

Acute sinusitis in daily clinical practice

Magdalena Arcimowicz

Department of Otorhinolaryngology and Surgery of the Head and Neck, Medical University of Warsaw, Poland; Head: prof. Kazimierz Niemczyk MD PhD

Article history: Received: 15.08.2021 Accepted: 26.08.2021 Published: 31.08.2021

ABSTRACT:

Understanding the appropriate use of diagnostics and treatment in acute rhinosinusitis is of immense importance given the high prevalence of this disease in the general population. The ability to differentiate between the principal phenotypes of acute sinusitis, namely acute viral infection (cold), acute post-viral sinusitis and acute bacterial sinusitis, determines the future management and is fundamental to providing rational therapeutic recommendations – especially as regards antibiotic treatment, which is very often overused in acute sinusitis even though bacterial phenotypes only account for 0.5–2% of all cases of the disease. The latest therapeutic recommendations contained in the EPOS2020 position paper introduce a system based on integrated care pathways (ICPs), which comprise pharmacy-supported self-care and e-health as the first level, followed by primary care as the second, with specialist care being reserved for patients who develop a more severe course of the disease, have suspected complications or suffer from recurrent acute sinusitis. Management of acute sinusitis is primarily based on symptomatic treatment modalities, with phytotherapeutic support, as well as on anti-inflammatory treatment, while antibiotic therapy is used in very specific and limited indications. Complications are relatively rare in acute sinusitis and they are not considered to be associated with antibiotic intake. Considering the high prevalence of acute forms of sinusitis, their significant impact on quality of life and high direct and indirect costs of treatment, the right diagnosis and management, without unnecessary escalation of therapy, can substantially translate into a number of public health benefits.

KEYWORDS:

acute bacterial sinusitis, acute post-viral sinusitis, acute sinusitis, antibiotic treatment, cold, diagnostics, epidemiology, EPOS, integrated care pathways, intranasal corticosteroids, phytotherapy, rhinosinusitis, treatment

ABBREVIATIONS

ABRS – acute bacterial rhinosinusitis
AECRS – acute exacerbation of chronic rhinosinusitis
ARS – acute rhinosinusitis (acute sinusitis)
CT – computed tomography
EGPA – eosinophilic granulomatosis with polyangiitis, formerly Churg-Strauss syndrome
EPOS – The European Position Paper on Rhinosinusitis and Nasal Polyps
GC – glucocorticoid
GPA – granulomatosis with polyangiitis, formerly Wegener granulomatosis
ICP – integrated care pathway
NSAID – non-steroidal anti-inflammatory drug
OTC – over-the-counter medicine, non-prescription medicine
PHC – primary health care
QOL – quality of life
RARS – recurrent acute rhinosinusitis
URTI – upper respiratory tract infection

INTRODUCTION

Acute rhinosinusitis (ARS, lat. *rhinosinusitis acuta*) is one of the most common diseases of the general population and generates an enormous number of visits to primary health care and specialized care physicians. ARS significantly reduces the quality of life and is responsible not only for direct costs to healthcare systems, but also significant and also higher indirect costs [1, 2]. Rhinosinusitis is one of the 10 most costly illnesses for US employers: 85% of

patients are working age adults, which means a high number of sick days and a significant decrease in performance [3].

Bearing in mind the prevalence of acute sinusitis, the authors of the latest European guidelines on ARS – the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS2020) – decided to broaden the target audience of the paper, addressing it not only to otorhinolaryngologists and primary care physicians (or non-ENT doctors), but also to patients themselves, pharmacists, nurses, and other medical professionals. According to integrated care pathways (ICPs) presented in EPOS2020, the first level of treatment for acute rhinosinusitis is self-medication, e-health, and pharmacist recommendations. It is worth noting that an earlier edition of EPOS from 2012 introduced a completely new perspective on the issue of acute rhinosinusitis, and a new and still valid classification of this disease [4].

DEFINITION AND CLASSIFICATION OF ARS

The current definition of ARS [1, 4]:

- Acute rhinosinusitis in adults; characterized by two or more symptoms, where one of the following must be present:

