

# EPOS 2012: European position paper on rhinosinusitis and nasal polyps 2012.

## A summary for otorhinolaryngologists.

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## Summary

The European Position Paper on Rhinosinusitis and Nasal Polyps 2012 is the update of similar evidence based position papers published in 2005 and 2007.

The document contains chapters on definitions and classification, we now also propose definitions for 'difficult to treat' rhinosinusitis, control of disease and better definitions for rhinosinusitis in children. More emphasis is placed on the diagnosis and treatment of acute rhinosinusitis. Throughout the document the terms chronic rhinosinusitis without nasal polyps (CRSsNP) and chronic rhinosinusitis with nasal polyps (CRSwNP) are used to further point out differences in pathophysiology and treatment of these two entities.

There are extensive chapters on epidemiology and predisposing factors, inflammatory mechanisms, (differential) diagnosis of facial pain, genetics, cystic fibrosis, aspirin exacerbated respiratory disease, immunodeficiencies, allergic fungal rhinosinusitis and the relationship between the upper and lower airways. The chapters on paediatric acute and chronic rhinosinusitis are totally rewritten.

Last but not least all available evidence for management of acute rhinosinusitis and chronic rhinosinusitis with or without nasal polyps in adults and children is analyzed and presented and management schemes based on the evidence are proposed. This executive summary for otorhinolaryngologists focuses on the most important changes and issues for otorhinolaryngologists.

The full document can be downloaded for free on the website of this journal: <http://www.rhinologyjournal.com>

To cite this article: Wytske J. Fokkens, Valerie J. Lund, Joachim Mullol, Claus Bachert, Isam Alobid, Fuad Baroody, Noam Cohen, Anders Cervin, Richard Douglas, Philippe Gevaert, Christos Georgalas, Herman Goossens, Richard Harvey, Peter Hellings, Claire Hopkins, Nick Jones, Guy Joos, Liviye Kalogjera, Bob Kern, Marek Kowalski, David Price, Herbert Riechelmann, Rodney Schlosser, Brent Senior, Mike Thomas, Elina Toskala, Richard Voegels, Wang Deyun, Peter John Wormald The European Position Paper on Rhinosinusitis and Nasal Polyps 2012. *Rhinology*. 2012 Suppl. 23: 1-299.

## 1. Introduction

Rhinosinusitis is a significant health problem which seems to mirror the increasing frequency of allergic rhinitis and which results in a large financial burden on society<sup>(1-3)</sup>.

The last decade has seen the development of a number of guidelines, consensus documents and position papers on the epidemiology, diagnosis and treatment of rhinosinusitis and nasal polyposis<sup>(1-7)</sup>. In 2005 the first European Position Paper on Rhinosinusitis and Nasal Polyps (EP<sup>3</sup>OS) was published<sup>(1,2)</sup>. This first evidence based position paper was initiated by the European Academy of Allergology and Clinical Immunology (EAACI) to consider what was known about rhinosinusitis and nasal polyps, to offer evidence based recommendations on diagnosis and treatment, and to consider how we could make progress with research in this area. The paper was endorsed by the European Rhinologic Society. Such was the interest in the topic and the increasing number of publications that by 2007 we felt it necessary to update the document: EP<sup>3</sup>OS2007<sup>(3,4)</sup>.

These new publications included some important randomized controlled trials and filled in some of the gaps in our knowledge, which has significantly altered our approach. In particular

it has played an important role in the understanding of the management of ARS and has helped to minimize unnecessary use of radiological investigations, overuse of antibiotics, and improve the under-utilisation of nasal corticosteroids<sup>(8)</sup>. EP<sup>3</sup>OS2007 has had a considerable impact all over the world (the document was translated into more than 15 languages) but as expected with time, many people have requested that we revise it, as once again a wealth of new data has become available in the intervening period. Indeed one of its most important roles has been in the identification of the gaps in the evidence and stimulating colleagues to fill these with high quality studies.

The methodology for EPOS2012 has been the same as for the other two productions. Leaders in the field were invited to critically appraise the literature and write a report on a subject assigned to them. All contributions were distributed before the meeting in November when the group came together in Amsterdam and during the 4 days of the meeting every report was discussed in detail. In addition general discussions on important dilemmas and controversies took place. Finally the management schemes were revised significantly in the light of any new data which was available. Finally we decided to remove

the “3” out of EPOS2012 title (EPOS212 instead of EP<sup>3</sup>OS2012) to make it more easy to reproduce.

