GPs ranked their different treatment options from 1 to 10 (most often (1) – least often (10)). Since the ranks of the different treatment options were not normally distributed, we calculated the median rank per treatment option to describe the GPs' treatment preferences within the severity categories.

Analysis

Data were analysed with SPSS (Statistical Package for the Social Sciences) 16.0. We received information about the characteristics (sex, kind of practice, age and years of practice) of all Dutch GPs from the NIVEL to decide whether the characteristics of the GPs included in this study were representative of the entire GP population.

Results

Five hundred questionnaires were returned (a response rate of 50%). Twenty-nine GPs refused to participate, 46 GPs completed parts 1 and 2 only, 395 filled out the complete questionnaire, and 26 forgot to complete parts 1 and 2 but did fill out part 3a or b. Four GPs said they discriminated between ARS and CRS, but completed part 3b instead of 3a (Figure 1). Four duplicate cases (IDs) were found in the responders. Since we did not know which were the right questionnaires, we used both in our analysis.

Most of the parameters of the responder GPs (who returned the questionnaire) were comparable to the non-responders (GPs who did not respond). Of the responders, 33% worked in a group practice, but this figure was 60% for the non-responders ($p=0.000$). Furthermore, the responders worked more often alone or in a practice with one other GP than the non-responders. The only age group in which there was a significant difference between responders and non-

Figure 1. Organogram.

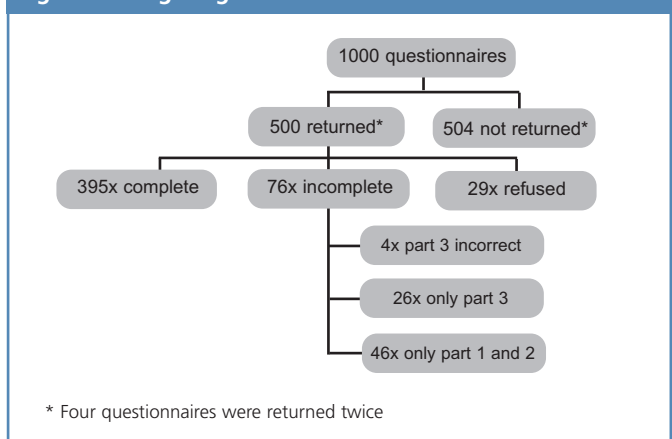


Table 1. Characteristics.

| | Responders % | Non-responders % |
|-------------------------|--------------|------------------|
| Male | 68.2 | 71.3 |
| Female | 31.8 | 28.7 |
| Solopractice | 33.9* | 16.3 |
| Duopractice | 33.5* | 23.5 |
| Grouppractice | 32.6* | 60.2 |
| Aged < 30 years | 0.4 | 0.0 |
| Aged 30-34 years | 4.0 | 3.2 |
| Aged 35-39 years | 14.6* | 8.3 |
| Aged 40-44 years | 14.4 | 15.4 |
| Aged 45-49 years | 16.2 | 14.7 |
| Aged 50-54 years | 19.8 | 24.1 |
| Aged 55-59 years | 19.3 | 22.1 |
| Aged 60-64 years | 10.8 | 11.0 |
| Aged ≥ 65 years | 0.4 | 1.3 |
| <5 years of practice | 15.5* | 6.1 |
| 5-10 years of practice | 17.3 | 19.8 |
| 10-15 years of practice | 15.5 | 16.2 |
| 15-20 years of practice | 13.1 | 12.8 |
| 20-25 years of practice | 13.3 | 15.8 |
| >25 years of practice | 25.2 | 29.3 |

* Significant difference between responders and non-responders (p<0.05)

responders was the 35-39-year group (p=0.001). Significantly more responders had worked as GPs for less than five years (Table 1).

Do you discriminate between ARS and CRS for your treatment?

Ninety-six percent said they differentiated (the 'differentiating group') between ARS and CRS. The management of GPs differentiating between ARS and CRS will be further evaluated. The group of GPs that do not differentiate between ARS and CRS is too small to draw any significant conclusions.

How long must symptoms have been present before you consider a diagnosis of CRS to be appropriate?

