

# Acute and chronic sinusitis

Acute rhinosinusitis (ARS) is defined as symptomatic inflammation of the nasal cavity and paranasal sinuses lasting less than four weeks.

- Treatment for acute viral rhinosinusitis (AVRS) focuses on symptomatic management as it typically resolves within 7 to 10 days.
- Bacterial infection occurs in only 0.5 to 2 percent of episodes of ARS .
- Acute bacterial rhinosinusitis (ABRS) may also be a self-limited disease.
- Patients may be treated symptomatically and observed or treated with antibiotics.
- Rarely, patients with ABRS develop serious complications

# ACUTE VIRAL RHINOSINUSITIS

- AVRS may not completely resolve within 10 days but is expected to improve.
- Patients who fail to improve after  $\geq 10$  days of symptomatic management are more likely to have acute bacterial rhinosinusitis
- we suggest over-the-counter (OTC) analgesics and antipyretics, saline irrigation, and intranasal glucocorticoids for symptomatic management in patients with ARS.

# Other treatment

- Intranasal saline spray –
- Intranasal [ipratropium](#) bromide
- Oral decongestants
- Intranasal decongestants
- Antihistamines
- Mucolytics

# ACUTE BACTERIAL RHINOSINUSITIS

- Many patients with ABRS have self-limited disease that resolves without antibiotic therapy.
- Patients rarely develop complications of bacterial infection beyond the nasal cavity into the central nervous system, orbit, or surrounding tissues

- **Indications for urgent referral** — Urgent early referral is essential for patients with symptoms that are concerning for complicated ABRS or have evidence of complications on imaging.
- These include patients with high, persistent fevers  $>102^{\circ}\text{F}$ ;
- periorbital edema, inflammation, or erythema;
- cranial nerve palsies;
- abnormal extraocular movements; proptosis; vision changes (double vision or impaired vision);
- severe headache; altered mental status; or meningeal signs.

- We suggest observation (watchful waiting for a seven-day period) with symptomatic management for immunocompetent patients with ABRS who have good follow-up.
- For patients who do not have good follow-up, we start antibiotic therapy at the time of diagnosis.
- We also start antibiotics for patients with a clinical diagnosis of ABRS whose symptoms worsen or fail to improve within the seven-day observation period

# Initial oral therapy

- The choice of antibiotic is based on the most common bacteria associated with ABRS .
- Routine coverage for *Staphylococcus aureus* or methicillin-resistant *S. aureus* (MRSA) is not indicated at this time.

# Patients without risk factors for pneumococcal resistance

- Either [amoxicillin](#) (500 mg orally three times daily or 875 mg orally twice daily) or [amoxicillin-clavulanate](#) (500 mg/125 mg orally three times daily or 875 mg/125 mg orally twice daily) is appropriate initial therapy for patients with ABRS who do not have risk factors for resistance.

Risk factors for pneumococcal resistance in patients with acute bacterial rhinosinusitis

Living in geographic regions with rates of penicillin-nonsusceptible *S. pneumoniae* exceeding 10%\*

Age  $\geq 65$  years

Hospitalization in the last five days

Antibiotic use in the previous month

Immunocompromise

Multiple comorbidities (eg, diabetes or chronic cardiac, hepatic, or renal disease)

Severe infection (eg, evidence of systemic toxicity with temperature of  $\geq 102^{\circ}\text{F}$ , threat of suppurative complications)

\* Local and regional histograms of bacterial resistance should be referenced to understand resistance trends in the local community.

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- **Patients with risk factors for pneumococcal resistance –**
- High-dose [amoxicillin-clavulanate](#) (2 g/125 mg extended-release tablets orally twice daily) is appropriate initial therapy for patients who are at higher risk for pneumococcal resistance or poor outcomes.

- **Patients with penicillin allergy** – [Doxycycline](#) (100 mg orally twice daily or 200 mg orally daily) is a reasonable alternative to [amoxicillin](#) or [amoxicillin-clavulanate](#) for initial-line therapy and can be used in patients with penicillin allergy .
- For penicillin-allergic patients who can tolerate cephalosporins, a third-generation oral cephalosporin ([cefixime](#) 400 mg daily or [cefpodoxime](#) 200 mg twice daily) prescribed with or without [clindamycin](#) (300 mg every six hours) is another option.

- A respiratory fluoroquinolone ([levofloxacin](#) 750 mg or 500 mg orally once daily or [moxifloxacin](#) 400 mg orally once daily) is another alternative for penicillin-allergic patients.
- Macrolides ([clarithromycin](#) or [azithromycin](#)) and [trimethoprim-sulfamethoxazole](#) are not recommended for empiric therapy because of high rates of resistance of *S. pneumonia*
- **Duration** — Patients who are improving on initial therapy should be treated for a course of five to seven days.

- treatment options for patients who fail to improve with initial therapy should have a broader spectrum of activity and/or be in a different drug class than the initial agent used.
- ● [Amoxicillin-clavulanate](#) 2 g/125 mg extended-release tablets orally twice daily
- ● [Levofloxacin](#) 500 or 750 mg orally once daily
- ● [Moxifloxacin](#) 400 mg orally once daily

- **Systemic glucocorticoids** — We suggest not using systemic glucocorticoids in the treatment of ABRS.
- When given in addition to antibiotics, oral glucocorticoids may shorten the time to symptom resolution or improvement.
- However, the benefits are small and, unlike topical glucocorticoids, systemic glucocorticoids possess a significant side effect profile.