Overall the document has been made more consistent, some chapters are significantly extended and others are added. In addition contributions from many other parts of the world have increased our knowledge and understanding. One of the important new data acquired in the last year is that on the prevalence of CRS in Europe. Previously we had relied on estimates from the USA pointing at a prevalence of 14%. Firstly the EPOS epidemiological criteria for CRS from the 2007 document were validated. We have shown that the EPOS symptom-based definition of CRS for epidemiological research has a moderate reliability over time, is stable between study centres, is not influenced by the presence of allergic rhinitis, and is suitable for the assessment of geographic variation in prevalence of CRS<sup>(9)</sup>. Secondly a large epidemiological study was performed within the GA(2) LEN network of excellence in 19 centres in 12 countries, encompassing more than 50.000 respondents, in which the EPOS criteria were applied to estimate variation in the prevalence of Chronic rhinosinusitis for Europe. The overall prevalence of CRS was 10.9% with marked geographical variation (range 6.9-27.1)<sup>(10)</sup>. There was a strong association of asthma with CRS at all ages and this association with asthma was stronger in those reporting both CRS and allergic rhinitis (adjusted OR: 11.85). CRS in the absence of nasal allergies was positively associated with late-onset asthma<sup>(11)</sup>.

In the EPOS2012 we have made a stricter division between CRS with (CRSwNP) and without nasal polyps (CRSsNP)<sup>(12)</sup>. Although there is a considerable overlap between these two forms of CRS in inflammatory profile, clinical presentation and effect of treatment<sup>(3,13-18)</sup> there are recent papers pointing to differences in the respective inflammatory profiles<sup>(19-24)</sup> and treatment outcome<sup>(25)</sup>. For that reason management chapters are now divided in ARS, CRSsNP and CRSwNP. In addition the chapters on acute and chronic paediatric rhinosinusitis are totally revised and all the new evidence is implemented.

We sincerely hope that EPOS will continue to act as a stimulus for continued high quality clinical management and research in this common but difficult range of inflammatory conditions.

This EPOS 2012 revision is intended to be a state-of-the art review for the specialist as well as for the general practitioner. This summary indicates the main differences between the EP3OS 2007 and the EPOS2012 paper with emphasis on definition, diagnosis and treatment of CRS by otorhinolaryngologists.

## 2. Clinical definition of rhinosinusitis

### 2.1. Clinical definition of rhinosinusitis in adults

Rhinosinusitis in adults is defined as:

- inflammation of the nose and the paranasal sinuses characterised by two or more symptoms, one of which should be either nasal blockage/obstruction/congestion or nasal discharge (anterior/posterior nasal drip):
  - ± facial pain/pressure
  - ± reduction or loss of smell
- and either
- endoscopic signs of:
  - nasal polyps, and/or
  - mucopurulent discharge primarily from middle meatus and/or
  - oedema/mucosal obstruction primarily in middle meatus and/or
- CT changes:
  - mucosal changes within the ostiomeatal complex and/or sinuses

Chronic rhinosinusitis with nasal polyps (CRSwNP): Chronic rhinosinusitis as defined above and bilateral, endoscopically visualised polyps in middle meatus.

Chronic rhinosinusitis without nasal polyps (CRSsNP): Chronic rhinosinusitis as defined above and no visible polyps in middle meatus, if necessary following decongestant.

This definition accepts that there is a spectrum of disease in CRS which includes polypoid change in the sinuses and/or middle meatus but excludes those with polypoid disease presenting in the nasal cavity to avoid overlap.

### 2.2. Clinical definition of rhinosinusitis in children

Paediatric rhinosinusitis is defined as:

- presence of two or more symptoms one of which should be either nasal blockage/obstruction/congestion or nasal discharge (anterior/posterior nasal drip):
- ± facial pain/pressure
  - ± cough
- and either
- endoscopic signs of:
    - nasal polyps, and/or
    - mucopurulent discharge primarily from middle meatus and/or
    - oedema/mucosal obstruction primarily in middle meatus and/or
  - CT changes:
    - mucosal changes within the ostiomeatal complex and/or sinuses

No changes have been made in the definition of severity and acute versus chronic. For acute rhinosinusitis the term ARS comprises of viral ARS (common cold) and post-viral ARS. In the EP<sup>3</sup>OS 2007 the term non-viral ARS was chosen to indicate that most cases of ARS are not bacterial. However this term apparently led to confusion and for that reason we have decided to choose the term post-viral ARS to express the same phenomenon. A small percentage of the patients with post-viral ARS will have bacterial acute rhinosinusitis (ARBS).

### 2.3 Control of disease

The goal of CRS treatment is to achieve and maintain clinical control. Control is defined as a disease state in which the patients does not have symptoms or the symptoms are not bothersome, if possible combined with a healthy or almost healthy mucosa and only the need for local medication. We do not know what percentage of patients with CRS actually can achieve control of disease and further studies are necessary. We here propose an assessment of current clinical control of CRS (see Table 1). Further validation of this table is necessary.

### 2.4. Definition of difficult-to-treat rhinosinusitis

Patients who have persistent symptoms of rhinosinusitis despite appropriate treatment (recommended medication and surgery). Although the majority of CRS patients can obtain control, some patients will not do so even with the maximal medical therapy and surgery.

Patients who do not reach an acceptable level of control despite adequate surgery, intranasal corticosteroid treatment and up to 2 short courses of antibiotics or systemic corticosteroids in the last year can be considered to have difficult-to-treat rhinosinusitis.

