

CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF SINUSITIS IN FAMILY PRACTICE

Raquel Lim, MD, The Family Medicine Research Group and the Department of Family and Community Medicine Consensus Panel

Department of Family and Community Medicine, Philippine General Hospital

SUMMARY OF THE RECOMMENDATIONS

CLINICAL DEFINITION AND CLASSIFICATION OF SINUSITIS IN FAMILY PRACTICE

Recommendation 1

Sinusitis is clinically defined as a patient having any of the following symptoms: Maxillary toothache, poor response to decongestants and history of colored nasal discharge and any of the following signs: Purulent nasal secretion and abnormal transillumination. (Grade A Recommendation)

Recommendation 2

In Family practice, sinusitis is clinically classified as acute, subacute and chronic (Grade C Recommendation)

DIAGNOSIS FOR SINUSITIS IN FAMILY PRACTICE

Recommendation 3

The diagnosis of sinusitis is made by history and physical examination and is supported by roentgenographic findings (Grade A Recommendation)

Three symptoms (maxillary toothache, poor response to decongestants and history of colored nasal discharge) and 2 signs (purulent nasal secretion and abnormal transillumination) are the best clinical predictors of acute sinusitis. (Grade A Recommendation).

When fewer than 2 of the above the signs or symptoms are present acute sinusitis can be ruled out.

When 2 or 3 of the above signs and symptoms are present, sinus radiography would be helpful.

When 4 or more of the signs and symptoms are present the likelihood of acute sinusitis is very high.

Recommendation 4

If roentgenographic support is needed a single waters view is sufficient for diagnosis (Grade A Recommendation)

Recommendation 5

The gold standard for diagnosis which is culture of secretions obtained by direct sinus puncture is not recommended in primary care setting (Grade D Recommendation)

Recommendation 6

Ultrasonography is not recommended (Grade D Recommendation)

Recommendation 7

CT Scan is only recommended if malignant sinus disease is suspected (Grade A Recommendation)

TREATMENT OF SINUSITIS IN FAMILY PRACTICE

Recommendation 8

Antibiotics are recommended (Grade A Recommendation)

First line antibiotics:

1. Amoxicillin 500 mg TID x 7- 10 days
2. Cotrimoxazole 800/160 mg/tab BID x 3 days

Second line antibiotics

1. Ciprofloxacin 500 mg BID x 10 days
2. Amoxicillin-clavulanate 375 mg TID x5 days
3. Levofloxacin 500 mg OD x 7- 14 days
4. Cefdinir 600 mg OD x 10 days or 300 mg BID x 10 days
5. Cefuroxime 250 mg BID x 10 days
6. Ofloxacin 400 mg OD x 7 days

FOR CHRONIC SINUSITIS:

1. Antibiotics may be given for a longer period of time (up to 3-6 weeks)
2. Broad-spectrum antibiotics + Metronidazole 500 mg QID x 14 days or Clindamycin 500mg TID. (Grade C Recommendation)

Recommendation 9

Decongestants are recommended (Grade C Recommendation)

Recommendation 10

Topical corticosteroids are useful as an adjunct to antibiotic therapy (Grade A Recommendation)

Recommendation 11

Antihistamines are not recommended (Grade D Recommendation)

Recommendation 12

Increase oral fluid intake is recommended (Grade C Recommendation)

Recommendation 13

Indications for referral to a specialist

1. Complications
 - A.Orbital
 1. Orbital Cellulitis
 - B.Local
 - 1.Mucocoeles or mucopyoceles
 - 2.Oro-antral fistula
 - C.Intracranial
 - 1.Cavernous sinus thrombosis
 2. Superior sagittal sinus thrombosis)
 - 3..Bacterial meningitis
 - 4.cerebral abscess
 - 5.subdural empyema
 - 6.epidural abscess
 7. Osteomyelitis
- 2.Failure of Second-line therapy
- 3.Recurrent Disease (more than 3 episodes per year)

INTRODUCTION

Upper Respiratory tract infection is the 8th leading cause of morbidity in the Family Medicine Clinic at the University of the Philippines-Philippine General Hospital based on the census last 1998. This diagnosis actually comprises a group of distinct clinical entities that may warrant different forms of treatment. Upper Respiratory tract infections include tonsillopharyngitis, rhinitis, sinusitis and otitis media. These disease entities significantly contribute to the morbidity statistics not only in the Philippine General Hospital but in the family practice setting as well.

This paper aims to formulate an evidence-based practice guideline on the diagnosis and treatment of sinusitis in family practice

Family practitioners involved in the care of patients with sinusitis in the out-patient setting are the targeted users of this guideline.

This guideline was formulated to answer basic questions that are considered essential for decision making in family practice.

