Sinusitis: Appropriate Diagnosis and Management in Children and Adults

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Introduction:

Sinusitis is a commonly encountered condition for the Canadian family physician. There are an estimated 30 million cases diagnosed annually with over 22 million office visits per year in the United States. The overall expenditure attributable to sinusitis in 1996 was estimated at US$5.8 billion with an estimated 73 million restricted activity days between 1990 and 1992. Chronic sinusitis has worse quality of life scores than COPD, CHF or angina. The total cost of diagnosing and treating sinusitis remains one of the most expensive chronic disorders experienced by the North American population and continues to increase yearly.

Pathophysiology and categories of sinusitis:

Sinus mucosal inflammation often follows a viral upper respiratory tract infection (URTI) or rarely after an allergic reaction. This is thought to occur in 90% of individuals with the common cold or viral URTI. In approximately 98-99% of cases, the common cold resolves without any negative consequences regardless of treatment. In 0.5-2% of individuals, a common cold can progress to an acute bacterial rhinosinusitis (ABRS). ABRS is diagnosed if the common cold does not resolve over a seven-day period or worsens after an initial improvement (double worsening). If the ABRS does not resolve or worsens beyond 12 weeks, a diagnosis of chronic rhinosinusitis (CRS) can be made. Other common categories of sinusitis include recurrent acute rhinosinusitis, which is diagnosed if the patient has four or more episodes of ABRS within a year with complete resolution of symptoms in-between episodes. Another common category is acute on chronic rhinosinusitis, diagnosed when a patient gets an acute exacerbation of symptoms from a new infection on the background of an ongoing chronic sinusitis.

The most common and classic pathogens in ABRS have remained the same over the decades with Streptococcus *pneumonia* still being the most common at 40%, Haemophilus *influenzae* accounting for 30% of the cases, and Moraxella *catarrhalis* accounting for 20% of cases. Patients who are infected with Streptococcus *pneumonia* have a worse symptom score, and are most likely to take time off work. All three of these pathogens are often transmitted to adults from children attending daycare, and young school children where a lack of frequent handwashing may be a norm.

Diagnosis:

The diagnosis of ABRS is based on clinical symptomatology and therefore taking a good history is very important. Differential diagnosis includes viral URTI's and Allergic Rhinosinusitis (AR). The symptoms are non-specific and similar to viral URTI and AR. The diagnosis of ABRS requires the presence of at least two major symptoms, one of which must be nasal obstruction (O) or nasal discharge (D) from the following four major symptoms easily remembered using the pneumonic (PODS):

1. Facial **P**ain/pressure/fullness: **P**
2. Nasal **o**bstruction: **O**

3. **D**ischarge/postnasal/nasal/purulence/discolored: **D**
4. **S**mell loss/hyposmia or anosmia: **S**

Minor symptoms of ABRS include headache, halitosis, fatigue, dental pain, cough, and ear pain or pressure.

A basic but thorough physical exam of the ear, nose and throat should be conducted by the family doctor. The congested nasal passages can be better examined about ten minutes after the patient has been decongested with a couple of sprays of oxymetazoline or xylometazoline. Using either a headlight with a nasal speculum or an otoscope, the family physician should be able to identify the inferior and middle turbinates as well as the nasal septum through each nostril. It is very important to recognize normal anatomy so as to be able to pick out anomalies in the nasal passages. If purulence is encountered in the middle meatus, it can easily be swabbed with a wire swab. If masses such as polyps, tumors, etc., are observed, an immediate referral to an otolaryngologist-head and neck surgeon should be made.

Management:

If an acute sinusitis is diagnosed on history and physical exam, there is no indication for further radiologic or other testing. In particular sinus x-rays should **not** be ordered. For patients with acute sinusitis, an assessment of severity should be made. Mild or moderate ABRS is treated with intranasal corticosteroids (INCS) as first line treatment plus or minus nasal saline douches. For severe ABRS, diagnosed if the patient is febrile with a temperature of greater than 38.5^{o} C or if the patient seems to be severely symptomatic, a course of antibiotics should be started in addition to the INCS. The recommended first line antibiotic for severe ABRS is Amoxicillin at 30mg/kg/day divided three times per day. If there is worsening or no significant improvement within 48 hours, a referral to a specialist should be made. If at any time the symptoms worsen to include periorbital edema, double vision, opthalmoplegia, visual compromise, severe headaches or if there are any signs of meningitis, immediate referral and hospitalization should be organized. Complications of ABRS elicit a medical emergency.

Imaging studies are not necessary for non-severe ABRS. CT is the modality of choice but is usually reserved for failed medical therapy, chronic rhinosinusitis or for surgical planning. CT should also be ordered if the patient has unilateral symptoms.