## 3. Important changes in the management of CRS between EP<sup>3</sup>OS2007 and EPOS2012

### 3.1. Evidence based management for adults with CRS without NP for ENT specialists

#### 3.1.1. Introduction

Firstly, a small but important change has occurred in the categorisation of the patients with CRSsNP. In 2007 patients were categorized solely on symptoms. We now decided that using symptoms alone was unreliable and decided to include the endoscopic view in the categorisation. In moderate/severe disease we now require signs of mucosal disease at endoscopy. The most important change in the management of adults with CRS without NP is the changed place of long-term antibiotics. In 2007 we had three important facts pointing to a potential important role for macrolides in the treatment of CRS:

a. the remarkable efficacy of macrolides in diffuse panbronchiolitis patients <sup>(26, 27)</sup>, b. the results from a study in CRS patients with and without nasal polyps comparing 3 months erythromycin with FESS in which both treatment modalities improved symptoms significantly and equally, except for nasal volume, which was better in the surgery group <sup>(14)</sup> and c. the first DBPCT study of roxithromycin in patients with CRS without nasal polyps that showed a small but significant effect on symptoms, more pronounced in the patients with normal IgE <sup>(28)</sup>. The EP<sup>3</sup>OS2007 group decided due to these findings that and the fact that the potential hazards of treatment were considered to be less for macrolides than those for surgery to put long-term treatment with macrolides as treatment of first choice in CRS patients with moderate to severe CRS that had failed local corticosteroids and nasal irrigation with saline.

Since 2007 another DBPCT trial with a macrolide, this time

Table 1. Assessment of current clinical control of CRS.

Characteristic	Assessment of current clinical control of CRS ( in the last month)		
	Controlled (all of the following)	Partly Controlled (at least one present)	Uncontrolled
Nasal blockage	Not present or not bothersome	Present on most days of the week	Three or more features of partly controlled CRS
Rhinorrhea/ Postnasal drip	Little and mucous	Mucopurulent on most days of the week	
Facial pain/headache	Not present or not bothersome	Present	
Smell	Normal or only slightly impaired	Impaired	
Sleep disturbance or fatigue	Not impaired	Impaired	
Nasal endoscopy (if available)	Healthy or almost healthy mucosa	Diseased mucosa (nasal polyps, mucopurulent secretions, inflamed mucosa)	
Systemic medication needed to control disease	Not needed	Need of up to 1 short course of antibiotics or systemic corticosteroids <b>in the last three months</b>	Need of long term antibiotics or systemic corticosteroids <b>in the last month</b>

Table 2. Treatment evidence and recommendations for adults with chronic rhinosinusitis without nasal polyps \* %.

Therapy	Level	Grade of recommendation	Relevance
steroid – topical	Ia	A	yes
nasal saline irrigation	Ia	A	yes
bacterial lysates (OM-85 BV)	Ib	A	unclear
oral antibiotic therapy short term < 4 weeks	II	B	during exacerbations
oral antibiotic therapy long term ≥12 weeks**	Ib	C	yes, especially if IgE is not elevated
steroid – oral	IV	C	unclear
mucolytics	III	C	no
proton pump inhibitors	III	D	no
decongestant oral / topical	no data on single use	D	no
allergen avoidance in allergic patients	IV	D	yes
oral antihistamine added in allergic patients	no data	D	no
herbal and probiotics	no data	D	no
immunotherapy	no data	D	no
probiotics	Ib (-)	A(-)	no
antimycotics – topical	Ib (-)	A(-)	no
antimycotics - systemic	no data	A(-)	no
antibiotics – topical	Ib (-)	A(-) <sup>§</sup>	no

\* Some of these studies also included patients with CRS with nasal polyps

% Acute exacerbations of CRS should be treated like acute rhinosinusitis

# Ib (-): Ib study with a negative outcome

§ A(-): grade A recommendation **not** to use

\*\* Level of evidence for macrolides in all patients with CRSsNP is Ib, and strength of recommendation C, because the two double blind placebo controlled studies are contradictory; indication exist for better efficacy in CRSsNP patients with normal IgE the recommendation A. No RCTs exist for other antibiotics.

azithromycin, has been published <sup>(29)</sup>. Unfortunately this study was negative. In the Wallwork study the response rate overall in the treatment group was 67%, compared to 22% in the placebo group whereas in the Videler study it was 44% for azithromycin and 28% for placebo. Both studies are about the same size (including 64 vs. 60 patients with CRS respectively). Also recently a retrospective analysis compared a mixed CRS population (both with and without polyps) treated with long-term macrolide, azithromycin or clarithromycin or trimethoprim-

Table 3. Treatment evidence and recommendations postoperative treatment for adults with chronic rhinosinusitis without nasal polyps \*.

