

Treating Sinus Congestion: It's "Snot" Always Clear

The Evaluation and Treatment of Acute Rhinosinusitis in Adults presenting in Outpatient Settings and the Impact of Treatment Decisions on Antibiotic Stewardship

1

Presenter: Biographical Sketch

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The presenter has no conflicts of interest to disclose relevant to this presentation.

2

Learning Objectives

Examine	Appraise	Develop
Examine the most common etiologies of acute sinusitis in the adult client	Appraise the impact of current antibiotic prescribing patterns with best-practice recommendations	Develop strategies to integrate antibiotic stewardship in the treatment plans of clients with sinus complaints

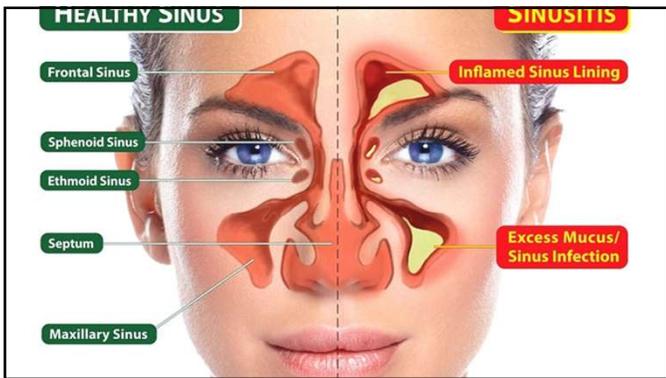
3

Prevalence of Acute Rhinosinusitis in the US

Sinusitis affects an estimated 30 million Americans annually

Defined as symptomatic inflammation of the paranasal sinuses and nasal cavity

4



5

Classification of Sinusitis

Acute: lasting up to 4 weeks

Chronic: lasting more than 3 months

Subacute: lasting between 4 weeks and 3 months

6

Sinusitis
Further
Classified by
Presumed
Etiology

- Viral (VRS)**
 - Most common cause; can progress to bacterial infection but occurs in less than 2% of cases
- Allergic**
 - Second most common cause, often seasonal pattern
- Bacterial (ABRS)**
 - Least common cause, <5% of all cases
- Fungal**
 - Consider in the immunocompromised client

7

Main Clinical
Characteristics
of Sinusitis

- Nasal congestion
- Facial pain and/or pressure
- Rhinorrhea
- Post-nasal drainage
- Headache
- Cough

8

Differentiating
Between Viral
and Bacterial

- Differentiating between viral and bacterial poses a challenge due to similar presentations.
- Viral infections often precede bacterial infections.
- Providers often use symptom duration and presence of purulent discharge to differentiate between viral or bacterial causes.
- There is no high-level evidence supporting this practice
- Using fever and facial or dental pain to distinguish between a viral or bacterial source is also not supported by evidence and should not be used in decision making to prescribe antibiotics.

9

The ominous "green spot" as a chief complaint

Physical findings (even color of nasal drainage) do not reliably predict a bacterial infection.

Discolored nasal discharge is a sign of inflammation and related to the presence of neutrophils, not bacteria.

10

What about Diagnostics??

- Currently no test, sign, or symptom that can clearly identify those clients who have a bacterial infection or who would benefit from an antibiotic.
- Sensitivity and specificity of current diagnostic imaging is insufficient for confirmative diagnosis.
- Radiographic imaging is not recommended for distinguishing between ABRS and VRS, unless a complication or alternative diagnosis is suspected.
- Sinus puncture and culture are the gold standard for microbial identification; however, routine use is not recommended.

11

Acute Bacterial Rhinosinusitis (ABRS)

- American Academy of Otolaryngology – Head and Neck Surgery Foundation (AAO-NHS) recommend a diagnosis of ABRS when the following conditions are met:
 1. Symptoms of sinusitis (purulent drainage accompanied by nasal obstruction, facial pain, pressure, fullness) persistent without improvement for at least 10 days beyond the onset of URI symptoms OR
 2. Symptoms or signs of sinusitis that worsen within 10 days after an initial improvement (double-worsening).