1. What is the clinical definition and classification of sinusitis in family practice?
2. What is the recommendation diagnostic procedure for patients with sinusitis in family practice?
3. What is the recommended treatment for patients with sinusitis?
4. When should a family practitioner refer a patient with sinusitis to a specialist?

METHODOLOGY

The development of this clinical practice guideline was a joint project of the Department of Family and Community Medicine (DFCM) of the Philippine General Hospital, Foundation for the Advancement of Clinical Epidemiology (FACE) of the University of the Philippines, College of Medicine, the Philippine Academy of Family Physicians (PAFP) and Aetna foundation Inc.

The project was divided into four phases: 1) formulation of initial draft, 2) Consensus development 3) dissemination and implementation, and 4) Evaluation of effectiveness. The role of Aetna foundation Inc. was to provide financial assistance to the project and did not in any way influence the guideline recommendations or how the recommendations and consensus was attained.

Phase 1 Formulation of the initial draft of the Clinical Practice Guideline

A Technical Research Committee (TRC) from the DFCM formulated the initial draft of the clinical practice guideline. The committee was also responsible for searching and appraising the medical literature that was used as the basis for the recommendations. The technical research committee was mainly composed of resource persons from the Family Medicine Research Group (FMRG), a group of residents and consultants in family medicine who were trained in the application of evidence based medicine concepts in family practice.

An electronic search using MEDLINE, OVID, and Internet resources was conducted to search clinical studies limited to humans, any language and all journal publications from 1966 up to the present. The citations generated by the searches were examined for relevance to the issues in question on the basis article titles and /or clinical abstracts available. The full texts of studies that are assessed to be relevant to the issues at hand and their own full texts retrieved.

A systematic assessment of the validity of the retrieved full texts articles were done using the appropriate guide questions as formulated by the Evidence-Based Medicine Working Group. Separate User's guide questions were used for articles on (a) effectiveness of therapy or prevention, (b) diagnosis, (c) prognosis, (d) harm and causation, (e) overview of effectiveness of therapy or prevention, (f) overview of diagnosis, and (g) overview of prognosis

Evidences from articles that have been checked for validity were categorized into different levels of validity the recommendations based on the grading system used by the Canadian Task Force for Preventive Health Care of the Canadian Medical Association (see Appendix)

Phase IIA DFCM Consensus Development

The initial draft was then presented to the staff of the Department of Family and Community Medicine in a two-day workshop. Discussion was done on each of the Recommendation. Disagreements were settled by discussion followed by voting if unresolved. After the workshop, the initial draft was the revised.

The recommendations presented here were the result of these initial phases of guideline development. These recommendations will be subjected to further development as described in the Appendix.

CLINICAL DEFINITION AND CLASSIFICATION OF SINUSITIS IN FAMILY PRACTICE

Recommendation 1

Sinusitis is clinically defined as a patient having any of the following symptoms: Maxillary toothache, poor response to decongestants and history of colored nasal discharge and any of the following signs: Purulent nasal secretion and abnormal transillumination. (Grade A Recommendation)

Summary of Evidence

In a prospective comparison study of clinical findings with radiographs by *Williams in 1992* to identify the most useful clinical examination findings for the diagnosis of acute & subacute sinusitis, Logistic regression analysis showed 5 independent predictors of sinusitis:

1. Maxillary toothache (odds ratio, 2.9),
2. Transillumination (odds ratio, 2.7),
3. Poor response to nasal decongestants or antihistamines (odds ratio, 2.4)
4. Colored nasal discharge reported by the patients (odds ratio, 2.2)
5. Mucopurulence seen during examination (odds ratio, 2.9).

Recommendation 2

In Family practice, sinusitis is clinically classified as acute, subacute and chronic (Grade C Recommendation)

Summary of Evidence:

Acute sinusitis usually lasts no longer than one month

Subacute sinusitis is more than a month but less than 3 months

Chronic suppurative sinusitis usually lasts for 12 weeks or more. It can be more than three months with or without medical treatment (*CPG*). Patients who experience more than 3 or 4 episodes annually or who repeatedly fail to respond to medical therapy may be considered to have chronic disease. (*kern*)

DIAGNOSIS FOR SINUSITIS IN FAMILY PRACTICE

Recommendation 3

The diagnosis of sinusitis is made by history and physical examination and is supported by roentgenographic findings (Grade A Recommendation)

When fewer than 2 of the above the signs or symptoms are present acute sinusitis can be ruled out.

When 2 or 3 of the above signs and symptoms are present, sinus radiography would be helpful.

When 4 or more of the signs and symptoms are present the likelihood of acute sinusitis is very high.

