Sinusitis–Child

EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
1. American Academy of Pediatrics. Subcommittee on Management of Sinusitis and Committee on Quality Improvement. Clinical practice guideline: management of sinusitis. Pediatrics. 2001; 108(3):798-808.	Review/Other-Dx	N/A	Guidelines. (Recommendations regarding diagnosis, evaluation and management of sinusitis in children ages 1-21).	N/A	4
2. Brook I. Acute sinusitis in children. Pediatr Clin North Am. 2013;60(2):409-424.	Review/Other-Dx	N/A	To discuss acute sinusitis in children.	No results stated in abstract.	4
3. De Cleyn KM, Kersschot EA, De Clerck LS, et al. Paranasal sinus pathology in allergic and non-allergic respiratory tract diseases. Allergy. 1986; 41(5):313-318.	Observational-Dx	270 patients	Prospective study on patients with rhinitis and/or asthma for sinus pathology using standard radiographs and tomograms.	Asthma was associated with sinus Radiograph abnormalities (65.1%) than rhinitis and/or chronic cough (44.4%). Loss of translucency of the cavities is more frequent in children. 32.5% of the patients with mucosa thickening could be detected on standard radiographs.	2
4. Fireman P. Diagnosis of sinusitis in children: emphasis on the history and physical examination. J Allergy Clin Immunol. 1992; 90(3 Pt 2):433-436.	Review/Other-Dx	N/A	To review diagnosis of sinusitis in children.	Diagnosis is possible based on careful history and physical examination. Radiography is recommended for confirmation of clinical impression or documentation of disease.	4
5. Gungor A, Corey JP. Pediatric sinusitis: a literature review with emphasis on the role of allergy. Otolaryngol Head Neck Surg. 1997; 116(1):4-15.	Review/Other-Dx	N/A	Review literature to assess the role of allergy in pediatric sinus disease. Recommendations for method, duration and therapeutic interventions are presented.	Allergies and viral upper respiratory infections are among the most common predisposing factors for sinus disease.	4
6. Jannert M, Andreasson L, Helin I, Pettersson H. Acute sinusitis in children--symptoms, clinical findings and bacteriology related to initial radiologic appearance. Int J Pediatr Otorhinolaryngol. 1982; 4(2):139-148.	Review/Other-Dx	175 patients	Prospective study comparing signs or symptoms of sinusitis with bacteriology and radiography to enable accurate diagnosis of sinusitis.	Main symptoms predicting radiologic changes were upper respiratory tract infection, purulent nasal secretion and pain. In 75% of the patients, the presence of two or three of these symptoms was co-existent with major radiological changes.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
7. Nguyen KL, Corbett ML, Garcia DP, et al. Chronic sinusitis among pediatric patients with chronic respiratory complaints. J Allergy Clin Immunol. 1993; 92(6):824-830.	Review/Other-Dx	91 patients	To examine incidence of chronic sinusitis in children with respiratory symptoms of =3 months.	Combining symptoms of moderate to severe rhinorrhea and cough with minimum sneezing had specificity of 95% and sensitivity of 38% in predicting presence of chronic sinusitis. Age (r=0.30, P=0.004) in pediatric patients with chronic respiratory symptoms was the single risk factor significantly associated with abnormalities on sinus CT scan. 73% of children 2 to 6 years of age, 74% of children 6 to 10 years of age, and 38% of children older than 10 had chronic sinusitis.	4
8. Parsons DS. Chronic sinusitis: a medical or surgical disease? Otolaryngol Clin North Am. 1996; 29(1):1-9.	Review/Other-Dx	N/A	To review the role of surgery vs medical therapy of chronic sinusitis in the pediatric population.	Chronic sinusitis is a medical problem and the functional endoscopic surgery is an effective tool for medically recalcitrant sinusitis.	4
9. Slavin RG, Spector SL, Bernstein IL, et al. The diagnosis and management of sinusitis: a practice parameter update. J Allergy Clin Immunol. 2005; 116(6 Suppl):S13-47.	Review/Other-Dx	N/A	Guideline.	N/A	4