Therapy	Level	Grade of recommendation	Relevance
steroid – topical	Ia	A	yes
nasal saline irrigation	Ia	A	yes
nasal saline irrigation with xylitol	Ib	A	yes
oral antibiotic therapy short term < 4 weeks	II	B	during exacerbations
nasal saline irrigation with sodium hypochlorite	IIb	B	yes
oral antibiotic therapy long term ≥12 weeks**	Ib	C	yes, especially if IgE is not elevated
nasal saline irrigation with babyshampoo	III	C	no
steroid – oral	IV	C	unclear
antibiotics – topical	Ib (-) #	A(-) <sup>§</sup>	no

\* Some of these studies also included patients with CRS with nasal polyps

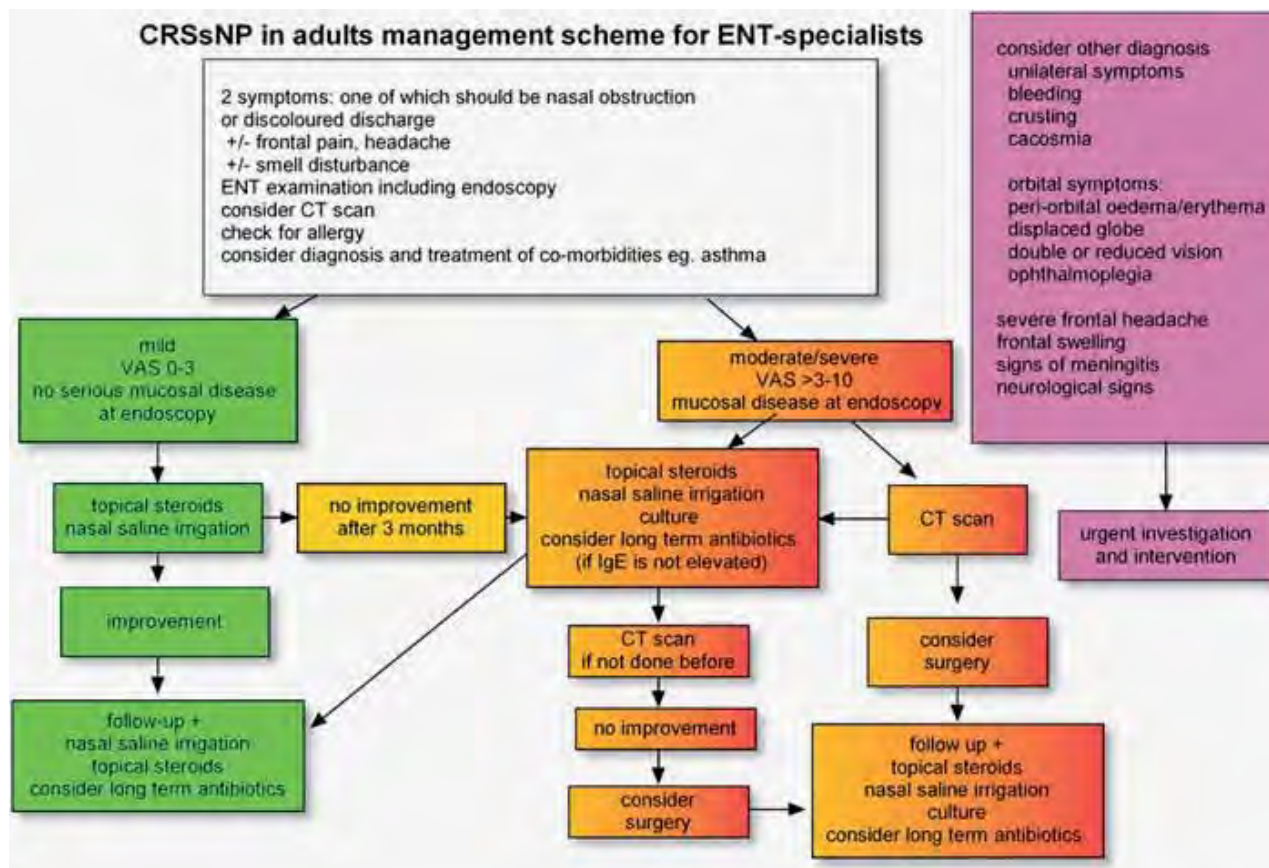
# Ib (-): Ib study with a negative outcome

§ A(-): grade A recommendation **not** to use

\*\* Level of evidence for macrolides in all patients with CRSsNP is Ib, and strength of recommendation C, because the two double blind placebo controlled studies are contradictory; indication exist for better efficacy in CRSsNP patients with normal IgE the recommendation A. No RCTs exist for other antibiotics.

sulfamethoxazole. Seventy-six patients were included, 53% had asthma and all had undergone sinus surgery. Severe nasal polyposis patients were excluded. The mean length of treatment was 189 and 232 day, respectively. The response rate was 78% with no difference between the 2 treatment groups. Follow up for a mean of 4.7 months in mean after cessation of treatment showed that the improvement was sustained in 68% of patients. Interesting to note, smokers were less likely to respond and there were more allergic patients in the responding group (30). In the lower airways the situation has become clearer. The anti-inflammatory effects of macrolides in the lower airways are clearly demonstrated, especially in a neutrophilic inflammatory-infectious disease, such as cystic fibrosis<sup>(31-33)</sup>. One has to bear in mind that a reduced dose was not always used and an added anti-bacterial effect is likely. In asthmatics PCR identification of *Chlamydomphila* or *Mycoplasma* seems to be one way to identify the responsive phenotype <sup>(34)</sup>. The case with COPD where 2 small studies showed little or no effect, whereas a large RCT showed effect, is an important reminder that a power analysis is paramount <sup>(35)</sup>. These new data led to the following conclusions within the EPOS2012 group: although macrolides are effective in