Summary of Evidence:

The diagnosis of sinusitis is made by history and physical examination and is supported by roentgenographic findings. (*Williams*)

In a prospective comparison study of clinical findings with radiographs by *Williams in 1992* to identify the most useful clinical examination findings for the diagnosis of acute & subacute sinusitis, Logistic regression analysis showed 5 independent predictors of sinusitis:

1. Maxillary toothache (odds ratio, 2.9),
2. Transillumination (odds ratio, 2.7),
3. Poor response to nasal decongestants or antihistamines (odds ratio, 2.4)
4. Colored nasal discharge reported by the patients (odds ratio, 2.2)
5. Mucopurulence seen during examination (odds ratio, 2.9).

No single item was both sensitive and specific. Maxillary toothache was highly specific (93%) (LR+ 2.5), but few patients had this symptoms (11%), Failure to improve after treatment with systemic or topical nasal decongestants increased the likelihood ratio the most (LR+ 2.1). The absence of a history of colored nasal discharge decreased the likelihood ratio the most (LR- 0.5)

Table. Performance Characteristics of signs and symptoms for sinusitis in 247 patients.

Symptoms	+LR	-LR	Sensitivity %	Specificity %	Frequency %
Maxillary toothache	2.5*	0.9	18	93 *	11
No improvement with decongestants	2.1	0.7	41	80	28
Hyposmia	1.6	0.7	56	64	32
Colored discharge	1.5	0.5*	72 *	52	59
Myalgias	1.4	0.8	48	66	40
Cough	1.3	0.7	70	44	61
Preceding URTI	1.3	0.8	50	61	33
Difficulty sleeping	1.2	0.8	63	46	58
Sore throat	1.2	0.8	52	56	47
Sneezing	1.1	0.9	70	34	67
Malaise	1.1	0.9	56	47	31
Headache	1	1	68	30	69
Facial pain	1	1	52	48	52
Itchy eyes	1	1	52	43	56
Fever, chills or sweats	0.9	1.1	45	51	48
Painful chewing	0.8	1	13	84	15

Among physical examination findings, purulent secretion seen on nasal inspection increased the likelihood ratio the most (LR 2.1). Normal transillumination resulted in a likelihood ratio of 0.5.

Signs	+LR	-LR	Sensitivity	Specificity	Frequency
Purulent secretion	2.1*	0.7	51	76	34
Nasal speech	1.7	0.8	45	73	34
Abnormal transillumination (mini maglite)	1.6	0.5	73	54	56
Sinus tenderness	1.4	.8	48	65	39
Temperature >38 C	0.9	1	16	83	13

Use of these predictors yields a 9% predicted probability of sinusitis when no clinical predictors are present and a 92 % probability when all five clinical predictors are present.

Table. Predicted Probability of Sinusitis

Number of predictors present	Predicted probability of sinusitis (95%CI)
	%
0	9(5 to 17)
1	21(15 to 28)
2	40(33 to 47)
3	63(53 to 72)
4	81(69 to 89)
5	92(81 to 96)

The diagnosis of chronic sinusitis is suggested by the symptom complex & confirmed by examination of the anterior & posterior aspect of the nose with rhinoscopy. The presence of purulent discharge in the nose & throat when combined with the appropriate symptom complex supports the diagnosis. In addition to rhinoscopy, transillumination of the frontal & maxillary sinuses may be helpful in both the diagnosis & follow-up of patients with sinusitis.

Using paranasal sinus radiographs *Williams and Simel in 1993* compared the symptoms of 247 consecutive male patients who had rhinorrhea, facial pain unrelated to trauma or self-suspected sinusitis. Radiologists blinded to the clinical findings interpreted each radiograph. Colored nasal discharge, cough & sneezing had the greatest sensitivity (72%, 70% and 70% respectively) but not specific (52%, 44% and 34%). Maxillary toothache was highly specific (93%), but only 11% of the patients reported it. Symptoms historically thought to make sinusitis less likely, such as sore throat (sensitivity 52%, Specificity 56%), itchy eyes (sensitivity 52%, specificity 43%) and constitutional symptoms (sensitivity 56%, specificity 47%), were not discriminatory.

Applying digital pressure over the maxillary & frontal sinuses best assesses facial tenderness. Because 5% to 10% of cases of bacterial maxillary sinusitis are secondary to dental root infection, the maxillary teeth can be tapped with a tongue depressor to check for tenderness. (*Williams*) The ethmoid and sphenoid sinuses cannot be adequately evaluated during the physical examination. (*William*)

Several studies have shown that physicians can accurately distinguish between patients with low and high probabilities of sinusitis based on the number of clinical findings. When 4 or more signs and symptoms are present the probability of sinusitis is high and further testing is unwarranted. When less than 2 signs or symptoms are present, there is low probability of sinusitis, and again further testing is unwarranted. However, with 2 or 3 signs or symptoms the probability of sinusitis is intermediate, and radiographs are warranted to aid in the diagnosis. (*Williams, Hayward*)