1. nasal blockage/obstruction/congestion

or

2. anterior/posterior nasal drip/discharged discharge

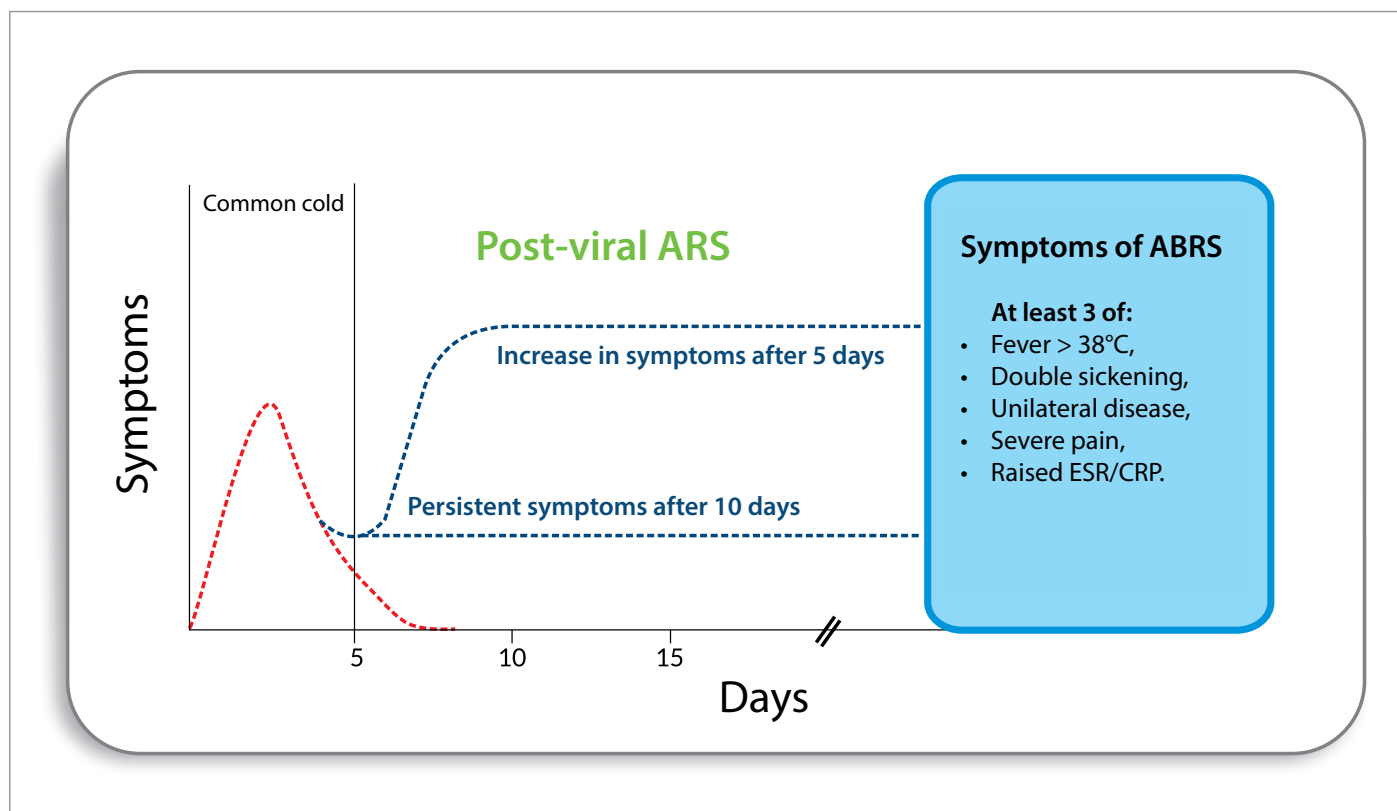


Fig. 1. Classification of acute rhinosinusitis.

and:

± facial pain/pressure,
± reduction or loss of smell.

Symptoms appear suddenly, lasting no more than 12 weeks with symptom-free intervals. If the problem is recurrent, an interview/telephone consultation is the basis for a diagnosis. Otorhinolaryngology specialist – endoscopic examination.

- Acute rhinosinusitis in children: sudden onset, 2 or more symptoms:

- blockage/obstruction/edema
- discolored nasal discharge
- cough (during day and/or night)

for < 12 weeks with symptom free intervals if the issue is not recurrent (validation by interview/telephone).

ARS classification distinguishes three phenotypes (Fig. 1.) [1, 4]:

1. common cold/acute viral rhinosinusitis,
2. acute post-viral rhinosinusitis,
3. acute bacterial rhinosinusitis.

Acute upper respiratory tract infections (common colds, URTIs) are self-limiting illnesses, therefore post-viral sinusitis can be diagnosed at the earliest on the 10th day of persistent symptoms or if there is a pronounced increase of symptoms after 5 days [1, 4].

Acute bacterial rhinosinusitis (ABRS) constitutes only a small proportion of acute rhinosinusitis cases and can be diagnosed by the presence of at least three of the following symptoms:

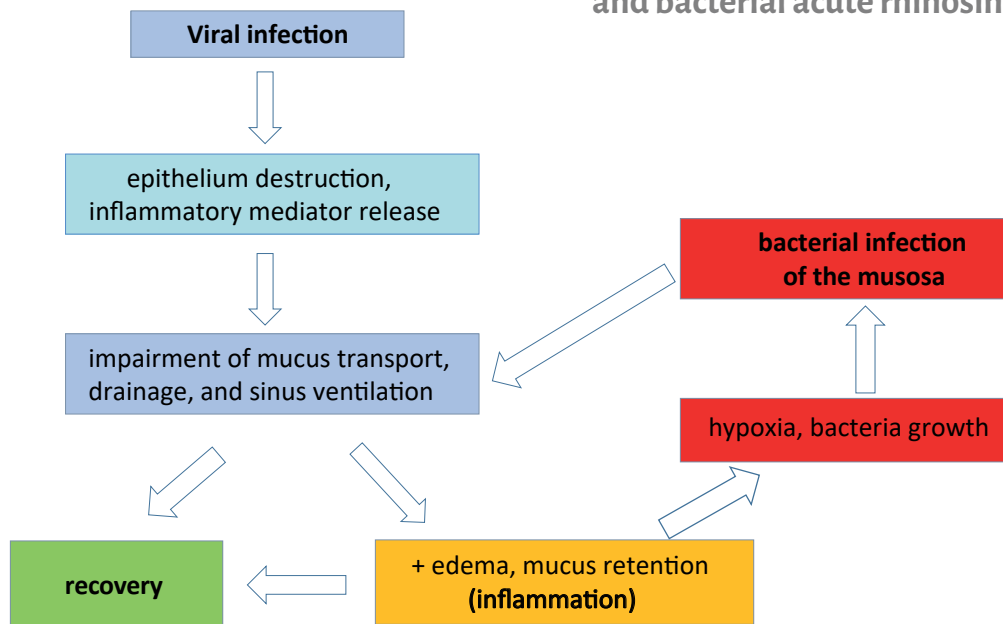
- discolored (purulent) discharge in the nasal cavity (note: this is the exact wording in the paper, but the symptom does not appear in the figures in EPOS2020, however the term unilateral disease appears),
- severe local pain,
- fever > 38°C,
- elevated CRP or ESR,
- ‘double sickening’ – a deterioration after an initial, milder phase of illness.

The symptoms can be often unilateral or more severe on one side [1, 4]. In addition, the EPOS2020 guidelines introduced a new term, namely recurrent acute rhinosinusitis (RARS), defined as ≥ 4 episodes of acute rhinosinusitis per year with symptom-free intervals between episodes. EPOS2020 recommends that at least one episode of post-viral ARS be diagnosed using endoscopy and/or CT before a diagnosis of RARS is made, therefore this diagnosis is beyond the competences of primary care physicians and an otorhinolaryngological consultation is necessary [1].