# Chronic rhinosinusitis

- Chronic rhinosinusitis (CRS) is defined as an inflammatory condition involving the paranasal sinuses and linings of the nasal passages, which persists for 12 weeks or longer . CRS can be divided into three subtypes
  - ●CRS without nasal polyposis (CRS without NP)
  - ●CRS with nasal polyposis (CRS with NP)
  - ●Allergic fungal rhinosinusitis (AFRS)

- **Intranasal saline**

- Irrigating the nasal cavities with saline reduces postnasal drainage, removes secretions, and rinses away allergens and irritants.
- Saline irrigations can be used immediately prior to administration of other intranasal medications, so that the mucosa is freshly cleansed when the medications are introduced.

- **Surfactants to disrupt biofilms** — The addition of surfactants, such as baby shampoo, to saline irrigations has been proposed to prevent the formation of bacterial biofilms on the sinus mucosa and to increase mucociliary clearance rates .
- Possible adverse effects include discomfort and decreased sense of smell
- **Nasal sprays** — Nasal glucocorticoid sprays include [budesonide](#), [fluticasone](#) propionate, [mometasone](#) furoate, [triamcinolone](#) acetonide, [ciclesonide](#), [beclomethasone](#) dipropionate, and fluticasone furoate.
- **Instillations/drops** — Instillation of glucocorticoid solutions into the nose can reach the middle meatus (where polyps often form) more reliably than nasal sprays

- **Oral glucocorticoids** — Oral glucocorticoids, such as [prednisone](#), may be administered to patients with CRS for the following purposes:
  - ●Relieving severe and refractory mucosal edema in CRS without NP
  - ●Reducing the size of polyps in CRS with NP
  - ●Minimizing mucosal inflammation in allergic fungal rhinosinusitis (AFRS)

- **Antibiotics** — Expert consensus reports from otolaryngology and allergy/immunology groups have concluded that there is limited evidence for antibiotics in the treatment of CRS, except for management of acute exacerbations.

- **Antileukotriene agents** — Cysteinyl leukotrienes are inflammatory mediators that cause mucus secretion, increased vascular permeability, and mucosal edema in the upper and lower airways.
- Antileukotriene agents include the leukotriene D<sub>4</sub> (LTD<sub>4</sub>) receptor blockers [montelukast](#) or [zafirlukast](#) and the 5-lipoxygenase inhibitor [zileuton](#).
- Antileukotriene agents may be used as an adjunct therapy to intranasal glucocorticoids in patients with CRS with concomitant allergic rhinitis or in patients with NP and may have additional advantages in patients with aspirin-exacerbated respiratory disease.

# CRS WITHOUT NASAL POLYPOSIS

- **Intranasal glucocorticoids and saline lavage**
- **Refractory symptoms** — For patients who fail to achieve adequate symptom control following one to three months of saline nasal lavage and topical glucocorticoids, there are two additional medical approaches that can be tried, both of which are supported only by low quality evidence, or the patient can be referred for sinus surgery
- **Short-term antibiotics and oral glucocorticoids** — A course of oral antibiotics combined with oral glucocorticoids can be given for patients with refractory symptoms

- ●The duration of antibiotics usually ranges from two to four weeks. (
- ●Glucocorticoids are given for 10 to 15 days, as a single morning dose or divided twice daily.
- We prefer [prednisone](#), 40 mg daily for five days, followed by 20 mg daily for five day

- **Antibiotic selection** — Whenever possible, the choice of antibiotic treatment should be guided by cultures of purulent mucus that is visualized and sampled endoscopically from the middle meatus or another accessible sinus ostium.

# Empiric antibiotic treatment is **not** recommended in the following clinical settings

- ●If the patient has recently failed antibiotic treatment with a similar regimen
- ●If the patient has a history of infection with gram-negative or methicillin-resistant *Staphylococcus* or another highly drug-resistant bacteria
- ●If the patient is highly immunosuppressed and therefore at risk for invasive fungal rhinosinusitis
- Patients with these characteristics should undergo nasal endoscopy to obtain reliable material for culture

# macrolids

- the quality of the evidence for use of macrolides in CRS is low in general but looked most promising for patients with NP who had already undergone surgery.
- **Other antibiotics** — In a small, open-label study of 16 adults with CRS without NP refractory to previous antibiotic treatment, subjects received either [clindamycin](#) (150 mg three times daily patients), [amoxicillin-clavulanate](#) , or [doxycycline](#)
- **Endoscopic sinus surgery** — In patients in whom medical treatment appears to help but does not result in sufficient improvement in symptoms or resolution of CT findings, the next logical step after failure of medical treatment is sinus surgery.

# CRS WITH NASAL POLYPOSIS

- Oral glucocorticoids
- Antibiotics for concomitant infection
- fluoroquinolone, [amoxicillin-clavulanate](#), or co-trimoxazole) resulted no clinically significant benefits in unselected patients with CRS with NP, and [doxycycline](#) caused only a slight reduction in NP size
- **Endoscopic sinus surgery** — Sinus surgery can provide rapid relief of symptoms.

- **Biologic agents** — Biologic therapies are another option for patients with recalcitrant disease .
- Biologic agents that have been studied for the treatment of CRS with NP include [dupilumab](#), [mepolizumab](#), and [omalizumab](#).
- **Aspirin desensitization and therapy(uncertain benefit)**
- **Maintenance therapies:**
  - Intranasal glucocorticoids
  - Antileukotrienes

- Indications for surgical intervention include the following:
  - ● Failure of medical treatment
  - ● Restoration of sinus ventilation (ie, restoration of sinus ostial patency and removal of material from opacified sinuses)
  - ● Improve penetration of topical medical therapies
  - ● Debulking of severe polyposis
  - ● Bony erosion or extension of disease beyond the sinus cavities