Non-medical management:

Saline nasal irrigations/douches can be started very early, even with the onset of a viral URTI. The patient should be advised to lean forward over a sink or basin while flushing their nasal passages. The patient should not sniff or inhale the solution as it may enter the middle ear via the eustachian tube or get aspirated. Ideally the head should lean far forward and turned toward one side while the upper nostril is lavaged and vice versa. The fluid should exit via the dependent nostril.

Medical Management:

Intranasal Corticosteroids (INCS):

INCS reduce inflammation in the region of the middle meatus and therefore improve the drainage pathway of the sinus cavities. The patient should be advised to lean forward and aim the nozzle toward the inner canthus on the same side. Two squirts of the steroid spray can be instilled on each side with minimal to no sniffing. The INCS should never be administered with the nozzle pointing toward the midline (septum) or in the head back position.

Antibiotics:

There is little evidence that antibiotics help with ABRS. In the severe case they may be used as per the indications above. The first line antibiotic of choice remains to be amoxicillin in the appropriate dose. In case of failure or the presence of a risk factor such as a daycare setting (4X higher odds of penicillin resistance), or if there is an underlying disease that may cause immunodeficiency (Diabetes Mellitus, renal failure, immune deficiency) or if there has been use of antibiotics within the past three months, a second line antibiotic should be prescribed. Examples include amoxicillin/ clavulanic acid or fluoroquinolones.

Adjunctive Therapies

Decongestants (oral or topical):

May be used only for symptomatic relief and for no longer than 72 hours as there is a potential for rebound. Patients with hypertension or cardiac disorders should avoid using decongestants.

Antihistamines:

Have no benefit in ABRS and may be used only in the presence of concomitant environmental allergies.

Mucolytics:

There may be some benefit for prescribing mucolytics but this was only demonstrated in one study.

Complementary/alternative medicine:

Studies have shown mixed results for Vitamin C/Zinc lozenges. Echinacea has shown some positive effects and sinfrontal showed benefit in one placebo controlled randomized trial.

Chronic Sinusitis (CRS):

Patients whose symptoms last more than 12 weeks are diagnosed with CRS, a chronic condition that results in more bodily pain and worse QOL than COPD, CHF and back pain. A presence of symptoms and objective findings are necessary for making a diagnosis. The symptoms are usually lesser in intensity than ABRS and include PND, dull headaches, fatigue, lack of energy. The patient may have a new onset cough and new onset of pulmonary symptoms including asthma. The patient may often acutely remember the original onset of his/her 'cold' that never really went away. Asthma occurs in 40-70% of CRS patients indicative of the important 'united airway theory'. Diagnosis requires the presence of at least two major symptoms which can be remembered with the pneumonic **CPODS**:

1. Facial **C**ongestion/fullness: **C**
2. Facial **P**ain/pressure: **P**
3. Nasal **O**bstruction/blockage: **O**
4. Anterior/Posterior Nasal **D**ischarge/Purulence: **D**
5. **S**mell loss/hyposmia: **S**

A diagnosis requires at least 2 CPODS present for 12 weeks, plus evidence of inflammation of the paranasal sinuses or nasal mucosa on endoscopy or CT scan.

There are two major subtypes of CRS: with (20%) and without (80%) polyposis. The main pathogens involved in CRS are different than in ABRS and include Staphylococcus *aureus*, Pseudomonas *aeruginosa* and Enterobacter *spp*. The persistence of bacteria is often seen within biofilms that occur inside the sinuses. In 7-10% of CRSwNP patients, the main pathogen will be a fungi, usually of the dimetacious family of black molds. The success rate of medical management for CRS is significantly poorer compared to ABRS. A large portion of CRS patients will end up requiring surgical intervention despite maximal medical management.

When a patient with sinusitis does not improve on medical management or has unilateral symptoms, he/she should be referred for further workup. Many autoimmune diseases, tumors and other worrisome maladies can affect the sinus cavities and should be diagnosed earlier rather than later for best outcomes.

Surgical Management

Surgery is reserved for patients with chronic sinusitis who have failed exhaustive and maximally appropriate medical management. Surgical success rates for chronic sinusitis have improved drastically in the past three decades mainly due to a much-improved understanding of the physiology and anatomy of the sinuses and their drainage pathways. There have also been major advances in technology as well as instrumentation, including operating theatres equipped with computers to carry out

image guided surgery that have played a role in the improved surgical success rates. Also, advances and greater attention to detail before, during and after surgery as well as the creation of dedicated centres of excellence in the treatment of sinus disease have all played a major role in improved surgical outcomes. Surgical success rates have risen to approximately 85-90%. About 10% of patients do not improve despite well-executed sinus surgery, maximal post-operative care and medical management. These patients usually fall into the category of fungal infection or recalcitrant bacterial infections with biofilms. Advances in experimental therapies such as photodynamic therapy and experimental topical therapies are underway at the sinus centre to deal with this very challenging group of recalcitrant chronic sinus patients.