American guidelines (ICSAR) present similar definitions and symptomatology, and also include:

- acute rhinosinusitis with symptoms lasting up to 4 weeks,
- subacute rhinosinusitis with symptoms lasting between 4 and 12 weeks.

Pathophysiology of viral, post-viral and bacterial acute rhinosinusitis



common cold → acute post-viral rhinosinusitis → acute bacterial rhinosinusitis

Fig. 2. Pathophysiology of viral, post-viral, and bacterial ARS [18].

Like in the European guidelines, viral ARS can be diagnosed when the illness lasts less than 10 days. ICSAR guidelines also differ slightly in the diagnostic criteria for ABRS [3, 5].

EPIDEMIOLOGY, PREDISPOSING FACTORS

The prevalence of ARS in the general population varies significantly in available studies. Acute viral rhinosinusitis, the common cold, is an extremely common illness – on average it occurs 2 to 5 times per year in adults and up to 10 times per year in children [6, 7]. Acute post-viral rhinosinusitis is less frequent in children when compared to the adult population [1, 2]

In 2018, Hoffmans et al. published the latest Dutch study based on the EPOS criteria. Based on the results, the prevalence of post-viral ARS is estimated at 18% (17–21%) [8]. This subtype of sinusitis is also clearly associated with higher direct costs of treatment [9].

Only about 0.5–2% of viral ARS cases progress to bacterial ARS [1, 8]. This means that, in practice, ABRS is over-diagnosed and indications for antibiotics are grossly overstated [1, 10]. On the other hand, some authors report that the percentage of bacterial ARS may be higher, as positive culture results are obtained in 53% of patients suspected of having bacterial ARS [11].

Factors predisposing to ARS include [1–4, 12–14]:

- anatomical abnormalities (especially in RARS),
- allergic rhinitis,
- immunodeficiencies,
- primary and secondary ciliary dyskinesia,
- active and passive smoking,
- air pollution (smog),
- gastro-esophageal reflux (controversial factor),
- anxiety and depressive disorders.

EPOS2020 also summarized when the risk of bacterial ARS increases [1], listing the following predisposing factors for a bacterial infection:

- odontogenic: infections and surgical procedures,
- iatrogenic: sinus surgery, nasogastric tubes, nasal packing, mechanical ventilation,
- immunodeficiencies: HIV, immunoglobulin deficiencies,
- primary and secondary ciliary impairment: cystic fibrosis, primary ciliary dyskinesia (Kartagener syndrome), smoking, secondary immotile cilia syndromes (post-infectious, damage after exposure to harmful factors),
- structural/mechanical obstruction: deviated nasal septum (DNS), nasal polyps, hypertrophic turbinates, tumors, trauma, foreign bodies, GPA,

Acute viral rhinosinusitis (common cold)	Acute post-viral rhinosinusitis	
Symptomatic treatment NSAIDs, paracetamol, zinc, vit. C, decongestant (briefly) AVOID ANTIBIOTICS!!!	Intranasal corticosteroids 7–28 days, 2x day (+ decongestant, briefly) AVOID ANTIBIOTICS!!!	BACTERIAL
		add antibiotic to INCS, at least 10–14 days
Nasal irrigation with saline		
Phytotherapy		
Acute rhinosinusitis is typically a self-limiting disease but in case of lack of improvement or suspected complications the patient needs urgent referral to an otolaryngology specialist/an ENT department		

Fig. 3. General treatment principles of acute rhinosinusitis [1, 4].

- mucosal edema: preceding viral upper respiratory infection, allergic rhinitis, other rhinitis.

What is interesting, according to the Hoffmans et al. study the risk of ARS decreases with age [8].

SYMPTOM PROFILE AND QUALITY OF LIFE (QOL) IN ARS

Most common symptoms in ARS are [15]:

- 80.4% – nasal obstruction,
- 74.5–77% – facial pain,
- 70.4–94% – rhinorrhea,
- 63.3% – headaches,
- 63% – loss of smell.

At the onset of the disease, 88% of patients report pain and discomfort and 43% have difficulties performing normal daily activities. After 15 days only 31.5% report pain/discomfort [16].

Assessment of the severity of symptoms using a VAS by Jaume et al.:

- 2% – mild symptoms,
- 51% – moderate symptoms,
- 44% – severe symptoms.

This data clearly indicates that ARS is associated with burdensome symptoms for most patients [10], which in turn means moderate to very significant effects on the quality of life in a significant proportion of ARS patients [1, 15]:

- on activities of daily living in 71.6% of patients,
- on leisure in 63.1% of patients,
- on professional/school life in 59.2% of patients.

The symptom profile in children may differ significantly compared to adult patients [1, 2, 17]:

- acute viral sinusitis with typical viral infection symptoms is the dominant form (post-viral is less common),
- cough is one of the main symptoms, both in viral and post-viral ARS,
- post-nasal drip and hyposmia are relatively rare.

PATHOPHYSIOLOGY: INFECTION VERSUS INFLAMMATION

ARS is primarily an inflammatory disease of the nasal epithelium and paranasal sinuses. A viral infection usually triggers the activation of inflammatory pathways, secondary to the viral infection, and the infection itself is only a trigger for the inflammation. In rare cases the inflammation of the mucosa can predispose to

Tab. I. Recommendations for specific types of treatment and medicine groups in the treatment of ARS in adults [1, 2].