10. Shaikh N, Hoberman A, Colborn DK, et al. Are nasopharyngeal cultures useful in diagnosis of acute bacterial sinusitis in children? Clin Pediatr (Phila). 2013;52(12):1118-1121.	Observational-Dx	204 children	To determine if negative nasopharyngeal culture results could reliably identify the subgroup of children with normal radiographs.	Nasopharyngeal swabs were collected from 204 children meeting a priori clinical criteria for acute sinusitis. All children had sinus X-rays at the time of diagnosis. To determine if negative nasopharyngeal culture results could reliably identify the subgroup of children with normal radiographs, we calculated negative predictive values and negative likelihood ratios.	3
11. Wagenmann M, Naclerio RM. Anatomic and physiologic considerations in sinusitis. J Allergy Clin Immunol. 1992; 90(3 Pt 2):419-423.	Review/Other-Dx	N/A	Review of anatomy and mechanisms of sinusitis.	Ostial obstruction is a primary pathophysiologic mechanism in sinusitis. Anatomy and physiology have major impact on the therapeutic approach to sinus disease.	4

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EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
12. Wald ER. Sinusitis in children. N Engl J Med. 1992; 326(5):319-323.	Review/Other-Dx	N/A	Review anatomy and physiology; signs and symptoms; diagnosis and treatment of sinusitis in children.	CT scans are better than radiographs in defining sinus abnormalities but not necessary in children with uncomplicated acute sinusitis. Antibiotic therapy and surgical drainage are usually required for successful treatment.	4
13. Wald ER, Milmoe GJ, Bowen A, Ledesma-Medina J, Salamon N, Bluestone CD. Acute maxillary sinusitis in children. N Engl J Med. 1981; 304(13):749-754.	Review/Other-Dx	30 patients	To correlate clinical, radiographic, and bacteriologic findings in maxillary sinusitis in children who had both upper-respiratory-tract symptoms and abnormal maxillary radiographs.	Bacterial colony counts =10 (4) colony-forming units per milliliter were found in 34/47 sinus aspirates obtained from 23 children. Study shows that children with both upper respiratory tract symptoms and abnormal sinus radiographs are likely to harbor bacteria in their sinuses.	4

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EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
14. Wald ER, Applegate KE, Bordley C, et al. Clinical practice guideline for the diagnosis and management of acute bacterial sinusitis in children aged 1 to 18 years. Pediatrics. 2013;132(1):e262-280.	Review/Other-Dx	3 randomized studies	To update the American Academy of Pediatrics clinical practice guideline regarding the diagnosis and management of acute bacterial sinusitis in children and adolescents.	The diagnosis of acute bacterial sinusitis is made when a child with an acute upper respiratory tract infection (URI) presents with (1) persistent illness (nasal discharge [of any quality] or daytime cough or both lasting more than 10 days without improvement), (2) a worsening course (worsening or new onset of nasal discharge, daytime cough, or fever after initial improvement), or (3) severe onset (concurrent fever[temperature >/=39 degrees C/102.2 degrees F] and purulent nasal discharge for at least 3 consecutive days). Clinicians should not obtain imaging studies of any kind to distinguish acute bacterial sinusitis from viral URI, because they do not contribute to the diagnosis; however, a contrast-enhanced computed tomography scan of the paranasal sinuses should be obtained whenever a child is suspected of having orbital or central nervous system complications. The clinician should prescribe antibiotic therapy for acute bacterial sinusitis in children with severe onset or worsening course. The clinician should either prescribe antibiotic therapy or offer additional observation for 3 days to children with persistent illness. Amoxicillin with or without clavulanate is the firstline treatment of acute bacterial sinusitis. Clinicians should reassess initial management if there is either a caregiver report of worsening(progression of initial signs/symptoms or appearance of new signs/symptoms) or failure to improve within 72 hours of initial management.If the diagnosis of acute bacterial sinusitis is confirmed in a child with worsening symptoms or failure to improve, then clinicians may change the antibiotic	4

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
				therapy for the child initially managed with antibiotic or initiate antibiotic treatment of the child initially managed with observation.	