Williams and Colleagues compared the findings of transillumination with those of paranasal radiography in 247 patients. They reported that transillumination did little to change the post-test probability of sinusitis. It generated a likelihood ratio of only 1.6 if the result was dull or opaque for either maxillary sinus, and 0.5 if it was normal for both maxillary sinuses. The authors concluded that, as a single finding, transillumination was unreliable. In contrast, Gwaltney and coworkers transillumination was highly useful when the result was either opaque (likelihood ratio 4.0) or normal (likelihood ratio 0.04). Dull transmission findings were less useful (likelihood ratio 0.41). The apparent difference between these two trials may be the result of different patient populations. In the first study patients were recruited from a primary care walk-in clinic, whereas in the second study patients were selected from an otolaryngology clinic.

Transillumination, however, was helpful $p < 0.001$ in a study done by Evans et al on 24 adults with sinusitis. 93% of antrums with Normal transillumination were normal on aspiration whereas 100% of opaque antrums had abnormal aspirates. In acute & subacute patients, improvements in transillumination, such as from opaque to dull or dull to normal, were associated with recovery in 12 of 14 antrums.

Recommendation 4

If roentgenographic support is needed a single waters view is sufficient for diagnosis (Grade A Recommendation)

Summary of Evidence:

Radiographic studies can improve the diagnostic accuracy of acute sinusitis correlate well with sinus aspiration (*Evans*). Air-fluid levels and complete opacification of the sinus are useful features when present on radiographs, with positive predictive values of 80% to 100% in most studies. (*Willett, Evans, Axellson*) Sensitivity is low; only about 60% of patients with sinusitis will have opacification or air-fluid levels. (*Willett*) The sensitivity of sinus mucosal thickening is high (greater than 90%), but it is nonspecific in symptomatic patients. (*Willett, Gwaltney, Axellson, Pfeleiderer, Kuhn*) Mucosal thickening of at least 5mm has been used as a threshold in an attempt to optimize predictive values; however, specificities from 36% to 76% have been observed in symptomatic patients using the cutoff point. (*Evans, Gwaltney, Axellson*)

Roentgenograms may be ordered in cases of acute suppurative sinusitis to determine the extent of involvement, especially when pain and systemic features are prominent or when patients are extremely ill or are failing to get well within 1 week in antibiotic treatment

A 4-view radiographic series of the sinuses may be considered a pragmatic alternative reference standard in patients with signs and symptoms consistent with sinusitis. It is considered to be about 75% as accurate as sinus aspiration and culture is diagnosing maxillary sinusitis. (*Hamony*)

Basic radiographic examination of the paranasal sinuses includes 4 views: the Waters view (occipitometal), to evaluate the maxillary sinuses, the Caldwell view (angled posteroanterior), to evaluate the ethmoid and frontal sinuses; the lateral view, to evaluate the sphenoid sinuses and to confirm disease in the paired maxillary, ethmoid sinuses (*Ros, Williams*) This last view is also useful for examining the lateral walls of the maxillary sinuses. All radiographs are done with the patient erect in order to evaluate the air-fluid levels.

Several investigators have examined the number and types of views that should be ordered. *Hayward & Asso*. Compared the Waters view alone with a 3- view series (Waters, occipitofrontal, and lateral) and found 99% agreement. They concluded that a single Waters view is sufficient for diagnosis. *Williams and Collaborators* compared a single Waters view and a 4-

view series and also found a high rate agreement. However, after correcting for chance agreement they found that the results varied depending on which sinus was involved. Agreement for the maxillary sinuses was almost perfect but poor for the remaining sinuses. The authors pointed out that maxillary sinusitis is much more prevalent than other forms. Most studies have demonstrated that about 90% of cases of sinusitis involve the maxillary sinuses. Therefore, most cases of sinusitis would be diagnosed using only the Waters view. (*Stanford, Williams*)

Sinusitis was defined radiographically as complete sinus opacity, an air-fluid level, or mucous membrane thickening of at least 6 mm for the maxillary sinus.

Recommendation 5

The gold standard for diagnosis which is culture of secretions obtained by direct sinus puncture is not recommended in primary care setting (Grade D Recommendation)

Summary of Evidence:

The gold standard for diagnosing acute bacterial sinusitis is the culture of infected secretions obtained by direct sinus puncture. (*Evans, Gwaltney, Axellson*) however, this technique is invasive and impractical in most situations. Since direct sinus puncture is not routinely performed in primary care setting, the cause is assumed to be bacterial when acute sinusitis is diagnosed.