Figure 1. Management scheme for adults with CRS without NP for ENT specialists.



the lower airways, we do not have strong proof that the same is true for CRS, either with or without nasal polyps. There is some indication that CRS patients with normal IgE do better than patients with increased IgE. Also the dosage of azithromycin in the Videler study might have been too low. Other antibiotics like co-trimoxazole<sup>(30)</sup> and doxycycline<sup>(36)</sup> might have similar effects. For that reason we have placed long-term treatment with antibiotics at the same level as FESS and also left long-term treatment with antibiotics as a treatment option in CRS patients after surgery.

Secondly several studies have looked at the addition of substances like babyshampoo, sodium hypochlorite and xylitol to saline irrigation especially in post operative patients with difficult to treat CRS<sup>(37-39)</sup>. Although still a bit premature there is some evidence that adding xylitol or sodium hypochlorite might improve the outcome of saline irrigation<sup>(37, 38)</sup>.

### 3.1.2. Diagnosis

Symptoms present longer than 12 weeks

Two or more symptoms one of which should be either nasal blockage/obstruction/congestion or nasal discharge (anterior/posterior nasal drip):

± facial pain/pressure,

± reduction or loss of smell;

Signs

- ENT examination, endoscopy;
- review primary care physician's diagnosis and treatment;
- questionnaire for allergy and if positive, allergy testing if it has not already been done.

### 3.1.3. Treatment

Treatment should be based on severity of symptoms

Decide on severity of symptomatology using VAS and endoscope (See Figure 1).

Acute exacerbations of CRS should be treated like acute rhinosinusitis.

## 3.2. Evidence based management for adults with CRS with NP for ENT specialists

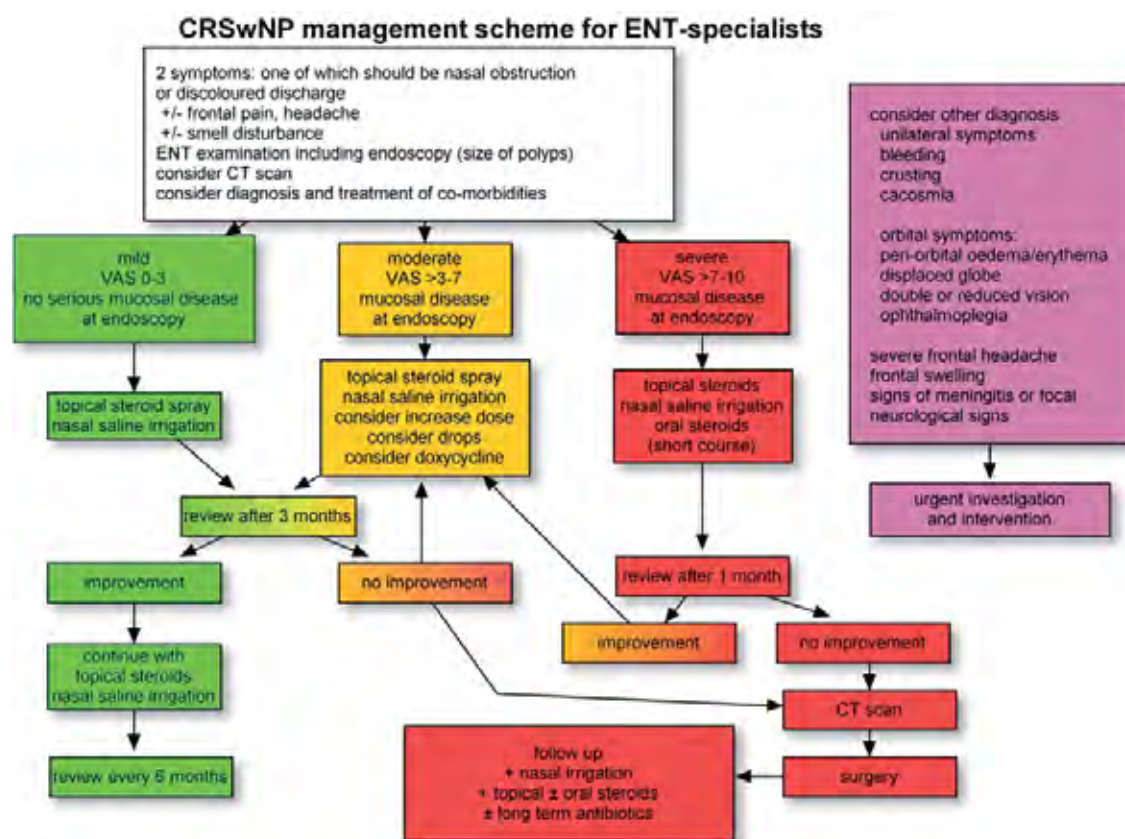
### 3.2.1. Introduction

The changes in the management of adults with CRS with NP are subtle.