12

Sinusitis: The good, bad, and ugly truth

- >90% of clients with viral URI have concurrent VRS; yet only 0.2-2% have sinusitis that progresses to ABRs.
- Sinusitis will resolve in most patients without antibiotic treatment, even if bacterial in origin.
- Sinusitis is the 5th leading reason for antibiotic prescribing in the US. Diagnosis of sinus infection is the top diagnosis in which antibiotics are prescribed in the outpatient setting.
- Antibiotics are prescribed for 84-91% of patients with acute sinusitis diagnosed in the emergency department or outpatient settings.

13

Factors Impacting Treatment Decisions

- Clients' desire something tangible from the encounter
- Research indicates that providers' perceptions of patients' expectations are one of the strongest determinants of prescribing patterns.
- Lack of information; both client and provider
- Providers' strong concern that if client is left untreated, may develop the rare complication of a bacterial infection that spreads beyond the sinus cavity

14

Sinus Complaints and Antibiotic Prescribing

- In the US, approximately 150 million antibiotic prescriptions are dispensed annually.
- Research has found that 81% of antibiotic prescriptions for treatment of acute sinusitis were deemed inappropriate.

15

Antibiotic Stewardship Efforts

- CDC has campaigned for the past 20 years for reductions in unnecessary antibiotic prescribing.
- Research indicates the rates for inappropriate antibiotic prescribing are only minimally reduced despite CDC's efforts.
- Monitoring has historically been aimed at in-patient setting.
- Monitoring for outpatient is complicated and convoluted. Most often occurs at the agency level.
- Prescribers in outpatient settings hold key positions in combating the prevalent problem of antibiotic overprescribing.

16

Problems with Overprescribing

- Current over-prescribing of antibiotics has led to a substantial increase in drug-resistant pathogens
- Has created an urgent public health crisis in the US
- Leads to increased mortality, morbidity, and costs
- Increased bacterial resistance combined with decreased development of new antibiotics signals a need for better alternative interventions to treat the clients with sinus complaints presenting in outpatient care settings.

17

Impact of Antibiotic Resistance in the US

- An estimated \$34 million annually is spent related to antibiotic resistance.
- Over 2 million people become infected with resistant bacteria each year.
- More than 35,000 deaths occur annually as a result of resistant bacterial infections.

18

Common to Life-Threatening Complications

- Nausea, Vomiting, Diarrhea, Abdominal Pain, Rash
- Tendon Rupture, Aortic Aneurysm, Neuropathies, Hypoglycemia
- Stevens-Johnson Syndrome, Anaphylactic Shock, Sudden Cardiac Death
- C difficile* infection (500,000 infections, 29,300 deaths, >80% deaths in adults over 65)

19

Research Findings

- 2008 Meta-Analysis
 - Study found that 15 clients with acute sinusitis complaints would have to be treated before a single additional patient was cured.
 - Older clients, who reported symptoms for longer or more severe symptoms, took longer to cure, but were no more likely to benefit from antibiotics than other clients.
 - Antibiotics are slightly more efficacious than placebo, but the risks of potential side effects should be weighed against potential benefits.
 - Investigators concluded that antibiotics are not indicated even if symptoms have been present for longer than 7 to 10 days.

20

More Recent Research Findings

- 2018 Cochrane Review
 - Only 5 to 11 more clients per 100 will be cured faster if receiving antibiotic therapy instead of placebo or no treatment.
 - 13 more clients per 100 experienced side effects with antibiotics compared with placebo or with no treatment.
 - Without antibiotics, almost half of clients were cured within 1 week, and 2 out of 3 were cured after 14 days.
 - Authors concluded that given the low incidence of serious complications (without antibiotic treatment) and considering antibiotic resistance and side effects to antibiotic therapy, there is no place for antibiotic therapy in people with uncomplicated acute sinusitis.

21

Latest Research Findings

- 2019 review
- Reports that most cases of sinusitis are caused by viral or self-limiting bacterial infections, neither of which require antibiotic treatment.
- The investigators' recommendations were based on the findings that only 1 in 17 clients achieved clinical cure at 7 to 14 days with antibiotics, while 1 in 8 had adverse side effects to the antibiotic.

22

Discussion of Treatment Options

- Antibiotic therapy when indicated
- Supportive measures
- Controversial treatment options

23

Who Needs an Antibiotic?