15. Glasier CM, Mallory GB, Jr., Steele RW. Significance of opacification of the maxillary and ethmoid sinuses in infants. J Pediatr. 1989; 114(1):45-50.	Review/Other-Dx	100 patients	Prospective study to evaluate the incidence and significance of opacification in infants. CT of the maxillary/ethmoid sinuses was performed with routine cranial CT.	Positive correlation of CT findings between the maxillary and ethmoid sinuses in 80% of infants older than 2 months but in only 49% of the younger infants. Radiographic sinus opacification is of uncertain significance and is not diagnostic of upper respiratory tract infection.	4
16. Leo G, Triulzi F, Consonni D, Cazzavillan A, Incorvaia C. Reappraising the role of radiography in the diagnosis of chronic rhinosinusitis. Rhinology. 2009;47(3):271-274.	Observational-Dx	269 children	To re-evaluate the role of radiography in the diagnosis of chronic rhinosinutis, versus the currently suggested standards of computed tomography (CT) or nasal endoscopy.	Radiography had a sensitivity of 84.2% (95% confidence interval 78.8 to 88.8), and a specificity of 76.6% (95% confidence interval 62.0 to 87.7) against the standard of nasal endoscopy.	3
17. Leo G, Triulzi F, Incorvaia C. Sinus imaging for diagnosis of chronic rhinosinusitis in children. Curr Allergy Asthma Rep. 2012;12(2):136-143.	Review/Other-Dx	N/A	To discus sinus imaging for diagnosis of chronic rhinosinusitis in children	No results stated in abstract.	4
18. Sedaghat AR, Cunningham MJ, Ishman SL. Regional and socioeconomic disparities in emergency department use of radiographic imaging for acute pediatric sinusitis. Am J Rhinol Allergy. 2014;28(1):23-28.	Observational-Dx	101,660 children	To analyze the use of imaging in acute pediatric sinusitis (APS) presenting to U.S. emergency departments (EDs).	The use of any imaging was associated with older age (odds ratio [OR] = 1.07; $p < 0.001$), male gender (OR = 1.57; $p < 0.001$), and diagnosis of chronic rhinosinusitis (OR = 2.46; $p < 0.001$). Imaging was more common in metropolitan teaching (OR = 1.40;0 $p < 0.001$) and nonteaching (OR = 5.64; $p < 0.001$) hospitals. Markers of higher socioeconomic status--private health insurance (OR = 1.37; $p < 0.001$) and higher income level (OR = 1.96; $p < 0.001$)--were associated with greater use of imaging, especially CT scans.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
19. Clary RA, Cunningham MJ, Eavey RD. Orbital complications of acute sinusitis: comparison of computed tomography scan and surgical findings. Ann Otol Rhinol Laryngol. 1992; 101(7):598-600.	Review/Other-Dx	19 patients	Retrospective study to assess accuracy of CT in diagnosing orbital complications. CT was compared with surgical findings.	15/19 CT scan interpretations indicated abscesses that were verified intraoperatively. CT effective in diagnosing orbital complications.	4
20. Clayman GL, Adams GL, Paugh DR, Koopmann CF, Jr. Intracranial complications of paranasal sinusitis: a combined institutional review. Laryngoscope. 1991; 101(3):234-239.	Review/Other-Dx	649 patients	Retrospective review to determine incidence of intracranial complications of sinusitis.	24 patients with complications from sinusitis are studied for an incidence of 3.7%. Aggressive medical and semi-emergent surgical intervention is required to prevent excessive morbidity and/or mortality.	4

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EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
21. Germiller JA, Monin DL, Sparano AM, Tom LW. Intracranial complications of sinusitis in children and adolescents and their outcomes. Arch Otolaryngol Head Neck Surg. 2006; 132(9):969-976.	Review/Other-Dx	25 consecutive children and adolescents treated for 35 intracranial complications	To gain insight into patterns of presentation, imaging, microbiological aspects, therapy, disease course, and outcome of intracranial complications of sinusitis, which are challenging conditions with the potential to cause significant morbidity and mortality.	Epidural abscess was most common (13 complications), followed by subdural empyema (n=9), meningitis (n=6), encephalitis (n=2), intracerebral abscess (n=2), and dural sinus thrombophlebitis (n=2). Abscesses were primarily located in the frontal or frontoparietal regions. MRI was extensively used and was superior to contrast CT in diagnosis. All patients received intravenous antibiotics, 21 underwent endoscopic sinus surgery, and 13 underwent neurosurgical drainage. Only 1 death occurred from sepsis secondary to meningitis (mortality, 4%). Overall, neurologic outcome was excellent. Although 10 patients (40%) had neurologic deficits, most resolved within 2 months. Only 2 patients had permanent neurologic sequelae. Among intracranial complications of sinusitis, epidural abscess appeared to be a distinct clinical entity. Epidural abscesses typically presented without specific neurologic symptoms or signs, were more often associated with orbital complications, and had outcomes considerably better than the other intracranial complications of sinusitis. Intracranial complications of sinusitis are challenging, but prognosis can be favorable in children and adolescents by using aggressive medical and surgical management.	4

