

Focus

The diagnosis and treatment of acute maxillary sinusitis

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Making the diagnosis

Diagnosing acute bacterial sinusitis is not easy. It is clear there is a syndrome in which the common cold may be associated with viral sinusitis; the sinus pain being secondary to rhinitis and blockage of the ostia with pressure effects in the maxillary sinus. These manifestations of viral illness are self-limiting and do not benefit from antibiotics.

This was confirmed in a study using computed tomographic scans of 31 patients with a two to four-day history of a common cold in which 87 per cent had abnormalities of one or both maxillary sinus cavities.¹ Two weeks later 14 of these subjects had a repeat scan and 79 per cent had clear sinus cavities having had no antibiotics. A nasal swab is of limited benefit as there is a poor correlation between swab results and the causative organisms in bacterial sinusitis.

No single clinical finding is predictive of acute sinusitis.² There are three studies which have examined the symptoms with potential gold standards. The first of these used antral washings as the gold standard.³ Only one symptom – unilateral facial tenderness – odds ratio 1.9 95 per cent CI (confidence interval) 1-3.4 and one sign – unilateral maxillary tenderness – odds ratio 2.5 95 per cent CI (1.2-5.2) were significantly associated with sinusitis.

KEY POINTS

- The diagnosis of bacterial v viral sinusitis is difficult
- Initial treatment can be with decongestants and analgesics
- Avoid radiological investigations during the first week of symptoms
- An elevated ESR or C reactive protein correlates well with bacterial sinusitis
- Amoxycillin, penicillin and cotrimoxazole are the first choice antibiotics for acute bacterial maxillary sinusitis
- Broader spectrum antibiotics (ie, amoxycillin-clavulanate or second generation cephalosporins) should be kept for treatment failure after the above antibiotics have been tried
- Treatment for seven to 14 days is recommended with antibiotics in the first instance

Previous sinusitis, nasal congestion, purulent nasal discharge, temperature >38°C and tender tapping of maxillary teeth were not significantly associated with bacterial sinusitis. (An odds ratio is the ratio of patients who have the disease and have the symptom divided by those who have the symptom and don't have the disease.) When these findings were all controlled for using statistical techniques the only one that was statistically significant was an ESR in women >49, which had a likelihood

ratio of four. This means the odds of disease with a positive test are four times more likely when the ESR is greater than 49.

An ESR in women <21 had a likelihood ratio of 0.64, meaning the odds of sinusitis were diminished by 0.64 with such a low ESR. The same occurred for men where an ESR >31 was associated with a likelihood ratio of 4.8. An ESR <11 was associated with a likelihood ratio of 0.38.

A C reactive protein >49 was associated with a likelihood ratio of 3.3 (as a means of comparison a positive screening mammogram has a likelihood ratio of 12). Such findings will be puzzling to many clinicians and may just mean the patient is unwell. However, this study did use antral washings as its gold standard and a blood test would be cheaper and safer than an x-ray.

Another study using maxillary x-ray as the gold standard found three symptoms (maxillary toothache, poor response to decongestants and history of coloured nasal discharge) and two signs (purulent nasal discharge and abnormal transillumination) were good clinical predictors of acute sinusitis.² Transillumination requires a completely dark room and some experience to get consistent results. When fewer than two of the above signs or symptoms are present acute sinusitis can be ruled out.

A diagnosis of acute sinusitis may be unclear in patients with two or three of the above signs and symptoms and in this situation sinus radiography (or ESR or C reactive protein) would be helpful.² With four or five symptoms treatment could be safely given without any further investigation. Thus, treatment of acute sinusitis-like symptoms may warrant a trial of a decongestant in the first instance.⁴ If symptoms fail to improve then a course of seven to 14 days of antibiotic may be tried.⁵

A third study using the less satisfactory gold standard of ultrasound found preceding cold, pain on bending, purulent nasal secretions, pain in teeth and unilateral facial pain to be associated with sinusitis.⁶

In summary, there seem to be at least three different ways of diagnosing acute sinusitis and it seems unwise to do x-rays in the first week as this will not distinguish between viral and bacterial rhinosinusitis.⁷ As there is no long term damage from delaying antibiotics it would appear wise not to rush in with these. There is evidence from an abstract that paracetamol and pseudoephedrine are more effective than placebo at reducing symptoms, although 4 per cent of patients in the pseudoephedrine group experienced nervousness.⁴

A trial of such therapy for symptoms of sinusitis with a delayed prescription if there was no symptomatic relief would offer the patient a potentially effective treatment with the back-up of a delayed prescription antibiotic. There is evidence from the sore throat literature that delayed prescriptions for sore throat (ie, wait three days and if symptoms are no better then start the antibiotic) reduces the amount of antibiotic usage by 69 per cent.⁸ Such a strategy for sinusitis would make sense, although there is no empirical evidence to demonstrate that.

Evidence of benefit from antibiotics

The current Cochrane library review on antibiotics for acute maxillary sinusitis considered only studies with a non-clinical diagnosis (ie, x-ray, CT or antral puncture) and more than 30 patients in each study. There were only three authors who had published studies of antibiotic v placebo.