An analysis of the answers from the differentiating group of GPs showed that most GPs see 12 weeks as the critical period (54%), with a slightly smaller group opting for 4 weeks (39%). The other 7% of GPs adopted other periods of time (see Figure 2).

What percentage of your population has been diagnosed with rhinosinusitis in the past 12 months?

The incidence estimate from most of the GPs in the differentiating group was 2-5% for ARS and less than 2% for CRS.

Do you agree with the following statement? – "To diagnose rhinosinusitis, radiology is not recommended"

In the differentiating group, 98% of the GPs reported that

Figure 2. Duration of symptoms to be considered CRS.

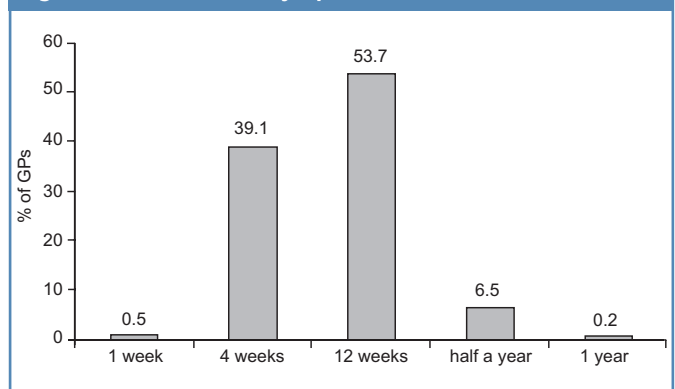


Table 2. Treatment of mild ARS.

| | Mild ARS % | | |
|-----------------------|---------------|--------------------------|----------------|
| No treatment | 48.5 | | |
| Treatment | 51.5 | | |
| | % prescribing | Median rank [§] | % first choice |
| Decongestives | 91.3 | 1.0 | 61.2 |
| Painkillers | 65.8 | 2.0 | 37.2 |
| Steaming | 55.8 | 2.0 | 18.4 |
| Nasal douche | 31.7 | 2.0 | 34.9 |
| Oral antibiotics | 20.6 | 4.0 | 2.6 |
| Nasal steroids | 19.4 | 3.0 | 2.6 |
| Oral antihistamine | 6.9 | 4.0 | 0.0 |
| Mucolytics | 5.1 | 4.0 | 9.1 |
| Systemic steroids | 3.2 | 9.0 | 0.0 |
| Other | 2.8 | 2.5 | 16.7 |
| Alternative treatment | 2.3 | 2.0 | 20.0 |
| Topical antibiotics | 2.3 | 6.5 | 0.0 |

§ Median rank of the GPs prescribing this medicine (1=most often, 10=least often)

there is no need for radiology in diagnosing ARS. Opinions differed for CRS: 39% still agreed there was no need for radiology, but 54% usually arranged an X-ray, 2% suggested a CT scan and 5% proposed something else.

Do you treat patients with mild acute rhinosinusitis?

Of the differentiating group, 51.5% treated patients with mild ARS. They prescribed decongestives most frequently (91.3%). Decongestives had a median rank of 1 (first-choice treatment). 20.6% of the GPs prescribed oral antibiotics. However, only 2.6% of them reported that antibiotics were their first choice treatment. The median rank for prescribing antibiotics was 4. Nasal steroids were prescribed by 19.4% of the GPs and the median rank was 3 (see Table 2). Again, only 2.6% of them reported nasal steroids to be their first-choice treatment.

Table 3. Treatment of moderate ARS.

| Moderate ARS % | | | |
|-----------------------|---------------|--------------------------|----------------|
| No treatment | 17.5 | | |
| Treatment | 82.5 | | |
| | % prescribing | Median rank [§] | % first choice |
| Decongestives | 83.5 | 1.0 | 59.5 |
| Painkillers | 62.3 | 2.0 | 38.7 |
| Steaming | 45.2 | 2.0 | 22.2 |
| Nasal steroids | 37.3 | 2.5 | 21.7 |
| Oral antibiotics | 34.0 | 3.0 | 17.2 |
| Nasal douche | 28.5 | 2.0 | 21.5 |
| Oral antihistamine | 7.2 | 4.0 | 0.0 |
| Mucolytics | 5.1 | 5.0 | 0.0 |
| Systemic steroids | 2.7 | 10.0 | 0.0 |
| Alternative treatment | 1.8 | 9.0 | 20.0 |
| Topical antibiotics | 1.8 | 9.0 | 16.7 |
| Other | 0.9 | 10.0 | 33.3 |

§ Median rank of the GPs prescribing this medicine (1=most often, 10=least often)

Do you treat patients with moderate acute rhinosinusitis?