- Reserve antibiotics for the client
 - Not responding to supportive care
 - Condition is acutely worsening
 - Those with underlying medical conditions or immunosuppression
 - Complicated cases

24

Prescribing Pearls - Antibiotics

- Prescribe only when indicated.
- Reserve fluoroquinolones for clients with no other treatment options.
 - Be aware of the FDA warnings.
 - Client teaching is critical.
- Avoid long treatment duration
 - Treatment guidelines typically support 10 to 14-day regimen; however, evidence for this is weak.
 - Longer durations promote bacterial resistance, poorer client compliance, higher toxicity, and greater overall economic burden.
 - Long-term antibiotic regimens are no more effective than short-term regimens; 3-7 days has been shown to be as effective as 7 to 10-day courses of same therapy.

25

Expert Recommendations

- AAO-HNS Guidelines
 - Employ watchful waiting, without antibiotic therapy, as initial management for all clients with uncomplicated ARBS.
 - If antibiotics are needed, coverage against *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis* should be considered.
 - Amoxicillin and amoxicillin/clavulanate are currently first-line treatment.
 - Doxycycline is second-line treatment.
 - Be mindful that bacterial resistance is increasing, especially to *Streptococcus pneumoniae*.
 - Macrolides, such as azithromycin, are commonly prescribed, but not recommended due to high resistance (>40%).

26

Intranasal Corticosteroids (INCS)

- Rationale for use in management of acute sinusitis related to anti-inflammatory properties; inflammation and edema of the nasal turbinate blocks and impairs mucus clearance
- Reduction in inflammation fosters drainage and increases aeration
- Clients with facial pain and nasal congestion are more responsive, require higher doses for greater benefit
- Are first-line in treatment of allergic rhinitis, which can be a predisposing factor for acute sinusitis
- Most common adverse effects are headache and epistaxis

27

Expert Opinion on INCS

- Can be used as monotherapy in cases of mild to severe
- Can be used as an adjunctive therapy to antibiotics in severe cases
- When combined with antibiotic, may reduce symptoms more effectively than antibiotic alone
- Client teaching should include clearance of nasal passages before application, avoid blowing nose immediately after
- Thought to be safe in pregnant women (local absorption)
- Recommendation of AAO-HSN is to use topical INCS for symptomatic relief of ABRs

28

Other Controversial Treatment Options

- Intramuscular Corticosteroid Use (IMCS)
 - IMCS use in the treatment of acute URI is highly prevalent despite lack of evidence for impact and safety.
 - Research findings show wide variability of IMCS use in treatment of acute URIs across multiple medical and surgical specialties including otorhinolaryngology.
 - Providers most likely to order IMCS were NPs (34.5%), PAs (26.2%), MDs (18.0%).
 - Administration of IMCS injection may contribute to the likelihood of a subsequent healthcare visit for the same indication.

29

Oral Corticosteroids

- 2014 Cochrane Review
 - A total of 5 randomized controlled studies were found examining the use of oral/systemic corticosteroids (SC) in ABRs.
 - One study examined using SC as monotherapy; other studies included SC with use of antibiotics.
 - The combined data of 5 studies showed clients had modest improvement of symptoms or short-term resolution when compared with those in the control group.
 - SC as monotherapy analyzed separately; SC was found to have no benefits
- Authors concluded that SC are ineffective as monotherapy for clinically diagnosed ABRs.

30

Benefits Versus Risks of Steroid Use in the Treatment for Acute URIs

- Systemic corticosteroids and IMCS lead to temporary reduction in symptoms.
- Parsel et al. (2020) found that 22.5% of all patients presenting with URI on 1st encounter received IMCS.
- Waljee et al. (2017) found that 21% of patients received a Rx for oral steroids on initial visit.
- Dvorin et al. (2018) found that 23% of patients presenting to primary care with URI received IMCS.
- Patient perceived benefit/satisfaction
- Use of SC/IMCS in the setting of acute URI does not modify the infectious agent, most commonly a viral etiology.
- Adverse effects; decreased bone density & pathological fractures are associated with cumulative doses over time more than dose of single injection or treatment (highest risk ages 50-55y).
- Parsel et al. (2020) found that there was an increased likelihood of return to clinic for acute URI within 60 days for a repeat encounter.

31

Topical Decongestants

- Topical decongestants improve nasal congestion by improving blood flow, airflow, and ciliary motility within the nasal tract.
- Effects may not extend to the paranasal sinuses.
- A small, randomized study examined topical decongestants as monotherapy for ABRS and found oxymetazoline improved mucus clearance, but the results were not statistically significant when compared with the other groups.
- There are no current randomized control studies studying decongestant efficacy for ABRS.