Cultures obtained directly from the sinuses are more accurate than cultures taken from the nose, but the only time such material can be obtained is during a sinus lavage or at the time of surgical exploration. Several studies have shown that no correlation exists between nasal and sinus cultures in acute bacterial sinusitis (*Evans, Gwaltney, Axellson*)

Recognize that an intranasal culture does not always reflect what is occurring in the sinuses. Cultures should be obtained when the patient is extremely ill or when the patient is not responding to conventional management. When the culture is obtained, they should be studied for general bacteria, acid-fast bacilli, fungi, and anaerobes.

Gwaltney and coworkers conducted a study between 1975 and 1989 to determine the causative pathogens in community-acquires acute bacterial sinusitis. They demonstrated, through sinus puncture and direct surgical exposure, that *Streptococcus pneumoniae* and *Hemophilus influenzae* were the most comon (in 41% and 35% of cases respectively). The relative incidence of this pathogens did not change significantly over the 15 year period; however, the number of strains of Beta-lactamase-producing H. influenza increased dramatically. None of the H. influenza strains isolated between 1975 and 1985 were B-lactamase producing, whereas 52% of those isolated between 1985 and 1989 were. Anaerobes and other streptococci were each isolated from 7% of sinus aspirated. *Moraxella catarrhalis* was isolated from 4% of sinus specimens and *Staphylococcus aureus* from another 3%.

H. influenza and S. pneumoniae are most often isolated in pure culture (72% of cases) but are occasionally found together or in combination with other organisms. (*Jousimies-Somer*). H. influenza strains isolated through sinus puncture are almost exclusively unencapsulated and cannot be typed.

Hamory et al did a study on the etiology of Acute sinusitis on 82 adults and showed that *Streptococcus pneumoniae* & *Hemophilus Influenza* accounted for 64% of the isolates. Other bacteria recovered included anaerobes 12%, *Neisseria* sp 8.5%, *Streptococcus pyogenes* 3%, A-hemolytic streptococcus 3%, non-group A B-hemolytic *Streptococcus* 3%, *Staphylococcus aureus* 2%, *Pseudomonas aeruginosa* 2% and *Escherichia coli* 2%. Viruses were isolated from 11

sinuses; these isolates included rhinovirus (6), influenza A virus(3), and two types of parainfluenza virus (one each).

Su et al did a study on 73 maxillary sinuses in 48 patients with chronic maxillary sinusitis and were able to establish that anaerobic bacteria are the most important pathogen in chronic maxillary sinusitis. The predominant anaerobes recovered were Veillonella sp. Peptococcus sp, Propionibacterium acne and anaerobic non spore forming GPB

Recommendation 6

Ultrasonography is not recommended (Grade D Recommendation)

Summary of Evidence:

In 90 patients, supposed to suffer from sinusitis, a correct diagnosis, sinus empyema vs. not sinus empyema was established in a majority of cases by means of clinical evaluation alone. By introducing ultrasonography as a complement to the clinical evaluation, the diagnostic reliability became lower. Ultrasonography seems to have little or no implication in the therapeutic decision unless diagnostic puncture is also performed. (*Berg*)

The correlation of Waters view radiographs and A-mode ultrasound for diagnosing sinusitis was evaluated in 75 subjects with allergic rhinitis who presented with signs & symptoms suggesting sinus disease. If the radiograph is considered to be a gold standard, sensitivity of ultrasound varied from 44% to 58% and specificity from 55%-61%, dependent on which criteria are applied to the radiograph to consider it normal. A-mode ultrasound is not sufficiently comparable to radiography to be used as its substitute for diagnosing sinus disease. (*Shapiro*)

Although A mode ultrasound provides limited value in diagnosing mucosal thickening, it is particularly useful in following the course of therapy once a positive diagnosis of sinusitis has been established without subjecting the patient to additional x-ray exposure. (*Rohr*)

Recommendation 7

CT Scan is only recommended if malignant sinus disease is suspected (Grade A Recommendation)

Summary of Evidence:

Computerized tomography has been applied to the assessment of malignant sinus disease (*Wortzman and Holgate, 1976*). *Forbes et al (1978)* concludes that CT provides additional valuable information with reference to the posterior, superior and orbital extension of paranasal tumors. They further state that CT provides little significant information in benign lesions. Computerized tomography provides greater definition of the sinus cavity contents than radiography. (*Carter*) On the basis of clinical & endoscopic criterion standards, CT appears to be more sensitive than plain radiography for detecting sinus abnormalities, particularly in the sphenoid and ethmoid sinuses. (*Nass*)

TREATMENT OF SINUSITIS

Recommendation 8

Antibiotics are recommended in the treatment of sinusitis (Grade A Recommendation)

First line antibiotics:

3. Amoxicillin 500 mg TID x 7- 10 days
4. Cotrimoxazole 800/160 mg/tab BID x 3 days

Second line antibiotics:

- 1.Ciprofloxacin 500 mg BID x 10 days
- 2.Amoxicillin-clavulanate 375 mg TID x5 days
- 3.Levofloxacin 500 mg OD x 7- 14 days
- 4.Cefdinir 600 mg OD x 10 days or 300 mg BID x 10 days
- 5.Cefuroxime 250 mg BID x 10 days
- 6.Ofloxacin 400 mg OD x 7 days

FOR CHRONIC SINUSITIS:

1. Antibiotics may be given for a longer period of time (up to 3-6 weeks)
- 2.Chronic use of a topical nasal corticosteroid preparation is recommended
- 3.Broad-spectrum antibiotics + Metronidazole 500 mg QID x 14 days or Clindamycin 500mg TID. (Grade C Recommendation)

Summary of Evidence:

The goal of treatment is to relieve patients of forehead and jaw pains, resolution of tenderness, disappearance of purulent nasal/ sinus secretion and resolution of nasal congestion/obstruction. Timely treatment of acute sinusitis prevents permanent mucosal damage, chronic sinusitis & more serious complications such as orbital cellulitis, optic neuritis, cavernous sinus thrombosis & subdural abscess.

The following recommendations suggest priority therapeutic options depending on the classification of sinusitis. When contraindications exist for the options, or when they fail to relieve the symptoms of sinusitis, other drugs may be tried.

This recommendation is based on a meta-analysis which showed antibiotics decreased the incidence of clinical failures by half (RR= 0.54 (95% CI 0.36-0.79). (*De Ferranti*)

Author	Population	Study	Intervention	Results	Level
De Ferranti, et al	2717 patients with acute sinusitis or acute exacerbation of chronic sinusitis from 27 trials	Meta-analysis	Any antibiotic vs placebo Amoxicillin or folate inhibitors vs newer more expensive antibiotics	*Compared with placebo, antibiotics decreased the incidence of clinical failures by half (<u>risk ratio 0.54</u> (95% CI 0.37-0.79). *Risk of clinical failure among 1553 randomised patients was not meaningfully decreased with more expensive antibiotics as compared with amoxicillin (<u>risk ratio 0.86</u> (0.62-1.19) *The results were similar for other antibiotics versus folate inhibitors (risk ratio 1.01 (0.52-1.97)	I

FIRST LINE THERAPY

1. Amoxicillin 500 mg TID x 7-10 days is the drug of choice for acute, recurrent or chronic sinusitis

2. Folate inhibitors like cotrimoxazole 800/160 mg BID x 3 days is an alternative drug.

Author	Population	Study	Intervention	Results	Level
De Ferranti, et al	2717 patients with acute sinusitis or acute exacerbation of chronic sinusitis from 27 trials	Meta-analysis	Any antibiotic vs placebo Amoxicillin or folate inhibitors vs newer more expensive antibiotics	*Compared with placebo, antibiotics decreased the incidence of clinical failures by half (<u>risk ratio 0.54</u> (95% CI 0.37-0.79). *Risk of clinical failure among 1553 randomised patients was not meaningfully decreased with more expensive antibiotics as compared with amoxicillin (<u>risk ratio 0.86</u> (0.62-1.19) *The results were similar for other antibiotics versus folate inhibitors (risk ratio 1.01 (0.52-1.97)	I
Van Buchem, Fi et al	214 adults patients with suspected acute maxillary sinusitis	Randomized, placebo-controlled	Amoxicillin 750 mg TID x 7 days vs placebo	Amoxicillin has a cure rate of 65% compared to placebo which has 53% cure rate. RR=1.25	I
Lindbaek, et al	130 adult patients with a clinical diagnosis of acute sinusitis confirmed by cranial tomography	Randomized, double-blind placebo controlled	Amoxicillin 500 mg TID x 10 days vs Pen V Amoxicillin vs placebo Pen V vs placebo	Amoxicillin and Pen V are equal but more superior than placebo in the treatment of acute sinusitis. (P<0.0001)	I
Huck et al	108 adults patients with acute, recurrent or chronic sinusitis	Double-blind randomized	Cefaclor 500 mg BID x 10 days vs Amoxicillin 500 mg TID x 10 days	Cefaclor and Amoxicillin are equally effective in acute and recurrent sinusitis however amoxicillin is more effective than cefaclor in chronic sinusitis	I

Author	Population	Study	Intervention	Results	Level
William, John et al	male patients older than 18y/o who are presented with nasal discharge of any quality, facial pain increases to trauma, or self-suspected sinusitis	Randomized, double-blind parallel design	3 day Cotrimoxazole vs 10 day Cotrimoxazole	3 day dosing of Co-trimoxazole is equally with 10 day dosing of cotrimoxazole (90 CI 15-17%)	I