Most (82.5%) of the differentiating GPs treated patients with moderate rhinosinusitis. Decongestives were most frequently prescribed and were their first choice treatment. Antibiotics were prescribed by 34% of the GPs, and ranked third. 17.2% of the GPs prescribing antibiotics reported this treatment to be their first choice. An even higher percentage (37.3%) prescribed nasal steroids (median rank 2.5). Of these GPs, 21.7% said that nasal steroids were their preferred treatment (see Table 3).

Do you treat patients with severe acute rhinosinusitis?

Nearly all GPs in the differentiating group treated patients with severe ARS (99%). Antibiotics were most frequently prescribed (84%). 39.1% of the GPs prescribing antibiotics reported antibiotics to be their first choice. The median rank for prescribing antibiotics was 2, but there was no median rank 1. The most commonly prescribed antibiotic in mild, moderate and severe (A)RS was doxycycline. Nasal steroids were prescribed by 28% of the GPs treating severe ARS; 14.7% of them said that nasal steroids was their first choice treatment. The median rank for nasal steroids was 3 (see Table 4).

When do you refer patients with moderate (acute) rhinosinusitis to a specialist?

Almost half of the GPs (46.5%) said that they never refer these patients to a specialist. One-third reported referring after four weeks of treatment without improvement. 6% referred after two weeks of treatment without improvement, and 1.5%

Table 4. Treatment of severe ARS.

| Severe ARS % | | | |
|-----------------------|---------------|--------------------------|----------------|
| No treatment | 1.0 | | |
| Treatment | 99.0 | | |
| | % prescribing | Median rank [§] | % first choice |
| Oral antibiotics | 84.0 | 2.0 | 39.1 |
| Decongestives | 75.5 | 2.0 | 34.8 |
| Painkillers | 75.4 | 2.0 | 47.7 |
| Steaming | 40.2 | 3.0 | 15.2 |
| Nasal steroids | 28.0 | 3.0 | 14.7 |
| Nasal douche | 23 | 3.0 | 14.5 |
| Oral antihistamine | 5.1 | 5.0 | 15.0 |
| Systemic steroids | 4.8 | 5.0 | 0.0 |
| Mucolytics | 3.5 | 5.0 | 8.3 |
| Topical antibiotics | 2.3 | 4.5 | 25.0 |
| Other | 1.3 | 10.0 | 33.3 |
| Alternative treatment | 1.3 | 10.0 | 20.0 |

§ Median rank of the GPs prescribing this medicine (1=most often, 10=least often)

referred after one unsuccessful course of antibiotics. The rest had other policies for referring these patients.

When do you refer patients with severe (acute) rhinosinusitis to a specialist?

One-third of the GPs from the differentiating group referred after two weeks of treatment without result. 17.9% did this after four weeks and 14.2% after one course of antibiotics. 10% never referred and 11.4% did after 48 hours if there was no effect from nasal steroids and/or antibiotics. Two GPs (0.5%) always referred.

When do you refer patients with ocular or neurological complications to a specialist?

Most of the differentiating GPs always referred to a specialist (87.8%). 2% reported referring after two weeks of treatment without improvement and 3.5% after 48 hours if there was no effect from nasal steroids and/or antibiotics. 1.7% referred after one course of antibiotics that did not work, 0.5% never referred and 4.5% did something else.

Do you treat patients with CRS?

Seventeen GPs (4.2%) did not treat these patients. Four of them always referred these patients to a specialist. The 95.8% who did treat patients with CRS prescribed nasal steroids most frequently (88.6%). Of these, 71.3% reported nasal steroids as their preferred treatment. They ranked nasal steroids first. Antibiotics were prescribed by 41.3% of the GPs, 36.9% of whom preferred this treatment above others. The median rank of antibiotics was 2 (see Table 5).

When do you refer patients with CRS to a specialist?