32

Considerations for Using Oral Decongestants

- One study compared healthy clients with chronic sinusitis treated with topical (oxymetazoline) and with oral (pseudoephedrine) decongestants.
 - MRI imaging found that topical was superior in reducing congestion of the nasal mucosa compared to oral; however, neither intervention showed an improvement in the mucosa of the sinuses.
- Both medications (topical and oral) carry risks of significant side effects in certain populations.
 - Oral – use with caution in clients with HTN or heart disease.
 - Topical – use must be limited to short duration (3-5 days) due to risk of rebound congestion and rhinitis medicamentosa.

33

Antihistamines

- Have been widely used in treating acute sinusitis but are most effective in treating rhinitis
- Have strong anticholinergic properties; thus, increasing the viscosity of nasal discharge and decreasing mucociliary function
- Cilia do not work effectively in dry or sticky nasal mucosa.
- Effects could cause more harm than good in treating sinusitis.
- There is currently no data to support antihistamine use for symptomatic relief of acute sinusitis.

34

Nasal Saline Irrigation

- Saline solution irrigation might be a missed opportunity for symptom relief.
- One randomized controlled trial found that daily hypertonic saline nasal irrigation improves sinus-related quality of life, decreases symptoms, and decreases medication use in clients with frequent sinusitis.
- Review of multiple studies found that overall, saline irrigation is well tolerated and safe with minimal side effects.
- Most established benefit is found in those with chronic sinusitis.
- Can be used alone or as adjunct therapy to treat both allergic and infectious sinusitis; clears mucus, increases ciliary activity, decreases inflammation by reducing allergen exposure.
- Client education – keep device clean, use distilled, boiled, or filtered water

35

Where do we go from here?

There have been some effective interventions over the last 20 years aimed toward reducing antibiotic overuse, but we have miles to go before we get there.

Efforts to educate providers and clients on importance of antibiotic stewardship have been shown to be helpful.

Clinical decision support can be an effective tool to decrease unnecessary antibiotic use and improve provider decision when making correct antibiotic choices when appropriate.

Implement EMR Best Practice Alerts if available.

36

Paving New Roads

- Provide clients with a symptomatic prescription pad with instructions on how best to manage their symptoms.
- Offers something tangible from the encounter, gives the client a plan of action, helps maintain client satisfaction
- Give a "wait and see" prescription with clear instructions for when to use it.
- Client education is critical; provide educational materials with specific self-care instructions, explain why delaying antibiotics is best-practice, implement supportive measures.

37

Increasing Awareness and Understanding

- Current evidence supports watchful waiting as initial management to clients with AOMs regardless of illness severity (earlier guidelines endorsed this option for those with mild illness).
- Understanding antibiotic prescribing practices in outpatient settings is critical.
- Designing strategies for reducing inappropriate prescribing must include both the provider and the client.
- CDC 2016 recommendation, "Core Elements of Outpatient Antibiotic Stewardship" provides guidance to providers and facility leaders for implementing activities to improve antibiotic use.

38

Conclusion

- Careful client assessment and history are crucial to diagnose and adequately treat clients with sinus complaints.
- Prescriber education and awareness are vital for stewardship of the antibiotic resources available in the arsenal of treatment choices.

39

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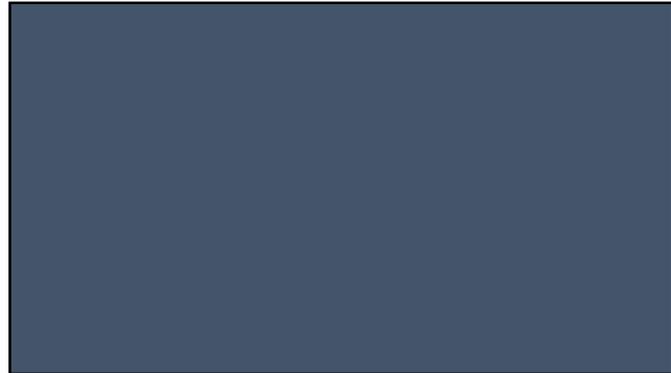
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43



44