As in CRSsNP we included endoscopy in the categorisation of patients into mild, moderate or severe. In moderate/severe disease we now require signs of mucosal disease at endoscopy.

The treatment of CRS with NP with intranasal corticosteroids has now been evaluated by meta-analysis. It shows that intranasal

Figure 2. Management scheme for adults with CRS with NP for ENT specialists.



corticosteroids improve symptoms and patient reported outcomes in CRSwNP, that delivery of INCS post surgery brings about a greater effect and that modern INCS do not have greater clinical efficacy (although potentially fewer side-effects) compared to first-generation INCS. The group felt there was not enough evidence to claim that nasal drops were more effective than nasal spray because no head to head comparison was made. A placebo-controlled study by van Zele and co-workers, compared the effect of methylprednisolone in a 3 week course (32 mg for 1 w, 16 mg for 1 week and finally 8 mg for 1 week) with doxycycline (100 mg except for the first day of 200 mg) for 20 days with placebo<sup>(36)</sup>. Inflammatory markers were measured in both nasal secretions and blood, polyp size was estimated and symptoms were registered. Methylprednisolone had a short but dramatic effect on polyp size and symptoms. Doxycycline had a significant but small effect on polyp size compared to placebo, which was present for the length of the study, 12 weeks. Doxycycline showed a significant effect on postnasal discharge leaving other symptoms unchanged. These data led to some small changes in the management scheme. In the treatment of moderate disease we now give a number of options to consider on top of topical nasal spray such as increasing the dose, using nasal drops or adding doxycycline.

### 3.2.2. Diagnosis

Symptoms present longer than 12 weeks.

Two or more symptoms one of which should be either nasal blockage/obstruction/congestion or nasal discharge (anterior/posterior nasal drip):

- ± facial pain/pressure,
- ± reduction or loss of smell;

Signs

- ENT examination, endoscopy;
- review primary care physician's diagnosis and treatment;
- questionnaire for allergy and if positive, allergy testing if it has not already been done.

### 3.2.3. Treatment

Treatment should be based on severity of symptoms.

Decide on severity of symptomatology using VAS and endoscopy (See Figure 2).

Table 4. Treatment evidence and recommendations for adults with chronic rhinosinusitis with nasal polyps\*.

Therapy	Level	Grade of recommendation	Relevance
topical steroids	Ia	A	yes
oral steroids	Ia	A	yes
oral antibiotics short term <4 weeks	1b and 1b(-)	C <sup>%</sup>	yes, small effect
oral antibiotic long term ≥ 12 weeks	III	C	yes, especially if IgE is not elevated, small effect
capsaicin	II	C	no
proton pump inhibitors	II	C	no
aspirin desensitisation	II	C	unclear
furosemide	III	D	no
immunosuppressants	IV	D	no
nasal saline irrigation	Ib, no data in single use	D	yes for symptomatic relief
topical antibiotics	no data	D	no
anti-IL-5	no data	D	unclear
phytotherapy	no data	D	no
decongestant topical / oral	no data in single use	D	no
mucolytics	no data	D	no
oral antihistamine in allergic patients	no data	D	no
antimycotics – topical	Ia (-)**	A(-)	no
antimycotics – systemic	Ib (-)#	A(-) <sup>§</sup>	no
anti leukotrienes	Ib (-)	A(-)	no
anti-IgE	Ib (-)	A(-)	no

\* Some of these studies also included patients with CRS with nasal polyps.

<sup>%</sup> short term antibiotics shows one positive and one negative study. Therefore recommendation C.

# Ib (-): Ib study with a negative outcome.

\*\* Ia(-): Ia level of evidence that treatment is **not** effective.

§: A(-): grade A recommendation **not** to use.

Table 5. Treatment evidence and recommendations postoperative treatment in adults with chronic rhinosinusitis with nasal polyps\*.

Therapy	Level	Grade of recommendation	Relevance
topical steroids	Ia	A	yes
oral steroids	Ia	A	yes
oral antibiotics short term <4 weeks	Ib	A	yes, small effect
anti-IL-5	Ib	A	yes
oral antibiotics long term > 12 weeks	Ib	C**	yes, only when IgE is not increased
oral antihistamines in allergic patients	Ib	C	unclear
furosemide	III	D	no
nasal saline irrigation	no data	D	unclear
anti leukotrienes	Ib(-)#	A(-) <sup>§</sup>	no
anti-IgE <sup>%</sup>	Ib(-)	C	unclear

\* Some of these studies also included patients with CRS with nasal polyps.