Over half of the differentiating GPs (60.8%) reported referring

Table 5. Treatment of CRS.

| | CRS % | | |
|-----------------------|---------------|--------------------------|----------------|
| No treatment | 4.2 | | |
| Treatment | 95.8 | | |
| | % prescribing | Median rank [§] | % first choice |
| Painkillers | 47.5 | 2.0 | 28.9 |
| Nasal steroids | 88.6 | 1.0 | 71.3 |
| Oral antibiotics | 41.3 | 2.0 | 36.9 |
| Oral antihistamine | 24.5 | 2.0 | 4.5 |
| Decongestives | 22.2 | 2.0 | 22.9 |
| Nasal douche | 19.1 | 2.0 | 15.9 |
| Steaming | 14.2 | 3.0 | 14.9 |
| Systemic steroids | 9.3 | 3.0 | 16.1 |
| Mucolytics | 3.9 | 4.0 | 0.0 |
| Other | 2.1 | 3.5 | 0.0 |
| Alternative treatment | 2.1 | 6.5 | 0.0 |
| Topical antibiotics | 2.1 | 10.0 | 28.6 |

§ Median rank of the GPs prescribing this medicine (1=most often, 10=least often)

after four weeks of treatment without improvement. 15% referred after two weeks of treatment, 2% never referred, 1.7% always referred to a specialist, and 1.2% referred after one unsuccessful course of antibiotics. The others (19.2%) had various other strategies like "on demand of the patient" or "in case of recurrence".

When do you want patients with CRS to visit you again for reassessment after you start therapy?

Most of the GPs (55.6%) wanted their patients to come back after two weeks and 38.7% after four weeks. Five GPs (1.3%) reassessed after 48 hours and 4.4% after 12 weeks.

Discussion

ARS and CRS may both be termed "rhinosinusitis", meaning "inflammation of the nose and sinuses". However, for clinical and research purposes, differentiation between these entities is preferable. Although far from being completely understood, pathological mechanisms in ARS and CRS are better understood today and begin to allow us to differentiate these diseases in terms of their cytokine profile, pattern of inflammation, and their remodelling processes.² It is therefore important to distinguish ARS from CRS because these two disease entities seem to have different underlying aetiologies and pathogenesis.

Although an earlier study did not allow us to determine whether GPs differentiated between ARS and CRS,²⁰ this study proves that they do (96% did differentiate). It is surprising that GPs do differentiate, given that the Dutch College of General Practitioners guideline does not distinguish between

ARS and CRS.⁴ In fact, a guideline for chronic rhinosinusitis that will make this distinction is being developed by (among others) otorhinolaryngologists and GPs.²²

In this study, the duration of symptoms after which the GPs consider the condition to be CRS is not consistent. EPOS recommends a period of 12 weeks.² Approximately half the GPs surveyed said that they used 12 weeks as their criterion. The period used by the rest varied.

Almost no GPs use radiology for diagnosing ARS, which is in accordance with current guideline advice.^{2,4} The conclusion of a Dutch randomised controlled trial in 1997 was that, for patients with acute maxillary rhinosinusitis presenting to general practice, an initial radiographic examination is not necessary.²³ This study also concluded that antibiotic treatment (with amoxicillin) did not improve the clinical course of rhinosinusitis presenting in general practice.²³ Acute rhinosinusitis will often resolve in most patients without antibiotic treatment, even if it is bacterial in origin.²³⁻²⁶ Common clinical signs and symptoms cannot identify patients with rhinosinusitis for whom treatment with antibiotics is clearly justified. Antibiotics are not justified even if a patient reports symptoms persisting for more than 7-10 days.²⁶

Data from Jacobs *et al.* demonstrate the continued evolution of bacterial resistance due to the overprescribing of antibiotics and highlight the need for limiting the unnecessary prescription of antimicrobials in community-acquired respiratory tract infections (RTIs).²⁷ It has been shown that countries with high levels of consumption have higher rates of antibiotic resistance.¹³ Although the antibiotic prescription rate in the Netherlands is extremely low compared to most European countries, and Dutch GPs do well,¹²⁻¹⁴ a considerable amount of antibiotics is still used unnecessarily. In our study, GPs consider prescribing antibiotics for mild to moderate acute rhinosinusitis, whilst the guidelines recommend otherwise. The results of recent randomised controlled trials constitute a firm scientific basis for restrictive antibiotic prescription behaviour.^{23,25} Initial management can be limited to symptom treatment.^{4,23}