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EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
22. Hicks CW, Weber JG, Reid JR, Moodley M. Identifying and managing intracranial complications of sinusitis in children: a retrospective series. Pediatric Infectious Disease Journal. 30(3):222-6, 2011 Mar.	Review/Other-Dx	13 patients	To describe the clinical features, laboratory data, imaging findings, and outcomes of pediatric patients with intracranial complications of sinusitis. A retrospective chart review was performed.	13 patients presented with headache (92%), fever (85%), nausea/vomiting (62%), sinus tenderness (31%), and lethargy (23%). Physical examination findings included Pott puffy tumor (46%), orbital cellulitis (46%), altered level of consciousness (46%), new-onset seizure (31%), hemiparesis (23%), nuchal rigidity (23%), visual disturbance (23%), and slurred speech (15%). CT and MRI demonstrated 16 instances of epidural and subdural empyema, and 1 brain abscess. One child had sagittal sinus thrombosis. Findings suggest that acute sinusitis in combination with severe intractable headache, varying degrees of altered level of consciousness, focal neurologic deficits, and/or signs of meningeal irritation should raise clinical suspicion for potential intracranial complications of sinusitis. These signs and symptoms should prompt early and aggressive evaluation and management, including neuroimaging studies, neurologic and otolaryngologic consultations, and intravenous antibiotics.	4
23. Oxford LE, McClay J. Complications of acute sinusitis in children. Otolaryngol Head Neck Surg. 2005; 133(1):32-37.	Review/Other-Dx	104 patients	Retrospective review of demographic, microbiologic, and outcome data for children with complications of acute sinusitis.	CT scan of the paranasal sinuses is recommended by many authors for evaluating a patient with a complication of acute sinusitis. Contrast-enhanced provides detailed bony anatomy and evaluation of soft tissue complications.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
24. Bizzoni A, Bolzoni Villaret A, Lombardi D, et al. Isolated sphenoid inflammatory diseases associated with visual impairment: 15-year experience at a single institution. Rhinology. 2011;49(2):202-206.	Review/Other-Dx	11 patients	To present a retrospective series of 11 patients treated for isolated sphenoid inflammatory disease (ISID) with visual impairment in the period between 1994 and 2008.	The possibility of recovery was related to both the modality of onset and severity of the deficit. All patients with reduction of the visual field reported significant improvement after surgery. Patients with decreased visual acuity obtained partial or complete resolution, while in patients with preoperative blindness no improvement was observed. Moreover, no postoperative improvement was noticed in the case of severe deficits with sudden onset, whereas the treatment of mild deficits was successful even some weeks after their occurrence.	4
25. Younis RT, Anand VK, Davidson B. The role of computed tomography and magnetic resonance imaging in patients with sinusitis with complications. Laryngoscope. 2002;112(2):224-229.	Observational-Dx	82 adult and pediatric patients	Retrospective review comparing the role of CT with MRI in patients with sinusitis with complications.	For patients with orbital complications, the diagnostic accuracy was 82% for clinical assessment compared with 91% for CT. For patients with intracranial complications, meningitis was common diagnosis and MRI was more accurate (97%) in determining diagnoses than CT (87%) or clinical findings (82%).	3

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