SECOND LINE ANTIBIOTICS

Second-line therapy is appropriate following the failure of first-line therapy when the failure has worse than usual implications (e.g. symptomatic frontal sinusitis), or when the likelihood of failure of first-line agents is thought to be unacceptably high (e.g. due to a recent antibiotic intake). (*Poole*)

1.Ciprofloxacin 500 mg BID x 10 days

Author	Population	Study	Intervention	Results	Level
Legent, et al	251 adults with chronic sinusitis	Prospective, randomized, multicenter, double-blind, double placebo	Ciprofloxacin 500 mg BID x 10 dyas vs Co-amoxyclav 500 mg TID	Ciprofloxacin has an 83% cure rate compared to Co-amoxyclav which has 68% cure rate RR = 1.2	I

2.Amoxicillin-clavulanate 375 mg TID x5 days

Author	Population	Study	Intervention	Results	Level
Kaeser, et al	314 patients with common colds presented in an outpatient clinic (rhinitis)	Randomized, double-blind placebo controlled	Co amoxyclav 375 mg TID x 5 days	Co-amoxyclav is effective in the treatment of common colds with (+) cultures of H. influenzae, M. catarrhalis and S. Pneumoniae.	I

5. Levofloxacin 500 mg OD x 7- 14 days

Author	Population	Study	Intervention	Results	Level
Abes, et al	90 patients at least 18 y/o with clinical diagnosis of acute, recurrent or chronic sinusitis	Single-blind randomized controlled trial	Levofloxacin 500 mg OD x 7-14 days vs Coamoxyclav 625 mg TID x 7-14 days	Levofloxacin is equal in effectiveness with Co-amoxyclav in the treatment of sinusitis	I

4. Cefdinir 600 mg OD x 10 days or 300 mg BID x 10 days

Author	Population	Study	Intervention	Results	Level
Gwaltney, J. et al	Male and females aged 13 years or older with signs and symptoms of acute sinusitis based on history and physical examination	2 Randomized, investigator blind, multicenter trials	Cefdinir 600 mg/day x 10 days and Cefdinir 300 mg BID x 10 days vs Co-amoxiclav 500 mg TID x 10 days	Cefdinir is as effective as Coamoxyclav (RR .92)	I

5. Cefuroxime 250 mg BID x 10 days

Author	Population	Study	Intervention	Results	Level
Sydnor, A et al	106 adults patients with symptoms and signs compatible with acute maxillary sinusitis	Randomized		Cefuroxime has a 95% cure compared to cefaclor which has 71% cure rate RR=1.2	I
Brodie DP, et al	160 patients > 16 y/o with signs and symptoms of sinusitis	Randomized	Cefuroxime axetil 250 mg BID x 10 days vs Amoxicillin 250 mg TID x 10 days	(acute sinusitis) <u>Cefuroxime</u> RR= 1.02 Amoxicillin Acute sinusitis on chronic <u>Cefuroxime</u> RR= 1.18 <u>Amoxicillin</u>	I

6. Ofloxacin 400 mg OD x 7 days

Author	Population	Study	Intervention	Results	Level
Husfeldt, et al	280 adults patients with acute sinusitis	Double-blind study with parallel group	Ofloxacin 400 OD x 1 week vs Erythromycin	Ofloxacin has a 94% cure rate compared to erythromycin which has 94.4% cure rate. RR=1	I

FOR CHRONIC SINUSITIS:

1. Antibiotics may be given for a longer period of time (up to 3-6 weeks)
2. Chronic use of a topical nasal corticosteroid preparation is recommended
3. Broad-spectrum antibiotics + Metronidazole 500 mg QID x 14 days or Clindamycin 500mg TID. (Grade C Recommendation)

Chronic sinusitis is treated in a similar way to acute sinusitis, except that the antibiotics may be given for a longer period of time (up to 3-6 weeks), and the nasal treatment includes the chronic use of a topical nasal corticosteroid preparation. Some patients fail to respond to initial therapy because they have anaerobic infection of their sinuses. The suspicion of an anaerobic infection may be raised by the results of culture of sinus secretions, the presence of foul breath or a fetid odor from the nasal cavity, or by the prior history of repeated courses of broad spectrum antibiotics. In this circumstance it might be appropriate to try a combination of broad-spectrum antibiotics + Metronidazole 500 mg QID x 14 days or Clindamycin 500mg TID. (*Kaliner*)

Recommendation 9

**DECONGESTANTS are recommended
(grade C recommendation)**

Summary of Evidence:

A decongestant, either applied topically(Oxymetazoline 1-2 sprays BID for 3-7 days) or orally(pseudoephedrine 30-60 mg BID- QID) is recommended. Topical decongestants act to open the sinus ostia and facilitate drainage.(Kaliner)