TYPE OF TREATMENT/DRUGS	COMMON COLD	POST-VIRAL ARS	BACTERIAL ARS
nasal GCs	no	yes	potentially yes
antibiotics	no	no	yes carefully establish indications for use
systemic corticosteroids	no	no	potentially yes in complications, severe pain
antihistamine drugs	rather not (potentially on the 1 st or 2 nd day)	no	no
decongestants (in/p.o.)	rather yes	rather not no data	no, poor quality data
nasal irrigation with saline	yes	rather yes	insufficient data
antihistamine/analgesic + decongestant	yes	insufficient data	no data
acetaminophen/paracetamol	rather yes		
NSAID	yes		
PHYTOTHERAPY (e.g., BNO1016)	yes	yes	insufficient data
ipratropium bromide	rather yes	insufficient data	insufficient data
vitamin C	? (yes if deficient or high physical activity)		
zinc	yes, on the 1 st day ≥ 75 mg (acetate or gluconate)	no data	no
probiotics	potential prevention		no
Echinacea	rather not		no
vaccines	no		no
steam inhalation	no		no
homeopathy	no	?	no
sodium hyaluronate			? requires further study
regular physical exercise	Yes, prevention		

bacterial infection [2, 18]. Thus, in most cases, ARS is the result of a viral infection (rhinoviruses, coronaviruses, RS viruses, influenza, parainfluenza, and adenoviruses) [1]. Bacterial infection is secondary to a viral infection and develops only in 0.5–2% of cases [8]. *S. pneumoniae* and *H. influenzae* are responsible for nearly 80% of bacterial ARS. Other potential etiological factors include *M. catarrhalis*, *S. aureus*, and *S. pyogenes*. Increased adhesion of bacteria responsible for acute rhinosinusitis to virus-damaged epithelium has been found. The possibility of „cooperation” between some viruses and bacteria (e.g., influenza A and streptococci) has been demonstrated [1, 3].

The pathophysiology of ARS emphasizes the special role of the nasal epithelium, which is the primary portal of entry for viruses responsible for respiratory infections and the direct target for viral replication in the respiratory tract. The nasal epithelium is both a barrier and an important element in inducing an inflammatory response. It is associated with an influx of inflammatory cells, induction of various cytokines, and disruption of ciliogenesis, with a simultaneous increase in goblet cells in the nasal mucosa. This results in: edema, engorgement, fluid extravasation, mucus production and sinus obstruction, eventually leading to ARS [1, 18–20] (Fig. 2.).

DIAGNOSIS

The diagnosis of ARS is made on the basis of an interview with a characteristic, sudden onset of symptoms that define ARS. The type, severity, and duration of symptoms should be assessed. This is sufficient for PCPs and non-ENT doctors. An otorhinolaryngology specialist should perform an endoscopic examination [1, 2].

Evident overuse of medical imaging is not justified [10].

CT of the sinuses is not recommended, apart from the following cases [1, 4]:

- severe symptoms,
- patients with immunodeficiencies,
- signs of complications,
- recurrent ARS.

While diagnosing ARS it is important to exclude odontogenic infections, especially in acute sinusitis with predominantly unilateral symptoms (dental assessment necessary!). It is also important to obtain information about any coexisting allergies or

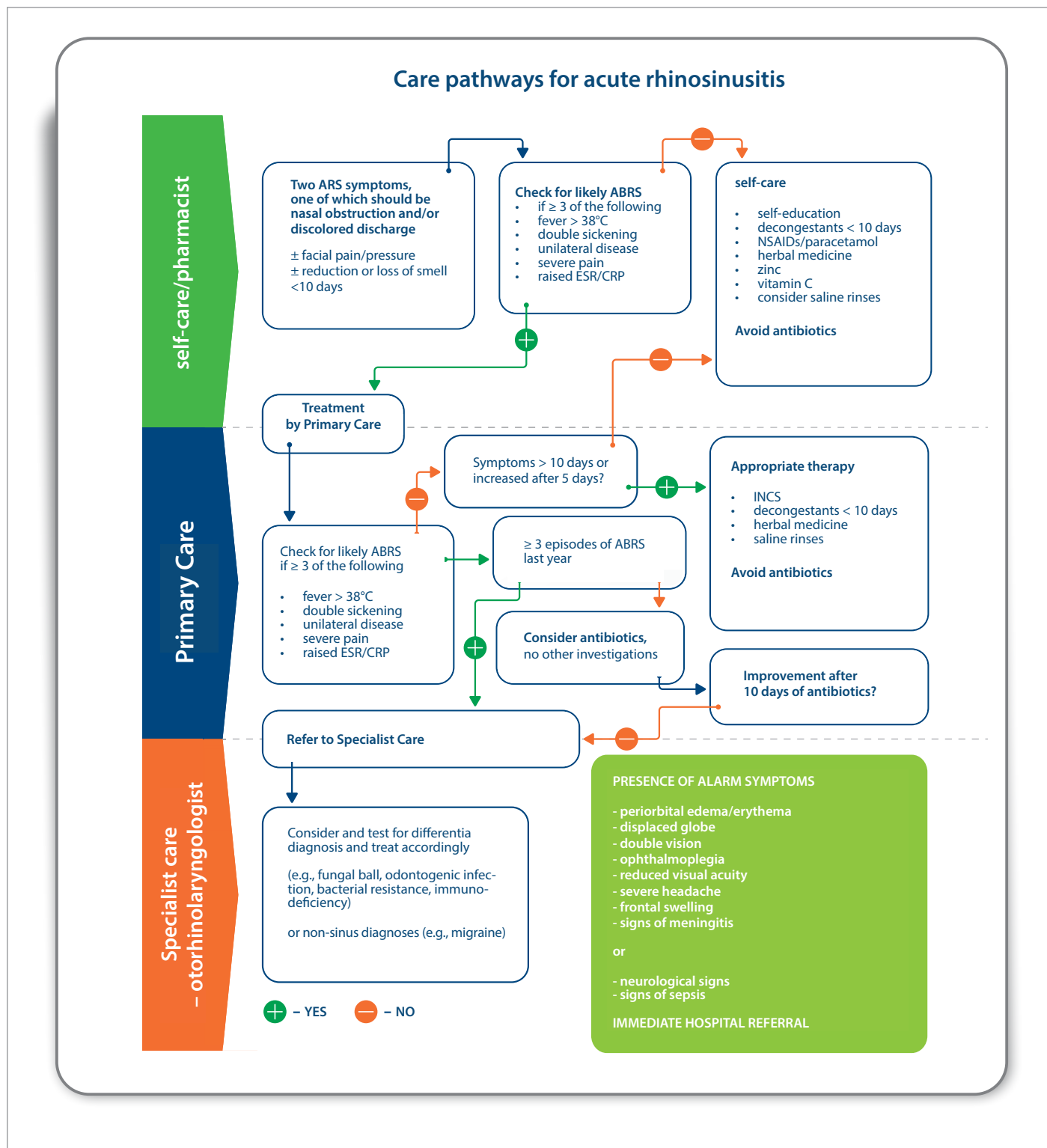


Fig. 4. Integrated care pathways of acute rhinosinusitis.

other chronic disorders. Only then are further diagnostic tests recommended, especially in the case of treatment resistant, recurrent, and complicated cases [1, 4].