26. Ryan JT, Preciado DA, Bauman N, et al. Management of pediatric orbital cellulitis in patients with radiographic findings of subperiosteal abscess. Otolaryngol Head Neck Surg. 2009; 140(6):907-911.	Review/Other-Dx	465 consecutive orbital cellulitis admissions	Case series with chart review to examine the outcomes of patients admitted for orbital cellulitis during a 7-year period.	189/465 patients were treated in the emergency room and 276 were admitted. CT was performed on 240 patients. Subperiosteal abscess was noted in 68 patients. Of these, 47 were treated medically and 21 had surgery. Surgical patients were older (8.3 vs 6.2 years, P=0.039), had larger abscesses (>10 mm, P<0.001), required a longer admission (10.2 vs 6.6 days, P<0.001), and had higher temperatures on admission (38.0 degrees C vs 37.3 degrees C, P=0.03). Majority of small subperiosteal abscesses as diagnosed on CT scans in younger children can be successfully treated medically. Surgery, however, should be considered for a worsening clinical examination. Findings confirm those of previous reports on this clinical entity.	4

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EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
27. Bedwell J, Bauman NM. Management of pediatric orbital cellulitis and abscess. Curr Opin Otolaryngol Head Neck Surg. 2011;19(6):467-473.	Review/Other-Dx	N/A	To describe the current evaluation and management of this condition.	Computed tomography with contrast remains the optimal imaging study for orbital inflammation. Orbital inflammation is still classified by Chandler's original description as preseptal or postseptal and nearly all cases of preseptal cellulitis are managed with oral antibiotics. Most cases of postseptal cellulitis are managed with intravenous antibiotics, although surgical therapy is required for some abscesses, particularly large ones. Patients under 9 years respond to medical management more frequently than older patients but recent studies confirm that even children over 9 with small or moderate-sized abscesses and normal vision deserve a medical trial before surgical intervention. Medial subperiosteal abscesses that fail medical therapy are usually drained endoscopically, whereas lateral or intraconal abscesses require an open procedure.	4
28. Beech T, Robinson A, McDermott AL, Sinha A. Paediatric periorbital cellulitis and its management. Rhinology. 2007;45(1):47-49.	Review/Other-Dx	34 patients	To look at an ideal way of managing periorbital cellulitis in a paediatric population using our department's experience.	Thirty-four patients met the criteria. Sixteen patients had reduced visual acuity, proptosis or ophthalmoplegia. Twenty-three had white cell count checked, 14 were raised and 7 of these had an operation. Eleven had blood cultures checked and all were negative. Seven had other cultures taken, Streptococcus milleri was the predominant organism isolated. Sixteen were CT scanned, 14 showed significant sinus disease. All patients were treated with intravenous antibiotics and ten required operative intervention. Two patients developed lateral orbital collections requiring further surgery.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
29. Ketenci I, Unlu Y, Vural A, Dogan H, Sahin MI, Tuncer E. Approaches to subperiosteal orbital abscesses. Eur Arch Otorhinolaryngol. 2013;270(4):1317-1327.	Review/Other-Dx	36 females (13 females aged from 3 to 76)	To evaluate the epidemiology, clinical features, management and complications of subperiosteal orbital abscesses (SPOA)-a serious complication of rhinosinusitis.	Patients were analyzed in terms of age, gender, clinical features, CT findings, surgical procedures, microbiology, and complications. Twenty-three males and 13 females aged from 3 to 76 were evaluated. Nine patients-seven of which were under the age of 10-with small medial SPOA were treated only with medical management. Of the 13 with medial SPOA, transnasal endoscopic approach was performed for 10 and external approach for 3 to drain the abscess. As for the 12 patients with superior SPOA, 8 were treated via combined approach and 4 via external approach. The most common microorganisms were streptococci in children and anaerobes in adults. Total loss of vision developed in two adults with diabetes mellitus (DM). One patient with superior SPOA died due to frontal lobe abscess.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
30. Oxford LE, McClay J. Medical and surgical management of subperiosteal orbital abscess secondary to acute sinusitis in children. Int J Pediatr Otorhinolaryngol. 2006;70(11):1853-1861.	Observational-Dx	43 patients	To evaluate the presentations and outcomes of pediatric subperiosteal orbital abscesses (SPOA) secondary to acute sinusitis.	