

Opinion

Pediatric Chronic Sinusitis: What Art Thou?

Russell J. Hopp ^{1,2}

¹ Division of Allergy and Immunology, Creighton University, Omaha, NE 68131, USA; rhopp@creighton.edu

² Children's Hospital and Medical Center, Omaha, NE 68131, USA

Academic Editor: César Picado

Received: 13 September 2017; Accepted: 14 September 2017; Published: 18 September 2017

Abstract: Pediatric chronic sinusitis has been re-termed, pediatric chronic rhinosinusitis, largely following the adult nomenclature. However, other large areas of medical management of the process have remained largely uninvestigated. This opinion piece discusses the gaps in our current knowledge of pediatric rhinosinusitis pathophysiology and limitations of current management protocols.

Keywords: children; pediatric; chronic sinusitis; chronic rhinosinusitis

1. Clinical Scenario

In 1979, a 3rd year pediatric resident was doing a preceptorship with a local pediatrician. In those days, a resident's time was largely unsupervised. A 10 year old male was seen by the resident with weeks of nasal congestion. The resident noticed purulent intra-nasal and posterior pharyngeal drainage. The resident told the mother it was a "cold" and it would resolve. Two days later the preceptor pediatrician asked the resident to accompany him to radiology. A Waters sinus view of the same child showed opacified maxillary sinuses. The mother had returned to see the pediatrician and a sinus X-ray was obtained. The pediatrician told the resident "Doctor, the boy you saw has a chronic sinusitis, and I took the X-ray to show you what it looks like".

Flash ahead to 2017. A 5 year old female is referred to an allergist for chronic nasal congestion lasting more than 1 year. The adenoids had been removed 6 months previous. The examination showed thin, mucopurulent nasal secretions. Allergy skin tests were negative. The sinus X-ray reveals bilateral ethmoid and maxillary opacification and absent adenoids.

What has changed in the past 38 years? Largely nothing!

2. Pediatric Chronic Sinusitis: What Art Thou?

The term chronic sinusitis, well recognized by providers and the lay public, acquired a new name in the early 2000s, and by time the first pediatric chronic rhinosinusitis consensus statement in 2014 was published, the condition had been re-termed "pediatric chronic rhinosinusitis (PCRS)" [1]. The authors admit that "many aspects of PCRS remain ill-defined" [1].

The term PCRS, in large part, mimics the terminology used to define adult disease(s) [2]; but using this phrase may in fact detract from the simplistic background leading to its presence: a chronically altered microbiology. A more accurate description is pediatric infectious chronic rhinosinusitis. Other concepts of PCRS remain largely unexplored.

3. Diagnosis

A recent review discussed the vagaries of the radiological assessment of PCRS [3]. Plain sinus films have acquired a negative connotation; and in another recent opinion paper any radiological procedure was considered unnecessary unless surgery was contemplated [4].

With regard to using a radiological approach to PCRS, the consensus for a diagnosis for pediatric rhinosinusitis as a condition is that the “disease” has existed for a minimum of 12 weeks; therefore, it seems curious that only expensive standards (CT of the sinuses), or no standards at all, are advocated for supporting its existence.

4. Treatment

There exists only two PCRS studies in children using antibiotics without a surgical option. Publications from 1982 and 1995 provide minimal current guidance [4,4]. In fact, none of the antibiotics in the studies are currently recommended or currently used: amoxicillin (ampicillin), erythromycin, trimethoprim-sulfamethoxazole, clindamycin, cefaclor.

As summarized elsewhere, many reports recommended various antibiotics, although amoxicillin-clavulanate potassium has extensive support [3]. However, to date no regulatory approval has arrived or prospective studies done in the clinical application of Amoxicillin-clavulanate in PCRS.

Equally lacking, is any guidance for alternative antibiotics for penicillin-allergic children.

5. Natural History

What remains totally undefined is the natural history of PCRS. Assuming the underlying dysfunctional microbiological process has taken 12 or more weeks to develop, how long does it take for the accompanying inflammatory process to resolve, and if the value of sinus X-rays is questioned, how is resolution to be determined? Since there is no standard for assessing if total resolution of a chronic rhinosinusitis infection has occurred (after antibiotic therapy), it is likely (although never studied) that recurrent (or recalcitrant) chronic pediatric sinusitis is actually non-resolved chronic pediatric rhinosinusitis.