The clinical criteria for the diagnosis of acute bacterial rhinosinusitis have been strictly defined in the EPOS guidelines and demonstrate specificity [21].

There are no indications for bacteriologic tests (cultures) in the case of uncomplicated acute sinusitis.

If a decision is made to perform bacteriologic tests, the material should be collected from the middle nasal meatus under the guidance of an endoscope or through a maxillary sinus puncture; both techniques have similar sensitivity and specificity [2, 22].

Tab. II. Recommendations for specific types of therapy and drug groups in the treatment of ARS in children [1, 2].

THERAPY	POST-VIRAL	BACTERIAL
nasal GCs	no (+/-)	
antibiotics	no	yes/no data
antihistamine drugs	no	
bacterial lysates	?	
mucoytics		no

TREATMENT OF ARS

EPOS2020 recommendations for the treatment of ARS do not significantly differ from those published in 2012, although there are several new recommendations based on the latest publications.

The main difference is treatment based on integrated care pathways (Fig. 4.). EPOS2012 guidelines were primarily addressed to general practitioners and otolaryngologists [4]. In EPOS2020 guidelines the patient is first treatment level – self-care and pharmacists, second level – primary care physicians (PHC – family doctors, internal doctors, pediatricians), and only secondary/tertiary care is specialists, including hospitalization (applies to ARS complications and severe cases) [1].

The main message of EPOS2020 is to avoid antibiotics when there are no indications for their use. Studies show that acute bacterial sinusitis is often overdiagnoses with a simultaneous overuse of both diagnostic methods and antibiotics. Up to 60% (!) of patients receive antibiotics on the first day of the illness [1, 10].

In a UK study, 88% of consultations on sinusitis resulted in an antibiotic prescription, where only 11% were deemed appropriate.

In a study from Spain, even after excluding all patients with bacterial sinusitis, it was found that antibiotics were given to 60% of patients with a common cold and 70% of patients with post-viral ARS [10].

American studies emphasize that the real benefits of antibiotics are minimal and require 11 to 15 patients to be treated with antibiotics to get improvement in one person [3].

In case of suspected ABRS, and often due to patient pressure, the decision to use antibiotics should be made individually, based on the patient's symptoms, using simple bacterial infection markers like CRP or procalcitonin [1].

Symptomatic treatment is recommended in viral ARS. Non-steroid anti-inflammatory drugs (NSAIDs) can be used if there are no special contraindications. Moreover, the following are used: painkillers (paracetamol), nasal irrigation with saline, nasal decongestants (no longer than 7 days), ipratropium bromide, zinc (effective on the first day of the infection) [1, 2]. Herbal medicines, like phytotherapeutics/phytopharmaceuticals, in the form of complex extracts show high effectiveness. Preparations that are classed as medicine, not as dietary supplements, should be used. Only treatments registered as medications have a therapeutic effect confirmed by reliable clinical trials. Phytotherapy can be effectively

combined with other medications for the symptomatic treatment of acute viral rhinosinusitis, e.g., NSAIDs or nasal decongestants (alpha-adrenergic agonists, pseudoephedrine).

It is worth noting that the latest EPOS recommendations clearly indicate, based on a meta-analysis by Lee et al., that regular, moderate-intensity physical exercise is one of the preventive factors of acute rhinosinusitis. The beneficial effects of probiotics have also been considered [1].

The inflammatory process intensifies in post-viral ARS, hence in addition to symptomatic treatment the guidelines recommend introducing nasal corticosteroids at this stage [1, 4].

Intranasal glucocorticoids (GCs) reduce the inflammatory process and the swelling of the nasal mucosa, and improve mucociliary clearance, facilitating nasal discharge drainage [1–4].

In the clinical studies summarized in EPOS2012 and EPOS2020:

- patients receiving nasal GCs showed quicker improvement of ARS symptoms than those receiving placebo,
- higher doses of nasal GCs had a stronger effect on the improvement or complete relief of symptoms (thus the recommendation that they should be used twice a day in ARS).

In bacterial post-viral ARS, nasal glucocorticoids are recommended as an adjunct to systemic antibiotic therapy, which is the main form of treatment. Numerous studies have shown that nasal GCs shorten the treatment duration of ARS [1, 3]. However, the recommendation in EPOS2020 for the use of nasal glucocorticoids in acute bacterial sinusitis is not clear.

Phytotherapy is effective in post-viral ARS, as is the case in viral ARS. Numerous studies confirm a measurable benefit of using herbal drugs – they reduce the severity of symptoms and significantly shorten the duration of ARS. Phytopharmaceuticals obtain their therapeutic effect thanks to their mucolytic and secretolytic properties, improved mucociliary clearance, but also confirmed in vitro anti-viral, anti-bacterial and anti-inflammatory properties [24, 26–29].

The use of phytoengineering techniques allows to obtain higher concentrations of active ingredients in medicinal products, and thus better therapeutic effects [29].