The EPOS guidelines consider symptoms lasting for less than five days, or improving thereafter, to constitute a common cold – in which case symptomatic treatment is advisable. When symptoms worsen after five days or persist after 10 days, a distinction is made between moderate and severe ARS. Severe ARS is ARS with fever > 38°C and/or severe pain. For moderate rhinosinusitis, topical steroids are advised, and antibiotics and nasal steroids are advised for severe ARS.² These recommendations are based on recent studies showing that additional nasal corticosteroids are as effective as, or more effective than, antibiotics.¹⁵⁻¹⁸ This provides a welcome alternative to antibiotics without the negative consequences of microbial resistance. In the Dutch

College of General Practitioners guideline, local corticosteroids are advised only after the failure of other treatment, in persistent or recurring complaints, or in patients with an abnormal course of rhinosinusitis.⁴

Corticosteroid prescription for moderate and severe ARS in our study was not very common. Only a third of the GPs in our study considered prescribing corticosteroids in moderate or severe ARS. We would like to see a higher prescription rate for the treatment of moderate and severe ARS.

In the Dutch College of General Practitioners and the EPOS guidelines, immediate referral is recommended in the presence of alarming symptoms such as periorbital oedema, displaced globe, double vision, ophthalmoplegia, reduced visual acuity, severe unilateral or bilateral headache, frontal swelling, signs of meningitis or focal neurological signs.^{2,4} It is worrying that 12.2% of the differentiating GPs do not refer immediately. Patients can still die of complications of ARS.²⁸

According to the Dutch College of General Practitioners, referral should be considered when there is an abnormal disease course that does not respond to treatment or does not respond sufficiently.⁴ EPOS suggests considering referral when there is no improvement after 14 days of treatment in moderate ARS. In severe ARS cases, GPs should refer if there is no improvement in 48 hours.² In the general practices studied, only 6% of the GPs referred patients with moderate ARS in accordance with the EPOS recommendations.

In our study, more than half of the GPs arranged a plain X-ray in CRS cases. The sensitivity of plain film radiography when detecting sinus opacification is unacceptably low for the ethmoid, frontal and sphenoid sinuses compared to a CT scan.²⁹ Especially in chronic rhinosinusitis – where mucosal thickening alone may be present – the drawback of overlapping structures makes evaluation of the osteomeatal complex, anterior ethmoid sinus, middle meatus and sphenoid sinus limited.³⁰ Plain X-rays are therefore not advisable for CRS.

For the treatment of CRS, EPOS advises GPs to prescribe nasal steroids, to advise nasal douching, and to prescribe antihistamines if the patient is allergic.² In this study, in CRS, the prescribing rate for nasal steroids is rather high (88.6%). Patients with CRS are referred to a specialist – as recommended in EPOS (after four weeks of treatment without improvement) – by 60.8% of the differentiating GPs.² EPOS advises the re-evaluation of CRS after 4 weeks² and 38.7% of the GPs report doing this.

The study questionnaire asks GPs what they say they do, but does not check what they actually do. In an earlier study we studied morbidity registrations used by Dutch GPs; we found that 91% of the GPs prescribed medication, 3% referred to a specialist and 8% applied for radiology.²⁰

In conclusion, GPs do not seem to differentiate between

ARS and CRS in the way described in EPOS. Their management of rhinosinusitis is not very consistent. It would be interesting to find out whether patients with rhinosinusitis benefit more from compliance with the EPOS guideline than when GPs make their own decisions about the choice of treatment. We are therefore planning to conduct a randomised study to compare outcomes in patients with ARS presenting to general practice. If compliance with the EPOS guideline proves more effective in treating rhinosinusitis, changes may be required to the Dutch College of General Practitioners guideline.

Conflict of interest declarations

There are no conflicts of interest.

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Available online at <http://www.thepcrj.org>

Appendix A. Questionnaire: Management of rhinosinusitis in general practice.