Eighteen/43 (42%) patients resolved their infection with medical management only, including five children older than nine. Twenty-five/43 (58%) children underwent surgical drainage. Purulence was identified in 22 of 25 surgical patients, and the most common organism was Streptococcus milleri (7 patients). Compared to 22 patients with drained purulence, the 18 patients with abscesses managed medically had significant differences for: chemosis in 2/18 (11.1%) versus 14/22 (63.6%, p=0.001), proptosis in 10/18 (55.6%) versus 20/22 (90.9%, p=0.025), elevated intraocular pressure (IOP) in 0/18 (0%) versus 11/22 (50%, p<0.001), severe restriction of extraocular movements in 1/18 (5.6%) versus 12/22 (54.5%, p=0.002), and length of stay (4.3 versus 5.8 days, p=0.038). The dimensions of medial SPOA managed medically were significantly smaller on CECT compared to surgically drained purulent SPOA: width (0.25 versus 1.46cm, p<0.001), height (0.73 versus 1.35cm, p=0.002), and length (1.1 versus 1.86cm, p=0.004). Persistent morbidities occurred in no patients managed medically and in 2/25 (8%) managed surgically.	3
31. Pereira FJ, Velasco e Cruz AA, Anselmo-Lima WT, Elias Junior J. Computed tomographic patterns of orbital cellulitis due to sinusitis. Arq Bras Oftalmol. 2006;69(4):513-518.	Observational-Dx	45 patients	To describe the CT findings of orbital cellulitis due to sinusitis.	Three major types of CT changes were observed: diffuse fat infiltration, subperiosteal abscess and orbital abscess. Diffuse fat infiltration (characterized by an increased density of the extra- or intraconal fat) was seen in 11 patients (24.44%). A subperiosteal abscess was diagnosed in 28 patients (62.23%). A surgically proved orbital abscess was detected in 6 patients (13.33%).	3

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
32. Velasco e Cruz AA, Demarco RC, Valera FC, dos Santos AC, Anselmo-Lima WT, Marquezini RM. Orbital complications of acute rhinosinusitis: a new classification. Braz J Otorhinolaryngol. 2007;73(5):684-688.	Review/Other-Dx	83 patients	To propose a new classification of acute rhinosinusitis complications to guide the physician in establishing lines of conduct for each case.	In sixty-six patients, were identified three types of orbital complications: orbital cellulitis (46.9%), subperiosteal abscess (40.9%) and orbital abscess (12.1%). Seventeen were considered as eyelid infections and excluded from this new classification system.	4
33. Ebright JR, Pace MT, Niazi AF. Septic thrombosis of the cavernous sinuses. Arch Intern Med. 2001;161(22):2671-2676.	Review/Other-Dx	N/A	To review the salient clinical features of septic thrombosis of the cavernous sinuses, with emphasis on newer aspects of diagnosis and treatment.	No results stated in abstract.	4
34. Ardeshirpour F, Bohm LA, Belani KK, Sencer SF, Lander TA, Sidman JD. Surgery for pediatric invasive fungal sinonasal disease. Laryngoscope. 2014;124(4):1008-1012.	Review/Other-Dx	11 patients	To evaluate the management and outcomes of children with invasive fungal sinonasal disease treated with radical surgery.	The studied patient population consisted of four males and seven females with an average age of 10 years (range, 2-14 years). Six patients were diagnosed with acute lymphoblastic leukemia and five with acute myeloid leukemia, which included 10 cases of relapsed disease. The average number of severely neutropenic days prior to diagnosis of an invasive fungal infection was 18 (range, 8-41 days). Culture results demonstrated Alternaria in seven patients and Aspergillus in four. Nine patients underwent an external medial maxillectomy, five of which were bilateral, and six underwent septectomy. All 11 patients (100%) were cured of their invasive fungal sinonasal disease without relapse. Three patients eventually died from unrelated causes.	4
35. Aribandi M, McCoy VA, Bazan C, 3rd. Imaging features of invasive and noninvasive fungal sinusitis: a review. Radiographics. 2007; 27(5):1283-1296.	Review/Other-Dx	N/A	To review imaging features of invasive and noninvasive fungal sinusitis.	Fungal sinusitis can be noninvasive or invasive with 5 major subtypes. The subtypes have different clinical and radiologic features with different treatment strategies and prognoses. Important for radiologist to know the subtypes and radiologic features.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
36. Payne SJ, Mitzner R, Kunchala S, Roland L, McGinn JD. Acute Invasive Fungal Rhinosinusitis: A 15-Year Experience with 41 Patients. Otolaryngol Head Neck Surg. 154(4):759-64, 2016 Apr.	Review/Other-Dx	131 patients	To describe a 15-year single-institution experience of 41 cases of acute invasive fungal sinusitis (AIFRS), identify clinical indicators predictive of AIFRS, and discuss our approach to these high-acuity patients.	Of 131 patients evaluated, 41 were diagnosed with AIFRS; 92.7% had an underlying hematologic malignancy. Disease predictive variables included absolute neutrophil count <500/muL (P < .0001; sensitivity = 78%), mucosal abnormalities of middle turbinate (P < .0001; specificity = 88%) and septum (P < .0001; specificity = 97%), and specifically, necrosis of the middle turbinate (P < .0001; specificity = 97%). Twenty-five AIFRS patients (61%) survived until discharge; 25% (n = 10) expired secondary to AIFRS infection explicitly.	4