One of these was by Lindbaek et al (1996) who used CT scanning as the diagnostic tool and at 10 days found 44 per cent of patients on amoxycillin and 11 per cent of patients on placebo were cured.⁹ In the same study 86 per cent of patients on amoxycillin and 57 per cent on placebo reported either being cured or improved.

In another general practice study patients were diagnosed with x-rays and at 14 days there were 63 per cent on amoxycillin and 50 per cent on placebo cured and 81 per cent v 74 per cent cured or improved respectively.¹⁰

The Lindbaek study was statistically significant while the Van Buchem was not. In the penicillin arm of the Lindbaek study there was a 29 per cent cure v an 11 per cent cure at day 10 in the antibiotic and placebo groups, and a 78 per cent and 57 per cent rate for cure and improvement respectively. This was statistically significant and the dose for penicillin was 1320mg three times daily and amoxycillin 500mg tds for 10 days. The Van Buchem study used 750mg of amoxycillin tds for seven days.

In another study by Stalman et al (1997) a clinical diagnosis was used and no benefit was found for antibiotics (doxycycline 100mg two stat then one daily for the remaining nine days) v placebo.¹¹ The commentators make the point that the Lindbaek study used CT scanning and this may have meant patients had a higher likelihood of having a bacterial sinusitis. The Cochrane reviewers say their recommendations only apply to patients with maxillary sinusitis and cannot be generalised to isolated frontal, sphenoidal or ethmoidal sinusitis.

Duration of antibiotics

There is a belief that up to three-week courses of antibiotics are necessary for acute sinusitis. That may apply to chronic sinusitis but the Cochrane reviewers recommended between seven and 14 days of antibiotics for radiologically diagnosed maxillary sinusitis. There has been a study of a three-day course of cotrimoxazole which showed the same benefit as the 10- day course.² There is concern that the increase in resistance to *Streptococcus pneumoniae* with cotrimoxazole makes recommending a three-day course unwise.

A more recent study found patients given three days of azithromycin 500mg once daily were 58 per cent cured v placebo of 31 per cent at day 11. However, this difference disappeared by day 25.¹² The duration of therapy has not been studied in children.¹³ If symptoms do not improve the antibiotic needs

Suggested regimens for acute Sinusitis^{5,14}

Symptoms less than seven days and no recent antibiotic usage

Use topical or systemic decongestants. If unsuccessful then consider antibiotics. Antihistamines are not good for decongesting the nose.¹⁵

Symptoms 7-10 days

Try (A)

Amoxycillin 500mg tds 7-14 days
or
Penicillin 1320mg tds 7-14 days

Patients with penicillin allergy:

Cotrimoxazole 960mg bd for 7-14 days
or
Macrolides
Shorter courses may be suitable but most of the clinical trials have used between 7 and 14 days

If no resolution after 5 days or symptoms return within 2 weeks after initial antibiotic treatment

to be changed.^{2,14} When frequent recurrent symptoms are present or there is failure to improve, indicating chronic sinusitis,² a sinus puncture may be useful to obtain reliable bacteriology. This requires specialist intervention.

If complications of bacterial sinusitis are suspected (which can be serious), or a patient fails to improve with antibiotic therapy or has more than three episodes in a year, referral to a specialist is appropriate.

Treatment recommendations

Common pathogens in acute sinusitis are *S. pneumoniae* and *Haemophilus influenzae*, and less commonly *Moraxella catarrhalis*, *Staphylococcus aureus* and anaerobes (associated with dental conditions). Common organisms in chronic sinusitis are anaerobes, streptococci and *S. aureus*, and less commonly Gram-negative bacilli and *Pseudomonas aeruginosa*.

Fungal infections are most commonly observed in immunocompromised and diabetic patients.¹⁴ Some authors say bacterial sinusitis should be treated with a broad spectrum antibiotic as complications of infection are sometimes serious and even life-threatening. In contrast to this advice at least 57 per cent of patients get better with no antibiotics after 10 days. After 25 days the difference between antibiotics and placebo disappears.¹²

There is no advantage from the newer non penicillins and amoxycillin-clavulanate. The Cochrane reviewers only recommend antibiotics for patients with radiographically or aspiration confirmed sinusitis.⁵ An alternative to radiographic or aspiration confirmed sinusitis would be the symptom/sign clusters mentioned above or an elevated ESR or C reactive protein.

The box lists suggested regimens for acute sinusitis.

Then try (B)

Amoxycillin-clavulanate 500mg tds

or

Second generation cephalosporins, eg, cefaclor 250mg po tds for 7-14 days

When to refer

- symptoms >12 weeks, ie, chronic sinusitis
- symptoms and signs of intracranial infection in acute sinusitis
- to rule out obstruction
- to obtain a CT scan (to make the diagnosis of chronic sinusitis)
- to give antibiotic treatment with group B drugs for 21-28 days and/or anti-anaerobic coverage of chronic infection.¹⁴

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Note: A Medline search [February 2000] of antibiotic treatment for chronic sinusitis found no references to randomised controlled trials. Use <http://hiru.mcmaster.ca/cochrane/> for the Cochrane Library Website at McMaster University to view the abstracts of all the reviews.