1. How long have you been practicing as a general practitioner?

- < 5 years
- 5-10 years
- 10-15 years
- 15-20 years
- 20-25 years
- 25 years



2. In what kind of practice do you work?

- Solo practice
- Duo practice
- Group practice

3. In which age group are you?

- < 30 years
- 30-34 years
- 35-39 years
- 40-44 years
- 45-49 years
- 50-54 years
- 55-59 years
- 60-64 years
- 65 years

4. From which duration of complaints would/do you speak of chronic rhinosinusitis?

- 1 week
- 4 weeks
- 12 weeks
- Half a year
- 1 year

5. Do you differentiate between mild, moderate and severe complaints in your treatment of rhinosinusitis? YES NO

6. Do you differentiate between acute and chronic complaints in your treatment of rhinosinusitis? YES NO

IF YOU ANSWERED **QUESTION 6** WITH **YES** ➡ PLEASE FILL OUT THE **PINK** QUESTIONNAIRE.

IF YOU ANSWERED **QUESTION 6** WITH **NO** ➡ PLEASE FILL OUT THE **YELLOW** QUESTIONNAIRE.

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

YOU DO DISCRIMINATE BETWEEN ACUTE AND CHRONIC RHINOSINUSITIS

The next questions are about **acute** rhinosinusitis.

1. What percentage of your total patients has had a diagnosis of acute rhinosinusitis during the past 12 months? (choose one)

- <2%
- 2-5%
- 6-10%
- 11-19%
- 20% or more

2. Do you agree with the following statement?

For acute rhinosinusitis it is not recommended to take radiologic investigations.

- Agree
- Disagree, I usually request:
Plain X-ray , CT , Echo , others _____ (specify please) aan.
- Disagree, as I request CT scan only, in cases of patients with additional problems such as very severe, immuno-compromised patients with signs of complications.

3. In general, do you treat acute rhinosinusitis patients with symptoms *less* than 5 days?

YES NO

If YES, then what is you typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

| | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | _____ | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | _____ | |

Please specify the name, dosage and duration of antibiotics you have commonly used:

| | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | _____ | |
| d. Systemic steroids | <input type="checkbox"/> | _____ | |
| e. Nasal steroids | <input type="checkbox"/> | _____ | |
| f. Oral antihistamine | <input type="checkbox"/> | _____ | |
| g. Decongestants | <input type="checkbox"/> | _____ | |
| h. Nasal douche | <input type="checkbox"/> | _____ | |
| i. Steaming | <input type="checkbox"/> | _____ | |
| j. Mucolytics | <input type="checkbox"/> | _____ | |
| k. Herbal medicine | <input type="checkbox"/> | _____ | |
| l. Others (specify) _____ | <input type="checkbox"/> | _____ | |

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

4. In general, do you treat patients with acute rhinosinusitis with moderate symptoms (no fever, no severe pain) which persist for *more* than 5 days? JA NEE

If YES, then what is you typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

- | | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | | |
- Please specify the name, dosage and duration of antibiotics you have commonly used:
-

- | | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | | |
| d. Systemic steroids | <input type="checkbox"/> | | |
| e. Nasal steroids | <input type="checkbox"/> | | |
| f. Oral antihistamine | <input type="checkbox"/> | | |
| g. Decongestants | <input type="checkbox"/> | | |
| h. Nasal douche | <input type="checkbox"/> | | |
| i. Steaming | <input type="checkbox"/> | | |
| j. Mucolytics | <input type="checkbox"/> | | |
| k. Herbal medicine | <input type="checkbox"/> | | |
| l. Others (specify) _____ | <input type="checkbox"/> | | |

5. In general, do you treat patients with acute rhinosinusitis with severe symptoms (with fever >38°C or severe pain)? JA NEE

If YES, then what is you typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

- | | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | | |
- Please specify the name, dosage and duration of antibiotics you have commonly used:
-

- | | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | | |
| d. Systemic steroids | <input type="checkbox"/> | | |
| e. Nasal steroids | <input type="checkbox"/> | | |
| f. Oral antihistamine | <input type="checkbox"/> | | |
| g. Decongestants | <input type="checkbox"/> | | |
| h. Nasal douche | <input type="checkbox"/> | | |
| i. Steaming | <input type="checkbox"/> | | |
| j. Mucolytics | <input type="checkbox"/> | | |
| k. Herbal medicine | <input type="checkbox"/> | | |
| l. Others (specify) _____ | <input type="checkbox"/> | | |

