COVER STORY
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Sinusitis: Understanding the principles.
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SINUSITIS IS AN INFECTION OR INFLAMMATION OF THE MUCOSIALIZED, NORMALLY AIR-FILLED SPACES WITHIN THE FACIAL BONES. SINCE THERE ARE MANY OVERLAPPING FEATURES WITH Colds, ALLERGIES, AND OTHER CAUSES OF HEADACHE SUCH AS MIGRAINE, AND THERE ARE MYRIAD POTENTIAL CONTRIBUTING FACTORS RESULTING IN SIMILAR SYMPTOMS, IT CAN AT TIMES BE ALMOST AS EXasperating TO TREAT AS IT IS TO EXPERIENCE.

Fortunately, understanding principles of sinus anatomy and physiology, and the pathological processes affecting this area, can allow for accurate diagnosis and successful control of this condition.

Anatomically, the sinuses are divided into paired maxillary (cheek) and ethmoid (between the eyes) sinuses, present at birth, sphenoid sinuses (behind the ethmoids) which gradually develop from birth through adolescence, and frontal sinuses (extending from the anterior ethmoids upward into the forehead), which develop from about 6 years of age into early adulthood. The sinuses drain through narrow openings, mostly into the middle meatus on the lateral wall of the nasal cavity. The drainage pathways from the maxillary sinuses are not only small, but oriented upward, and the cilia lining the cells in the maxillary sinuses must sweep the mucus up against gravity and around the uncinate processes to drain into the nose and back into the throat.

This delicate balance can be upset by anything that leads to swelling within the drainage pathway or thickening of the secretions, or by a structural abnormality in the way the sinuses drain. Most commonly, in the case of acute sinusitis (symptoms lasting less than 3 weeks), the disturbance begins as intranasal edema due to a viral upper respiratory infection, which retards or prevents drainage of mucus, allowing it to back up into the sinuses and become secondarily infected with bacteria. In the case of chronic sinusitis (persistent symptoms lasting longer than 3 months), it is often triggered by allergic rhinitis, an inappropriate immune-mediated reaction to environmental allergens, which may be seasonal (tree, grass and weed pollens) or perennial (dust mites, molds, animal danders, and many foods, especially milk in young children). Associated factors with allergic rhinitis include other signs of atopy, particularly asthma and eczema.

There is a high prevalence of allergic rhinitis in children with asthma (up to 80% in some studies), as many of the same inflammatory mediators are involved at the cellular level. Allergic fungal sinusitis, hypersorption of allergic mucin in mold-allergic individuals, can lead to impressively expansile sinus disease. Chronic sinusitis may also be a manifestation of extra-esophageal reflux, as acid containing secretions irritate the lining of the nasopharynx and posterior nasal cavity, leading to heightened inflammation. Young children with immature immune systems; particularly those in daycare, may have repeated viral exposures leading to symptoms which appear chronic but are actually a manifestation of new infections occurring before the previous one has cleared.

Symptoms early in the course of acute sinusitis may be indistinguishable from a viral upper respiratory infection or “cold,” which is usually the initial phase of infection. These include nasal stuffiness, clear runny nose, facial pain and headache, and sore throat. A cold should be at its peak on about day 3 of symptoms and be much improved by day 7. Worsening of symptoms at this point is suggestive of acute sinusitis, particularly if progressing to higher fever, thickening and discoloration of the drainage, fatigue, swelling of the infraorbital area and nasal bridge, and nocturnal cough with postnasal drainage and frequent throat clearing. In chronic sinusitis, the symptoms may be milder but much more prolonged.
Since the sinuses cannot be visualized directly without surgery, examination of the child with possible sinusitis should focus on evidence of sinus inflammation visualized through the surrounding structures. Often the eyes will appear glassy, with dull edema of the infraorbital area. The child may sit with an open-mouth posture, unable to move air comfortably through the congested nasal cavity. Mucopurulent secretions or frank pus may be seen streaming from the middle meatus. Postnasal drainage may be seen as mucoid or nasal antihistamines may be helpful if there are signs of allergy, or a NetiPot, or in younger children who will not tolerate aggressive irrigation, frequent use of nasal saline spray. The anti-bacterial arm would include a sinus irrigation product such as Pediatric Sinus Rinse (e.g. amoxicillin/clavulanate, 2nd generation cephalosporin, or macrolide). One of the most common pitfalls of sinusitis treatment is insufficient duration of therapy, which suppresses bacterial growth to a subclinical level but allows rapid re-population and return of clinical symptoms within weeks of discontinuing antibiotics. Antibiotics only reach the periphery of the sinuses through the mucosal lining and do not penetrate well into the enclosed mucopurulent secretions, which are slowly absorbed, swollen or expectorated as the inflammation decreases. Therefore antibiotic therapy should be continued at least one week beyond resolution of symptoms, often totaling 3-4 weeks or more.

In children whose symptoms are not responding to this regimen over several months, a search for underlying causes may direct the clinician to more fruitful methods of treatment. Allergy testing may identify particularly irritative nasal symptoms such as sniffing, sneezing, watery eyes and frequent itching or rubbing of the eyes and nose. A leukotriene inhibitor may also be a useful addition to the regimen, particularly if reactive airway disease coexists. The anti-stasis arm would include a sinus irrigation product such as Pediatric Sinus Rinse or a NetiPot, or in younger children who will not tolerate aggressive irrigation, frequent use of nasal saline spray. The anti-bacterial arm should include a longer course of broad-spectrum oral antibiotics (e.g. amoxicillin/clavulanate, 2nd generation cephalosporin, or macrolide). One of the most common pitfalls of sinusitis treatment is insufficient duration of therapy, which suppresses bacterial growth to a subclinical level but allows rapid re-population and return of clinical symptoms within weeks of discontinuing antibiotics. Antibiotics only reach the periphery of the sinuses through the mucosal lining and do not penetrate well into the enclosed mucopurulent secretions, which are slowly absorbed, swollen or expectorated as the inflammation decreases. Therefore antibiotic therapy should be continued at least one week beyond resolution of symptoms, often totaling 3-4 weeks or more.

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