37. Chandrasekharan R, Thomas M, Rupa V. Comparative study of orbital involvement in invasive and non-invasive fungal sinusitis. J Laryngol Otol. 2012;126(2):152-158.	Observational-Dx	100 cases	To investigate differences in orbital involvement in patients with invasive versus non-invasive fungal sinusitis.	Clinical orbital involvement was more common in invasive (73.5 per cent) than non-invasive (12.1 per cent) fungal sinusitis (p = 0.000). Computed tomography scanning showed similar orbital involvement in both groups, except for erosion of the floor of the orbit, which was more common in patients with invasive fungal sinusitis (p = 0.01). Extra-ocular muscle enlargement (44.4 vs 4 per cent, p = 0.01) and optic atrophy (44.4 vs 0 per cent, p = 0.003) were more common in chronic than acute invasive fungal sinusitis. Four patients (16 per cent) with acute invasive fungal sinusitis had no evidence of orbital involvement on scanning, despite clinical evidence of optic atrophy.	3

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
38. Campbell JM, Graham M, Gray HC, Bower C, Blaiss MS, Jones SM. Allergic fungal sinusitis in children. Ann Allergy Asthma Immunol. 2006;96(2):286-290.	Review/Other-Dx	20 patients	To characterize the features of allergic fungal sinusitis (AFS) in children.	Presentation at diagnosis included the following: atopy (n = 20), nasal symptoms (n = 20), recurrent sinusitis (n = 18), nasal polyps (n = 18), recurrent headaches (n = 12), asthma (n = 11), proptosis (n = 10), and ocular symptoms (n = 10). All had radiographic evidence of sinusitis and allergy to fungal organisms. IgE levels were elevated in 8 of 9 patients, and 10 of 15 patients had eosinophilia. Surgical specimens demonstrated allergic mucin (n = 11), Charcot-Leyden crystals (n = 2), hyphae or fungal debris (n = 9), and fungal growth (n = 17). All patients underwent endoscopic sinus surgery, with 11 requiring multiple surgical procedures. Postoperatively, 19 patients received intranasal and oral steroids, and all had nasal saline washes. Eleven patients (9 who had undergone multiple surgical procedures) were treated with immunotherapy. Relapse was seen in 55% of patients at 1 year of follow-up.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
39. Gupta AK, Bansal S, Gupta A, Mathur N. Is fungal infestation of paranasal sinuses more aggressive in pediatric population? Int J Pediatr Otorhinolaryngol. 2006;70(4):603-608.	Review/Other-Dx	200 cases	To compare characteristic features, radiology, management and recurrence pattern of fungal sinusitis between children and adults.	The study population comprised of 200 cases, with 68 cases in group 1 and 132 cases in group 2. The most common symptom in both the groups was presence of nasal obstruction. The children had higher incidence of having unilateral disease (46 out of 68) compared with adults, where it was 38 out of 132. The bony erosion was seen more often in group 1. Surgery was done endoscopically in all the cases. The intra orbital or intra cranial extension was seen in 58 cases of group 1 and 47 cases of group 2 ($p<0.001$). Recurrence was seen in 18 (15 with intraorbital and 3 with intracranial extension) cases in group 1 and 13 cases (11 with intraorbital and 2 with intracranial extension) in group 2 ($p<0.005$).	4
40. Patro SK, Verma RK, Panda NK, Chakrabarti A. Understanding paediatric allergic fungal sinusitis: Is it more aggressive? Int J Pediatr Otorhinolaryngol. 2015;79(11):1876-1880.	Observational-Dx	50 patients	To study and characterize the features of allergic fungal rhinosinusitis (AFRS) in children as compared to adults.	Group A had 12 patients and group B had 38. Mean duration of symptoms was significantly less in children as compared to adults ($p<0.05$). All patients of both groups had nasal polyposis at presentation. Unilateral disease and multisinus involvement was more common in children (6/12) as compared to adults. Proptosis (2/12) and telecanthus (4/12) was more common in children (group A) as compared to adults (group B). LM (Lund Mackay) scores and serum IgE were significantly high in children as compared to adults. Follow up CT scans showed early evidence of recurrence in children as compared to adults ($p<0.05$).	3