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

6. What criteria do you typically use for referring each of the following types of acute rhinosinusitis patients to an ENT specialist?
- a. Patients with moderate symptoms (choose one)
- Always refer them to a specialist right after diagnosis
 - When no improvement occurs after 14 days of treatment
 - When no improvement occurs after 4 weeks of treatment
 - After one course of antibiotic treatment which did not work
 - After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
 - Never refer them to a specialist
 - Other (specify): _____
- b. Patients with severe symptoms (fever,pain) (choose one)
- Always refer them to a specialist right after diagnosis
 - When no improvement occurs after 14 days of treatment
 - When no improvement occurs after 4 weeks of treatment
 - After one course of antibiotic treatment which did not work
 - After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
 - Never refer them to a specialist
 - Other (specify): _____
- c. Patients with ocular or neurological complications (choose one)
- Always refer them to a specialist right after diagnosis
 - When no improvement occurs after 14 days of treatment
 - When no improvement occurs after 4 weeks of treatment
 - After one course of antibiotic treatment which did not work
 - After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
 - Never refer them to a specialist
 - Other (specify): _____

The next questions are about chronic rhinosinusitis.

7. What percentage of your total patients has had a diagnosis of chronic rhinosinusitis during the past 12 months? (choose one)
- <2%
 - 2-5%
 - 6-10%
 - 11-19%
 - 20% or more
8. Do you agree with the following statement?
For chronic rhinosinusitis it is not recommended to take radiologic investigations.
- Agree
 - Disagree, I usually request:
Plain X-ray , CT , Echo , others _____ (specify please)
aan.
 - Disagree, as I request CT scan only, in cases of patients with additional problems such as very severe, immuno-compromised patients with signs of complications.

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

9. In general, do you treat patients with chronic rhinosinusitis?
 YES NO

If YES, then what is your typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

| | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | _____ | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | _____ | |

Please specify the name, dosage and duration of antibiotics you have commonly used:

| | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | _____ | |
| d. Systemic steroids | <input type="checkbox"/> | _____ | |
| e. Nasal steroids | <input type="checkbox"/> | _____ | |
| f. Oral antihistamine | <input type="checkbox"/> | _____ | |
| g. Decongestants | <input type="checkbox"/> | _____ | |
| h. Nasal douche | <input type="checkbox"/> | _____ | |
| i. Steaming | <input type="checkbox"/> | _____ | |
| j. Mucolytics | <input type="checkbox"/> | _____ | |
| k. Herbal medicine | <input type="checkbox"/> | _____ | |
| l. Others (specify) _____ | <input type="checkbox"/> | _____ | |

10. After which duration of treatment do you reassess the complaints of a patient with chronic rhinosinusitis?

- After 48 hours
- After 14 days
- After 4 weeks
- After 12 weeks

11. What criteria do you typically use for referring chronic rhinosinusitis patients to an ENT specialist?

- Always refer them to a specialist right after diagnosis
- When no improvement occurs after 14 days of treatment
- When no improvement occurs after 4 weeks of treatment
- After one course of antibiotic treatment which did not work
- After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
- Never refer them to a specialist
- Other (specify): _____

12. Can we call you for an interview by telephone with 3 cases. This will take approximately 20 minutes.
 YES NO

Telephone: _____

Thank you very much for your cooperation in this survey!

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

YOU NOT DISCRIMINATE BETWEEN ACUTE AND CHRONIC RHINOSINUSITIS

1. What percentage of your total patients has had a diagnosis of rhinosinusitis during the past 12 months? (choose one)

- <2%
- 2-5%
- 6-10%
- 11-19%
- 20% or more

2. Do you agree with the following statement?

For rhinosinusitis it is not recommended to take radiologic investigations.

- Agree
- Disagree, I usually request:
Plain X-ray , CT , Echo , others _____ (specify please)
aan.
- Disagree, as I request CT scan only, in cases of patients with additional problems such as very severe, immuno-compromised patients with signs of complications.