Phytopharmaceuticals can be used at stage of ARS, starting from first symptoms to treatment combined with other medication (e.g., nasal glucocorticoid, antibiotic). They exhibit a beneficial effect

both in monotherapy, as well as an adjunct to anti-inflammatory treatment – nasal GCs. Studies have shown a synergistic effect of using phytopharmaceuticals and mometasone in the treatment of ARS [30]. The study by Popovych et al. published last year, showed that the use of phytotherapy nearly halved the need for antibiotics in the treatment of ARS [31]. Herbal medication in the form of complex extracts is characterized by a low risk of adverse effects, thus meeting the needs of patients and treatment using herbal medicine, which is considered safe and free from adverse effects.

Acute bacterial rhinosinusitis – diagnosed on the basis of an interview and a physical examination, and ideally confirmed by additional tests (CRP, procalcitonin) – requires the use of antibiotics. Polish „Recommendations on the treatment of community-acquired respiratory tract infections coincide with the EPOS report and recommend the following antibiotics in the treatment of ABRS [32]:

- amoxicillin in the appropriate dose (1.5 to 2.0 g every 12 hours) is the antibiotic of choice, no improvement after 48 hours of first-line treatment is an indication for a specialist consultation and changes in current therapy,
- the use of amoxicillin with clavulanic acid is recommended in case of ineffective first-line treatment, oral administration of cefuroxime axetil for 10 days is recommended in case of penicillin allergy, and the use of clarithromycin or azithromycin, alternatively levofloxacin or moxifloxacin, up to 10 days is recommended in the case of allergy to all beta-lactam antibiotics (fluoroquinolones are also used in cases of penicillin-resistant strains of *Streptococcus pneumoniae*). [In the case of fluoroquinolones, it should be remembered that according to the announcement of the Office for Registration of Medicinal Products, Medical Devices and Biocidal Products from April 2019, there are restrictions in their uses due to the risk of performance-impairing, long-term, and potentially irreversible adverse effects. They should only be recommended when there is no other therapeutic option!],
- in severe cases, when it is necessary to administer antibiotics intravenously, third generation cephalosporins are used (ceftriaxone, cefotaxime) in combination with clindamycin.

Intranasal GCs and phytotherapy can be recommended as complementary treatments in bacterial ARS. There are reports that the addition of oral GCs to antibiotic therapy has a positive effect on pain reduction in bacterial ARS.

CHARACTERISTICS OF ACUTE RHINOSINUSITIS IN CHILDREN

The clinical diagnosis of ARS in children is a challenge for both the pediatrician and the otolaryngologist. This is influenced by overlapping symptoms of an acute viral infection and allergic rhinitis, difficulties in physical examination, but also the particulars of children's anatomy. All definitions and categorizations of ARS in adults also apply to children [1, 33]. However, some children may experience severe symptoms of ABRS from the onset, including high fever, purulent nasal discharge, and severe pain.

Alarm symptoms in rhinosinusitis – require urgent intervention/hospitalization

- periorbital edema and erythema,
- displaced globe,
- double vision,
- ophthalmoplegia,
- reduced visual acuity,
- severe unilateral or bilateral frontal pain,
- frontal swelling,
- signs of meningitis,
- neurological signs,
- disturbances of consciousness.

Fig. 5. Alarm symptoms in rhinosinusitis [1].

Treatment of acute viral rhinosinusitis in children is similar to that in adults, however in post-viral ARS it is evidently limited by the availability of reliable research of individual therapeutic groups and age restrictions in drug registration.

In case of rapidly developing symptoms, treatment should be intensified immediately, including hospitalization, due to a higher risk of complications than in adults [33–35].

COMPLICATIONS OF ACUTE BACTERIAL RHINOSINUSITIS

In general, complications of acute rhinosinusitis refer to complications of acute bacterial rhinosinusitis. Unjustified use of antibiotics in the treatment of acute post-viral sinusitis does not prevent complications [1, 2, 36]. Despite the widespread use antibiotic therapy, complications still occur, although they happen significantly less often than in the past. They remain a type of pathology, a laryngological urgency, and a potential life threat. That is why it is important to recognize and know the symptoms that may suggest complications, referred to as alarm symptoms (Fig. 5.) [1].

The incidence of ABRS complications has been estimated at approximately 3 per million inhabitants and comparable in different regions, despite differences in the utilizations of antibiotic prescriptions [1]. In patients hospitalized with ABRS, the percentage of patients with complications varies from 3% to 20% [1, 34, 37–39]. Orbital complications are most common (60–80%), followed by intracranial complications (15–20%), while osteomyelitis and subperiosteal abscesses constitute approximately 5% of complications. They are more common in men [4, 35, 37–40].

Due to their anatomy, children are particularly predisposed to developing orbital complications [34, 35, 37]. Intracranial complications can develop at any age; they are most common in young adults (around 20 years of age) [38–40]. Treatment duration in patients with acute rhinosinusitis complications increases significantly with age [38, 39]. Each patient hospitalized due to complications should undergo full radiological diagnostics; CT and/or MRI, potentially with an angiographic scan [1, 34, 38].

According to EPOS2020, in many cases endoscopic sinus surgery concurrent with long-term, intravenous antibiotic therapy may be sufficient. Preseptal complications and subperiosteal intraorbital abscesses in children are not an absolute indication for surgical intervention and conservative treatment may be attempted [1].

DIFFERENTIAL DIAGNOSIS OF ARS (POST-VIRAL ACUTE RHINOSINUSITIS) [1]

Common conditions for differential diagnosis

1. URTI – upper respiratory tract infection;
2. AR – allergic rhinitis;
3. AECRS – acute exacerbation of chronic rhinosinusitis;

Rare conditions for differential diagnosis

1. Systemic vasculitis (GPA, EGPA, sarcoidosis);
2. Odontogenic infections;
3. Facial pain syndromes;
4. Acute invasive fungal rhinosinusitis;
5. CSF leak.