\*\* Level of evidence for macrolides in all patients with CRSsNP is Ib, and strength of recommendation C, because the two double blind placebo controlled studies are contradictory; indication exist for better efficacy in CRSsNP patients with normal IgE the recommendation A. No RCTs exist for other antibiotics.

# Ib (-): Ib study with a negative outcome.

§ A(-): grade A recommendation **not** to use.

<sup>%</sup> Because positive level III evidence and positive unpublished 1b evidence recommendation is C.



### 3.3. Paediatric Chronic Rhinosinusitis

#### 3.3.1. Introduction

The paediatric chapters on ARS and CRS in children have been extensively revised. Rhinosinusitis in children has not been studied as well as the same entity in adults. Multiple factors contribute to the disease including bacteriologic and inflammatory factors.

The clinical diagnosis of CRS in children is challenging related to the overlap of symptoms with other common childhood nasal diseases such as viral upper respiratory tract infections, adenoid hypertrophy/adenoiditis and allergic rhinitis as well as the challenges related to physical examination. The EPOS2012 group felt that it was impossible to differentiate CRS from adenoid hypertrophy/adenoiditis in young children. Furthermore, studies examining the incidence of abnormalities in the paranasal sinuses on CT scans obtained for clinical reasons not related to CRS in children have shown a percentage of sinus radiographic abnormalities ranging from 18%<sup>(40)</sup> to 45%<sup>(41)</sup> with one study actually showing a Lund McKay score average of 2.8 in a similar paediatric population without symptoms of rhinosinusitis<sup>(42)</sup>. It has also been suggested that only a Lund-Mackay score over 5 is indicative for CRS in children<sup>(43)</sup>. In uncomplicated CRS, scanning is reserved to evaluate residual disease and anatomic abnormalities after maximal medical therapy. Abnormalities in the CT scan are assessed in the context of their severity and correlation with the clinical picture and guide the plan for further management which might include surgical intervention.

Adding to the challenge in making the diagnosis is the fact that symptoms consistent with the diagnosis of CRS such as purulent rhinorrhea and cough are very common in the paediatric age group, and the symptoms of CRS are often subtle and the history is limited to the observations and subjective evaluation by the child's parent. Because some younger children might not tolerate nasal endoscopy, clinicians are sometimes hindered in

their physical examination and have to rely on history and or imaging studies for appropriate diagnosis. Studies examining clinical characteristics of paediatric patients with CRS suggest that the four most common clinical symptoms are cough, rhinorrhea, nasal congestion, and post nasal drip with a slightly higher predominance of chronic cough<sup>(44)</sup>. The adenoids are a prominent contributor to CRS in young children. Data related to the role of adenoids in CRS is emerging but the studies are small and mostly evaluate the adenoids after their removal from the site. They do suggest a role for the adenoids in young children with CRS, both from a bacteriologic and immunologic perspective. Most of these studies however, do not really shed light on the relative contribution of adenoiditis proper vs CRS in chronic nasal symptomatology in children.

For the majority of evidence based treatment used in adults with CRS there is no evidence in children with CRS. Available data does not justify the use of short-term oral antibiotics for the treatment of CRS in children. There might a place for longer-term antibiotics for the treatment of CRS in children (equivalent to CRS in adults). There are also no randomized controlled trials evaluating the effect of intranasal corticosteroids in children with CRS. However the combination of proven efficacy of intranasal corticosteroids in CRS with and without nasal polyps in adults and proven efficacy and safety of intranasal corticosteroids in allergic rhinitis in children makes intranasal corticosteroid the first line of treatment in CRS<sup>(45-47)</sup>. A recent Cochrane review analysed randomized controlled trials in which saline was evaluated in comparison with either no treatment, a placebo, as an adjunct to other treatments, or against other treatments<sup>(48)</sup>. A total of 8 trials satisfied inclusion criteria of which 3 were conducted in children. The studies included a broad range of delivery techniques, tonicity of saline used, and comparator treatments. Overall there was evidence that saline is beneficial in the treatment of the symptoms of CRS when used as the sole modality of treatment. Evidence also

Table 6. Treatment evidence and recommendations for children with chronic rhinosinusitis.

Therapy	Level	Grade of recommendation	Relevance
nasal saline irrigation	Ia	A	yes
therapy for gastro-oesophageal reflux	III	C	no
topical corticosteroid	IV	D	yes
oral antibiotic long term	no data	D	unclear
oral antibiotic short term <4 weeks	Ib(-) <sup>#</sup>	A(-) <sup>*</sup>	no
intravenous antibiotics	III(-) <sup>##</sup>	C(-) <sup>**</sup>	no