3. In general, do you treat patients with rhinosinusitis with symptoms for *less* than 5 days?

YES NO

If YES, then what is you typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

| | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | | |

Please specify the name, dosage and duration of antibiotics you have commonly used:

| | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | | |
| d. Systemic steroids | <input type="checkbox"/> | | |
| e. Nasal steroids | <input type="checkbox"/> | | |
| f. Oral antihistamine | <input type="checkbox"/> | | |
| g. Decongestants | <input type="checkbox"/> | | |
| h. Nasal douche | <input type="checkbox"/> | | |
| i. Steaming | <input type="checkbox"/> | | |
| j. Mucolytics | <input type="checkbox"/> | | |
| k. Herbal medicine | <input type="checkbox"/> | | |
| l. Others (specify) _____ | <input type="checkbox"/> | | |

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

4. In general, do you treat patients with rhinosinusitis with moderate symptoms (no fever, no severe pain) which persist *more* than 5 days? YES NO

If YES, then what is you typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

- | | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | | |
- Please specify the name, dosage and duration of antibiotics you have commonly used:
-

- | | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | | |
| d. Systemic steroids | <input type="checkbox"/> | | |
| e. Nasal steroids | <input type="checkbox"/> | | |
| f. Oral antihistamine | <input type="checkbox"/> | | |
| g. Decongestants | <input type="checkbox"/> | | |
| h. Nasal douche | <input type="checkbox"/> | | |
| i. Steaming | <input type="checkbox"/> | | |
| j. Mucolytics | <input type="checkbox"/> | | |
| k. Herbal medicine | <input type="checkbox"/> | | |
| l. Others (specify) _____ | <input type="checkbox"/> | | |

5. In general, do you treat patients with rhinosinusitis with severe symptoms (with fever >38°C o severe pain)? YES NO

If YES, then what is you typical treatment plan? (check all that apply)

If you answer "yes" more than once, please rank order each treatment (1=most often, 10=least often)

- | | Yes | Numbering | (1-10) |
|---|--------------------------|-----------|--------|
| a. Painkillers | <input type="checkbox"/> | | |
| b. Antibiotics (penicillin / amoxicillin-clavulanate / broad spectrum antibiotics) | <input type="checkbox"/> | | |
- Please specify the name, dosage and duration of antibiotics you have commonly used:
-

- | | Yes | Numbering | (1-10) |
|---------------------------|--------------------------|-----------|--------|
| c. Topical antibiotics | <input type="checkbox"/> | | |
| d. Systemic steroids | <input type="checkbox"/> | | |
| e. Nasal steroids | <input type="checkbox"/> | | |
| f. Oral antihistamine | <input type="checkbox"/> | | |
| g. Decongestants | <input type="checkbox"/> | | |
| h. Nasal douche | <input type="checkbox"/> | | |
| i. Steaming | <input type="checkbox"/> | | |
| j. Mucolytics | <input type="checkbox"/> | | |
| k. Herbal medicine | <input type="checkbox"/> | | |
| l. Others (specify) _____ | <input type="checkbox"/> | | |

Appendix A. Questionnaire: Management of rhinosinusitis in general practice continued.

6. What criteria do you typically use for referring each of the following types of rhinosinusitis patients to an ENT specialist?

a. Patients with moderate symptoms (choose one)

- Always refer them to a specialist right after diagnosis
- When no improvement occurs after 14 days of treatment
- When no improvement occurs after 4 weeks of treatment
- After one course of antibiotic treatment which did not work
- After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
- Never refer them to a specialist
- Other (specify): _____

b. Patients with severe symptoms (fever,pain) (choose one)

- Always refer them to a specialist right after diagnosis
- When no improvement occurs after 14 days of treatment
- When no improvement occurs after 4 weeks of treatment
- After one course of antibiotic treatment which did not work
- After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
- Never refer them to a specialist
- Other (specify): _____

c. Patients with ocular or neurological complications (choose one)

- Always refer them to a specialist right after diagnosis
- When no improvement occurs after 14 days of treatment
- When no improvement occurs after 4 weeks of treatment
- After one course of antibiotic treatment which did not work
- After 48 hours with no effect of intranasal corticosteroids and/or antibiotics
- Never refer them to a specialist
- Other (specify): _____

7. Can we call you for an interview by telephone with 3 cases. This will take approximately 20 minutes. YES NO

Telephone: _____

Thank you very much for you cooperation in this survey!