REFERENCES

1. Fokkens W.J., Lund V.J., Hopkins C. et al.: European Position Paper on Rhinosinusitis and Nasal Polyps 2020. *Rhinology*, 2020; 50 (Suppl. 29): 1–464.
2. Jaume F., Valls-Mateus M., Mullol J.: Common Cold and Acute Rhinosinusitis: Up-to-Date Management in 2020. *Curr Allergy Asthma Rep.*, 2020; 20(7): 28. doi: 10.1007/s11882-020-00917-5.
3. Orlandi R.R., Kingdom T.T., Hwang P.H. et al.: International Consensus Statement on Allergy and Rhinology: Rhinosinusitis. *Int Forum Allergy Rhinol.*, 2016; 6 (Suppl 1): S22–S209.
4. Fokkens W.J., Lund V.J., Mullol J. et al.: European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS). *Rhinology*, 2012; 50 (Suppl. 23): 1–298.
5. Rosenfeld R.M., Piccirillo J.F., Chandrasekhar S.S. et al.: Clinical practice guideline (update): Adult sinusitis. *Otolaryngology – Head and Neck Surgery (United States)*, 2015; 152: S1–S39.
6. Turner R.B.: Epidemiology, pathogenesis, and treatment of the common cold. *Ann Allergy Asthma Immunol.*, 1997; 78(6): 531–539; quiz 539–540.
7. Finley C.R., Chan D.S., Garrison S. et al.: What are the most common conditions in primary care? Systematic review. *Can Fam Physician.* 2018; 64: 832–840.
8. Hoffmans R., Wagemakers A., van Druenen C., Hellings P., Fokkens W.: Acute and chronic rhinosinusitis and allergic rhinitis in relations to comorbidity, ethnicity and environment. *PLoS One*, 2018; 13: e0192330.
9. Jaume F., Quintó L.L.L., Alobid I., Mullol J.: Direct costs of Acute Rhinosinusitis in Spain - a prospective and observational study (PROSINUS). *J Investig Allergol Clin Immunol*, 2020; 0. doi: 10.18176/jiaci.0525. Online ahead of print.
10. Jaume F., Quintó L., Alobid I., Mullol J.: Overuse of diagnostic tools and medications in acute rhinosinusitis in Spain: a population-based study (the PROSINUS study). *BMJ, Open*, 2018; 8: e018788.
11. Smith S.S., Ference E.H., Evans C.T. et al.: The prevalence of bacterial infection in acute rhinosinusitis: a systemic review and meta-analysis. *Laryngoscope*, 2015; 125(1): 57–69.
12. De Sario M., Katsouyanni K., Michelozzi P.: Climate change, extreme weather events, air pollution and respiratory health in Europe. *Eur Resp Journal.*, 2013; 42(3): 826–843.
13. Kuiper J.R., Hirsch A.G., Bandeen-Roche K. et al.: Prevalence, severity, and risk factors for acute exacerbations of nasal and sinus symptoms by chronic rhinosinusitis status. *Allergy*, 2018; 73: 1244–1253.
14. Lin S.W., Wang S.K., Lu M.C., Wang C.L., Koo M.: Acute rhinosinusitis among pediatric patients with allergic rhinitis: A nationwide, population-based cohort study. *PLoS One.*, 2019; 14(2): e0211547.
15. Klossek J.M., Mesbah K.: Presentation and treatment of acute maxillary sinusitis in general practice: a French observational study. *Rhinology*, 2011; 49: 84–89.
16. Stjärne P., Odebäck P., Stållberg B., Lundberg J., Olsson P.: High costs and burden of illness in acute rhinosinusitis: real-life treatment patterns and outcomes in Swedish primary care. *Prim Care Respir J.*, 2012; 21: 174–179.
17. Shaikh N., Hoberman A., Kearney D.H. et al.: Signs and symptoms that differentiate acute sinusitis from viral upper respiratory tract infection. *Pediatr Infect Dis J.*, 2013; 32: 1061–1065.
18. Samoliński B., Gotlib T., Pietruszewska W. et al.: Postępowanie w ostrym zapaleniu zatok przynosowych w praktyce lekarza rodzinnego. *Stanowisko 4 Towarzystw (StanForT) Rekomendacje PTA, PTChGiS, PTMR, KLR w Polsce*, 2014.
19. Tan K.S., Ong H.H., Yan Y. et al.: In Vitro Model of Fully Differentiated Human Nasal Epithelial Cells Infected With Rhinovirus Reveals Epithelium-Initiated Immune Responses. *J Infect Dis.*, 2018; 217(6): 906–915.
20. Liu T., Zhou Y.T., Wang L.Q. et al.: NOD-like receptor family, pyrin domain containing 3 (NLRP3) contributes to inflammation, pyroptosis, and mucin production in human airway epithelium on rhinovirus infection. *J Allergy Clin Immunol.*, 2019; 144(3): 777–787.
21. Seresirikachorn K., Snidvongs K., Chitsuthipakorn W. et al.: EPOS2012 has better specificity compared to IDSA2012 for diagnosing acute bacterial rhinosinusitis. *Rhinology.*, 2018; 56(3): 241–244.
22. Benninger M.S., Payne S.C., Ferguson B.J. et al.: Endoscopically directed middle meatal cultures versus maxillary sinus taps in acute bacterial maxillary rhinosinusitis: a meta-analysis. *Otolaryngol Head Neck Surg.*, 2006; 134(1): 3–9.

CONCLUSION

Acute rhinosinusitis is mainly an inflammatory illness caused by a viral infection; in a small percentage of cases, it is caused by a bacterial infection. Despite the fact that it is mostly a self-limiting disease, diagnosis is made mainly based on clinical criteria and treatment is symptomatic, rhinosinusitis is associated with a large socioeconomic burden, high direct and indirect costs of treatment, and significant reduction in the quality of life. The incidence of complications is low and independent of antibiotic use, which are evidently overused in the treatment of acute rhinosinusitis. Therefore, the principles of appropriate diagnostics and therapy should be known to both family physicians and otorhinolaryngologists. In a way, EPOS2020 predicted the realities of the SARS-CoV-2 pandemic, where there was limited access to medical care, by introducing a rhinosinusitis treatment system based on integrated care pathways and addressing the guidelines not only to physicians but also patients, pharmacists, nurses, and other medical professionals, and also taking e-health into account. In many cases, acute rhinosinusitis – especially at the stage of a viral infection or mild post-viral acute sinusitis – can be treated with OTC drugs, however patients with recurrent ARS or with comorbidities require specialist consultations and enhanced diagnostics.