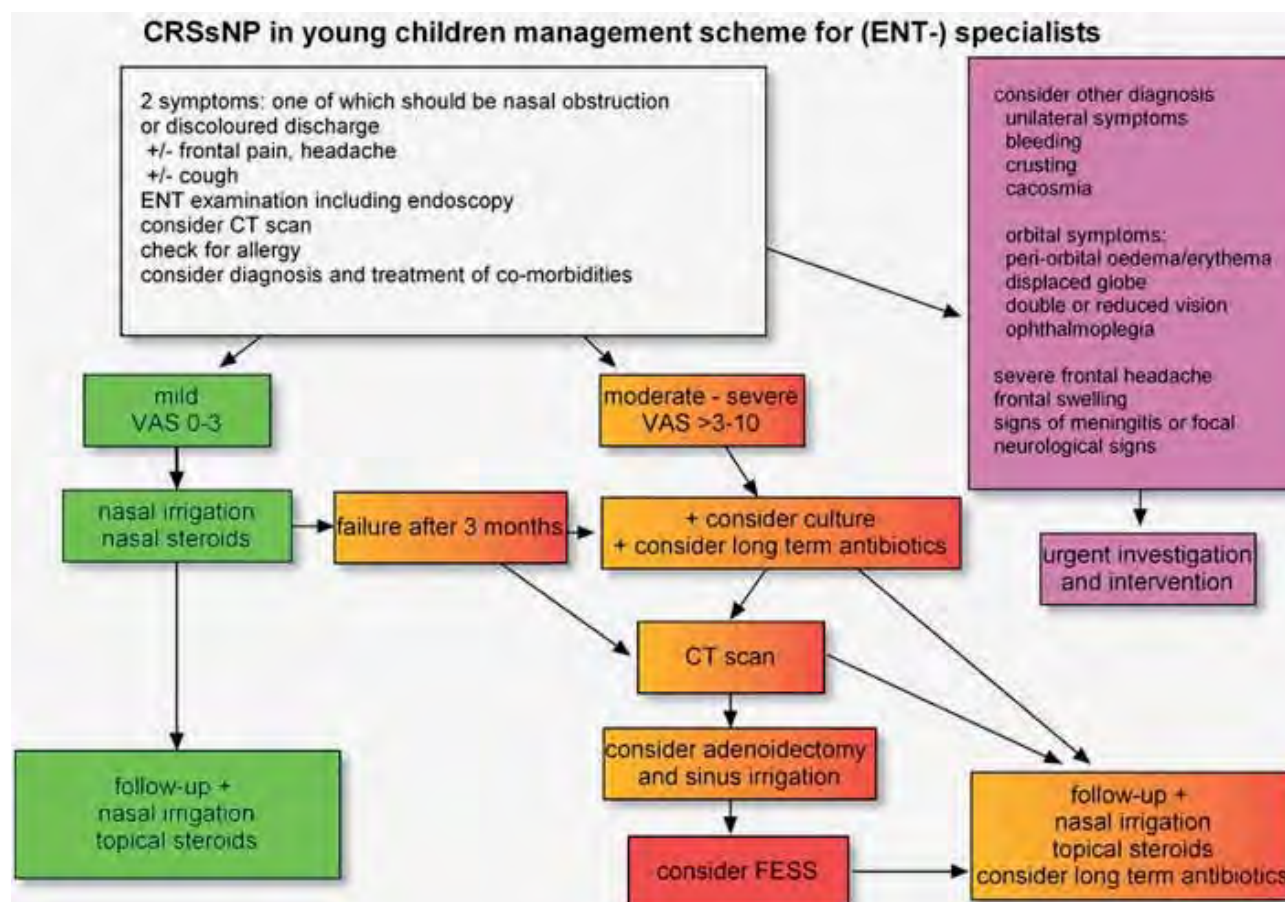
<sup>#</sup>Ib (-): Ib study with a negative outcome.

<sup>\*</sup>A(-): grade A recommendation **not** to use.

<sup>##</sup>III(-): level III study with a negative outcome.

<sup>\*\*</sup>C(-): grade C recommendation **not** to use.

Figure 3. Management scheme for young children with chronic rhinosinusitis.



exists in favor of saline as a treatment adjunct and saline was not as effective as an intranasal steroid. Surgical intervention for rhinosinusitis is usually considered for patients with CRS who have failed maximal medical therapy. This is hard to define but usually includes a course of antibiotics and intranasal and/or systemic steroids and differs widely between practitioners and practice locations. Adenoidectomy with or without antral irrigation, and functional endoscopic sinus surgery (FESS) are the most commonly used modalities.

### 3.3.2. Diagnosis

Symptoms present longer than 12 weeks.

Two or more symptoms one of which should be either nasal blockage/obstruction/congestion or nasal discharge (anterior/posterior nasal drip):

± facial pain/pressure;

± cough;

Additional diagnostic information

- questions on allergy should be added and, if positive, allergy testing should be performed.

ENT examination, endoscopy if possible;

Not recommended: plain x-ray or CT-scan (unless surgery is considered)

### 3.3.3. Treatment

For treatment evidence and recommendations for chronic rhinosinusitis in children see Table 6.

Treatment should be based on severity of symptoms

Acute exacerbations of CRS should be treated like acute rhinosinusitis.

This management scheme is for young children. Older children (in the age that adenoids are not considered important) can be treated as adults (see Figure 3).

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