

Pediatric Rhinosinusitis



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KEYWORDS

- Rhinosinusitis • Topical therapy for sinusitis • Paranasal sinus imaging
- Adenoidectomy • Complications of sinusitis • Endoscopic sinus surgery
- Nasal irrigations

KEY POINTS

- The diagnosis of rhinosinusitis is primarily a clinical diagnosis based on the duration of illness and complex of signs and symptoms.
- Imaging of the paranasal sinuses is indicated for suspected or confirmed complications of sinusitis or when a surgical intervention is being considered for chronic rhinosinusitis.
- Topical and systemic steroids have been demonstrated to have efficacy in treating chronic rhinosinusitis.
- Nasal saline irrigations, with and without antibiotics, may yield benefits for treating chronic rhinosinusitis.
- Surgical therapy for chronic rhinosinusitis should be implemented using a stepwise approach after medical therapy fails.

Abbreviations

ARS	Acute rhinosinusitis
BCD	Balloon catheter dilation
CF	Cystic fibrosis
CRS	Chronic rhinosinusitis
CT	Computed tomography
GER	Gastroesophageal reflux
MRI	Magnetic resonance imaging
URI	Upper respiratory infection

OVERVIEW

Pediatric rhinosinusitis represents a spectrum of disease that consumes a vast amount of health care resources with an estimated \$1.8 billion spent on treating

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sinusitis in children under the age 12 years in 1996.¹ Managing pediatric rhinosinusitis requires a systematic approach given the difficulty in diagnosis, multiple contributing factors, and various outcome measures (Table 1).² Additionally, the wide array of diagnostic and treatment options creates challenging clinical situations when deciding on the timing and type of therapeutic interventions. Pediatric rhinosinusitis is typically categorized as acute, subacute, or chronic, with acute sinusitis considered lasting between 10 and 30 days, subacute sinusitis between 30 days and 12 weeks, and chronic sinusitis lasting longer than 12 weeks. These 3 conditions represent a spectrum of disease based on the length of illness, with each category associated with different diagnostic and therapeutic approaches. In addition to these 3 categories, specific situations warrant further consideration, including complications of sinusitis, sinusitis in the immunologically compromised host, fungal sinusitis, sinusitis in patients with cystic fibrosis (CF), and sinusitis in patients with primary ciliary abnormalities.

PATHOPHYSIOLOGY

The paranasal sinuses are air-containing spaces aligned around the nasal cavity with ventilation achieved through natural openings or ostia. Sinuses are lined by respiratory epithelium possessing cilia that serve to function in a coordinated fashion to clear secretions and maintain a sterile environment.² The sinuses demonstrate progressive development with the paired maxillary and ethmoid sinuses present at birth, the sphenoid sinuses showing evidence of pneumatization at approximately 9 months of age, and the frontal sinuses usually appearing between 7 and 8 years of age. The frontal sinuses continue to enlarge throughout adolescence.³

Sinusitis denotes an inflammatory condition that may or not be associated with an infectious process. The intimate relationship, both anatomically and pathophysiologically, between the nose and paranasal sinuses has expanded the approach to sinus disease as evidenced by the term rhinosinusitis. The path to developing bacterial sinusitis often begins with a viral respiratory infection with concomitant mucosal inflammation, resulting in obstruction of the sinus ostia with diminished aeration of the sinuses, impaired ciliary function, and stasis of secretions within the sinuses. The usually sterile sinuses then become secondarily infected by bacteria residing within the nose and nasopharynx.

Biofilms and bacterial exotoxins have also been implicated in the pathogenesis of sinusitis. Biofilms describe bacteria aggregating on surfaces within a matrix of polysaccharides, nucleic acids, and proteins.⁴ Biofilms provide a protected environment for pathogens, and may be responsible for persistent disease and decreasing efficacy of antimicrobials. This explanation for the development of bacterial sinusitis may

Local	Inflammatory	Systemic
Sinus obstruction	Upper respiratory infection	Cystic fibrosis
Septal deviation	Bacterial infection	Primary ciliary dyskinesia
Nasal polyps	Allergy	Immune deficiency
Trauma	Gastroesophageal reflux	
Foreign body	Tobacco smoke	

From Rose AS, Thorp BD, Zanation AM, et al. Chronic rhinosinusitis in children. *Pediatr Clin North Am* 2013;60:981; with permission.

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