23. Pouwels K.B., Dolk F.C.K., Smith D.R.M. et al.: Actual versus 'ideal' antibiotic prescribing for common conditions in English primary care. *J Antimicrob Chemother.*, 2018; 73(suppl. 2): 19–26.
24. Jund R., Mondigler M., Stammer H., Stierna P., Bachert C.: Herbal drug BNO 1016 is safe and effective in the treatment of acute viral rhinosinusitis. *Acta Oto Laryngologica*, 2015; 135(1): 42–50.
25. Lee H.K., Hwang I.H., Kim S.Y., Pyo S.Y.: The effect of exercise on prevention of the common cold: a meta-analysis of randomized controlled trial studies. *Korean J Fam Med*, 2014; 35: 119–126.
26. Gottschlich S., Röschmann K., Candler H.: Phytomedicines in acute rhinosinusitis: A prospective, non-interventional parallel-group trial. *Adv Ther*, 2018; 35(7): 1023–1034.
27. Passali D., Loglisci M., Passali G.C. et al.: A prospective open-label study to assess the efficacy and safety of a herbal medicinal product (Sinupret) in patients with acute rhinosinusitis. *ORL J Otorhinolaryngol Relat Spec*, 2015; 77(1): 27–32.
28. Koch A.K., Klose P., Lauche R. et al.: A systemic review of phytotherapy for acute rhinosinusitis. *Forsch Komplementmed*, 2016; 23: 165–169.
29. Passali D., Cambi J., Passali F.M., Bellusi L.M.: Phytoneering: a new way of therapy for rhinosinusitis. *Acta Otorhinolaryngol Ital*, 2015; 35(1): 1–8.
30. Perić A., Kovačević S.V., Gaćeša D. et al.: Efficacy and safety of combined treatment of acute rhinosinusitis by herbal medicinal product Sinupret and mometasone furoate nasal spray. *ENT Updates*, 2017; 7(2): 68–74.
31. Popovych V.I., Beketova H.V., Koshel I.V. et al.: An open-label, multi-centre, randomized comparative study of efficacy, safety and tolerability of the 5 plant – extract BNO 1012 in the Delayed Antibiotic Prescription Method in children, aged 6 to 11 years with acute viral and post-viral rhinosinusitis. *Am J Otolaryngol*, 2020; 41(5): 102564. doi: 10.1016/j.amjoto.2020.102564. Epub 2020 Jun 1.
32. Hryniewicz W., Albrecht P., Radzikowski A.: Rekomendacje postępowania w pozaszpitalnych zakażeniach układu oddechowego. Narodowy Instytut Leków, Warszawa, 2016. Narodowy Program Ochrony Antybiotyków Ministerstwa Zdrowia. Wydanie drugie, wersja z dnia 31.03.2017, www.antybiotyki.edu.pl.
33. Nocon C.C., Baroody F.M.: Acute Rhinosinusitis in children. *Curr Allergy Asthma Rep*, 2014; 14: 443.
34. Torretta S., Guastella C., Marchisio P. et al.: Sinonasal-Related Orbital Infections in Children: A Clinical and Therapeutic Overview. *J Clin Med*, 2019; 8.
35. Piatt J.H., Jr: Intracranial suppuration complicating sinusitis among children: an epidemiological and clinical study. *J Neurosurg Pediatr*, 2011; 7: 567–574.
36. Babar-Craig H., Gupta Y., Lund V.J.: British Rhinological Society audit of the role of antibiotics in complications of acute rhinosinusitis: a national prospective audit. *Rhinology*, 2010; 48(3): 344–347.
37. Capra G., Liming B., Boseley M.E., Brigger M.T.: Trends in orbital complications of pediatric rhinosinusitis in the United States. *JAMA Otolaryngol Head Neck Surg*, 2015; 141: 12–17.
38. El Mograbi A., Ritter A., Najjar E., Soudry E.: Orbital Complications of Rhinosinusitis in the Adult Population: Analysis of Cases Presenting to a Tertiary Medical Center Over a 13-Year Period. *Ann Otol Rhinol Laryngol*, 2019; 128: 563–568.
39. Chaiyasate S., Fooanant S., Navacharoen N., Roongrotwattanasiri K., Tantilipikorn P., Patumanond J.: The complications of sinusitis in a tertiary care hospital: types, patient characteristics, and outcomes. *Int J Otolaryngol*, 2015; 2015: 709302.
40. Ball S.L., Carrie S.: Complications of rhinosinusitis. *BMJ*, 2016; 352: i795.

Word count: 4229 Tables: 2 Figures: 5 References: 40

DOI: 10.5604/01.3001.0015.2378 Table of content: <https://otolaryngologypl.com/issue/13862>

Copyright: Some right reserved: Polish Society of Otorhinolaryngologists Head and Neck Surgeons. Published by Index Copernicus Sp. z o.o.

Competing interests: The authors declare that they have no competing interests.



The content of the journal „Polish Society of Otorhinolaryngologists Head and Neck Surgeons” is circulated on the basis of the Open Access which means free and limitless access to scientific data.



This material is available under the Creative Commons – Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). The full terms of this license are available on: <https://creativecommons.org/licenses/by-nc/4.0/legalcode>

Corresponding author: Magdalena Arcimowicz MD PhD; Department of Otorhinolaryngology and Surgery of the Head and Neck, Medical University of Warsaw; Banacha street 1a, 02-097 Warsaw, Poland; E-mail: arcilena@gmail.com

Cite this article as: Arcimowicz M.: Acute sinusitis in daily clinical practice; *Otolaryngol Pol* 2021; 75 (4): 40-50