Recommendation 10

Topical corticosteroids are useful as an adjunct to antibiotic therapy (Grade A Recommendation)

Summary of Evidence:

The addition of flunisolide topical nasal spray to each nostril 100 ug 3x/day as an adjunct to antibiotic therapy was most effective in global evaluations, tended to improve symptoms, to decrease inflammatory cells in nasal cytograms, to normalize ultrasound scans, and to aid regression of radiographic abnormalities compared with placebo. (Meltzer)

AUTHOR	POPULATION	STUDY	INTERVENTION	RESULTS	LEVEL
Meltzer, Eli MD, etal	Patients >14 y/o with maxillary sinusitis documented by radiographs.	Multicenter, double blind, randomized, parallel trial	<p>PHASE 1</p> <p>A) Co-amoxycylav 500 mg/tab + Flunisolide 100 ug nasal spray to each nostril 3x/day x 3 weeks</p> <p>B) Co-amoxycylav 500 mg/tab + placebo to each nostril 3x/day x 3 weeks</p> <p>PHASE 2</p> <p>A) Flunisolide nasal spray 3x/day x 4 weeks</p> <p>B) Placebo</p>	<p>*Signs and symptoms decreased in both treatment groups in phase I (p <0.01)</p> <p>*Only turbinate swelling / obstruction reduced Significantly on patients with Flunisolide + Co-amoxycylav compared with placebo (p=0.041)</p> <p>*Patients assessment of global effectiveness was higher for flunisolide than placebo after phase 1 (p 0.007) and after phase 2 (p 0.08)</p>	I

Recommendation 11

ANTIHISTAMINES ARE NOT RECOMMENDED (Grade D Recommendation)

Antihistamines are usually not used because of their drying action. The exception to this rule is sinusitis which occurs in allergic subjects during the allergy season.

A non-sedating antihistamine, such as loratidine (Braun) or cetirizine is selected because these agents do not cause mucus inspissation.

Recommendation 12

Increase oral fluid intake is recommended (Grade C Recommendation)

Summary of Evidence:

An approach to the treatment of Chronic sinusitis by Kaliner included in his recommendations that increase in oral fluid intake be done in order to clear up secretions.

Table. An approach to the treatment of chronic sinusitis

1. Hydration (6-8 glasses of water per day)
2. Antibiotics 21 days , or longer (until the patient is well plus 7 days)
Choices: Cefuroxime axetil, amoxicillin-clavulanate, Clarithromycin, levofloxacin
3. Topical long-acting decongestants, twice daily for 7-14 days (oxymetazoline)
4. Nasal washing using saline and applied through an ear bulb syringe
5. Topical corticosteroids (aim towards the eye and away from the nasal symptom)
3 sprays BID x 2 weeks
2 sprays BID for 2-8 weeks , until symptomatically well
1-2 sprays 1-2 times per day until sinusitis is resolved

INDICATIONS FOR REFERRAL OF SINUSITIS IN FAMILY PRACTICE

Recommendation 13

1. Complications

A. Orbital

1. Orbital Cellulitis

B. Local

1. Mucocoeles or mucopyoceles

2. Oro-antral fistula

C. Intracranial

1. Cavernous sinus thrombosis

2. Superior sagittal sinus thrombosis

3. Bacterial meningitis

4. cerebral abscess

5. subdural empyema

6. epidural abscess

7. Osteomyelitis

2. Failure of Second-line therapy

3. Recurrent Disease (more than 3 episodes per year)

Summary of Evidence:

A practical guide for the diagnosis and treatment of acute sinusitis done by Donald Low MD et al recognizes that most patients can be diagnosed and managed by primary care physicians. They recommended that referral to a specialist should be done if complications develop, if second line therapy fails and if there is recurrent sinusitis (more than 3 episodes per year)

They divided complications into local, orbital and intracranial.

Local complications include **Mucocoeles or mucopyoceles** which are chronic cystic lesions of the paranasal sinuses. The most common location of clinically significant lesions is the frontal sinuses; the next most common is the anterior ethmoid sinus. Frontal headaches, proptosis, diplopia secondary to downward and outward displacement of the globe are the most common initial complaints.

Orbital complications such as orbital cellulitis results from direct extension which can occur through neurovascular foramina, through congenital or acquired dehiscence, or through thin bone such as lamina papyracea.

Gallagher RM in 1998 did a retrospective chart review on all patients admitted at University of Virginia Health Sciences Center with a diagnosis of intracranial suppuration between 1992 and 1997. 176 patients were identified, of which 15 had 22 suppurative intracranial complications of sinusitis. These were epidural abscess (23%), subdural empyema (18%), cerebral abscess (14%), superior sagittal sinus thrombosis (9%), cavernous sinus thrombosis (9%) and osteomyelitis (9%).