6. Microbiology

Acceptance that PCRS is an alternation of the normal bacterial flora has morphed into the concept that all CRS, in general, has an altered microbiome. This has exclusively been explored in adult forms of CRS, which may not have a PCRS corollary. A recent adult study suggests the immune response to the microbiome is altered as compared to controls, suggesting a broader anti-inflammatory approach to treatment may be required [7]. Investigation of the sinus microbiome and inflammatory response in children does not exist.

7. Ancillary Therapy

Under what conditions is antibiotic therapy for PCRS sufficient? What situations require anti-inflammatory co-therapy (corticosteroids), and how much and for how long? Are topical corticosteroids useful, or is systemic therapy required? Would an extended course of low dose corticosteroids provide the same resolution potential as antibiotics?

At the end of the therapy period, what determines resolution after primary (antibiotic), with/without ancillary therapy? Symptoms? Examination findings?

8. Surgical Options

The 2014 consensus statement [1], which included surgical options, and others summarized previously, e.g., [3], did not provide one unifying surgical approach to PCRS.

9. Summary

Although more descriptive, the term pediatric chronic rhinosinusitis has provided no additional window into the condition. Adult CRS (with or without polyps) may actually, based on new studies, provide little pediatric equivalency [8]. As expressed by the authors of the 2014 consensus, the condition in 2017 is still “ill-defined” [1]. Or alternatively, “a bear by any other name is still a bear”.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Brietzke, S.; Shin, J.; Choi, S.; Lee, J.T.; Parikh, S.R.; Pena, M.; Prager, J.D.; Ramadan, H.; Veling, M.; Corrigan, C.; et al. Clinical Consensus Statement: Pediatric Chronic Rhinosinusitis. *Otolaryngol. Head Neck Surg.* **2014**, *151*, 542–553. [[CrossRef](#)] [[PubMed](#)]
2. Orlandi, R.R.; Kingdom, T.T.; Hwang, P.H.; Smith, T.L.; Alt, J.A.; Baroody, F.M.; Batra, P.S.; Bernal-Sprekelsen, M.; Bhattacharyya, N.; Chandra, R.K.; et al. International Consensus Statement on Allergy and Rhinology: Rhinosinusitis. *Int. Forum Allergy Rhinol.* **2016**, *6*, S22–S209. [[CrossRef](#)] [[PubMed](#)]
3. Hopp, R.J.; Alison, J.; Brooks, D. Pediatric Chronic Rhinosinusitis. *Pediatr. Ann.* **2014**, *43*, e201–e209.
4. Fokkens, W.J.; Lund, V.J.; Mullol, J.; Bachert, C.; Alobid, I.; Baroody, F.; Cohen, N.; Cervin, A.; Douglas, R.; Gevaert, P.; et al. EPOS 2012: European position paper on rhinosinusitis and nasal polyps 2012. A summary for Otorhinolaryngologists. *Rhinology* **2012**, *50*, 1–12. [[PubMed](#)]
5. Rachelefsky, G.S.; Katz, R.M.; Siegel, S.C. Chronic sinusitis in children with respiratory allergy: the role of antimicrobials. *J. Allergy Clin. Immunol.* **1982**, *69*, 382–387. [[CrossRef](#)]
6. Brook, I.; Yocum, P. Antimicrobial management of chronic sinusitis in children. *J. Laryngol. Otol.* **1995**, *109*, 1159–1162. [[CrossRef](#)] [[PubMed](#)]
7. Aurora, R.; Chatterjee, D.; Hentzleman, J.; Prasad, G.; Sindwani, R.; Sanford, T. Contrasting the microbiomes from healthy volunteers and patients with chronic rhinosinusitis. *JAMA Otolaryngol. Head Neck Surg.* **2013**, *139*, 1328–1338. [[CrossRef](#)] [[PubMed](#)]
8. Cho, S.H.; Bachert, C.; Lockey, R.F. Chronic Rhinosinusitis Phenotypes: An Approach to Better Medical Care for Chronic Rhinosinusitis. *J. Allergy Clin. Immunol. Pract.* **2016**, *4*, 639–642. [[CrossRef](#)] [[PubMed](#)]



© 2017 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).