41. April MM, Zinreich SJ, Baroody FM, Naclerio RM. Coronal CT scan abnormalities in children with chronic sinusitis. Laryngoscope. 1993; 103(9):985-990.	Review/Other-Dx	74 CT scans	Retrospective review of CT scans to evaluate the distribution of disease and anatomical abnormalities in pediatric patients with sinus disease in comparison with adult.	Bone abnormal same as adults. Greater frequency of disease in pediatric patients.	4

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EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
42. Arjmand EM, Lusk RP, Muntz HR. Pediatric sinusitis and subperiosteal orbital abscess formation: diagnosis and treatment. Otolaryngol Head Neck Surg. 1993; 109(5):886-894.	Review/Other-Dx	22 patients	To examine diagnosis and treatment of children with subperiosteal orbital abscess.	Endoscopic ethmoidectomy and abscess drainage have some advantages over external ethmoidectomy and abscess drainage.	4
43. Aygun N, Uzuner O, Zinreich SJ. Advances in imaging of the paranasal sinuses. Otolaryngol Clin North Am. 2005; 38(3):429-437.	Review/Other-Dx	N/A	Reviews the advancements in imaging of the paranasal sinuses.	Miniaturization of large and bulky cross-sectional imaging equipment will gradually become popular in clinical practice.	4
44. Babbel RW, Harnsberger HR, Sonkens J, Hunt S. Recurring patterns of inflammatory sinonasal disease demonstrated on screening sinus CT. AJNR Am J Neuroradiol. 1992; 13(3):903-912.	Review/Other-Dx	500 consecutive patients	Retrospective review to define recurring patterns of inflammatory sinonasal disease demonstrated on screening sinus CT.	Five recurring radiologic patterns of sinonasal inflammatory disease were identified: 1) infundibular (129/500 or 26%), 2) ostiomeatal unit (126/500 or 25%) 3) sphenoethmoidal recess (32/500 or 6%), 4) sinonasal polyposis (49/500 or 10%), and 5) sporadic (unclassifiable) (121/500 or 24%) patterns. Normal screening sinus CT was seen in 133/500 patients (27%). Identification of patterns allows grouping patients into nonsurgical (normal CT), routine (infundibular, ostiomeatal unit, and most sporadic patterns) and complex (sinonasal polyposis and sphenoethmoidal recess patterns) surgical groups. Pattern allows direct endoscopic surgery.	4
45. Laine FJ, Smoker WR. The ostiomeatal unit and endoscopic surgery: anatomy, variations, and imaging findings in inflammatory diseases. AJR Am J Roentgenol. 1992; 159(4):849-857.	Review/Other-Dx	N/A	To review anatomy, variations, and imaging findings in paranasal sinus inflammatory diseases.	CT has become an important complementary procedure to sinus endoscopy.	4
46. Lazar RH, Younis RT, Parvey LS. Comparison of plain radiographs, coronal CT, and intraoperative findings in children with chronic sinusitis. Otolaryngol Head Neck Surg. 1992; 107(1):29-34.	Review/Other-Dx	300 patients	To compare radiographs, CT, and surgery in children with chronic sinusitis.	CT most reliable. Surgery should be determined by signs and symptoms plus CT.	4

Sinusitis–Child
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
47. McAlister WH, Lusk R, Muntz HR. Comparison of plain radiographs and coronal CT scans in infants and children with recurrent sinusitis. AJR Am J Roentgenol. 1989; 153(6):1259-1264.	Review/Other-Dx	70 patients	Prospective study to compare radiographs with coronal CT to determine if radiographs can be used to accurately diagnose and localize residual sinus disease. CT is gold standard.	Findings on slightly over 80% of the CT scans were abnormal. In about 75% of the patients, the findings on radiographs did not correlate with those on CT scans. About 45% of the patients had normal findings on radiographs of at least one sinus with an abnormality of that sinus shown on CT scans. Almost 35% of the patients had what was interpreted as an abnormality of at least one sinus on radiographs, but that sinus was normal on CT scans. Radiographs are unreliable.	4
48. Parsons DS, Phillips SE. Functional endoscopic surgery in children: a retrospective analysis of results. Laryngoscope. 1993; 103(8):899-903.	Review/Other-Tx	200 patients	Retrospective analysis of follow-up results from functional endoscopic sinus surgery in children.	Functional endoscopic sinus surgery is recommended in treating medically recalcitrant severe chronic sinusitis in children.	4
49. Sonkens JW, Harnsberger HR, Blanch GM, Babbel RW, Hunt S. The impact of screening sinus CT on the planning of functional endoscopic sinus surgery. Otolaryngol Head Neck Surg. 1991; 105(6):802-813.	Review/Other-Dx	500 patients	To determine the impact of screening sinus CT on the planning of functional endoscopic sinus surgery.	5 radiologic patterns were identified: Infundibular (129/500 or 26%). Ostiomeatal unit (126/500 or 25%). Sphenoethmoidal recess (32/500 or 6%). Sinonasal polyposis (49/500 or 10%). Sporadia (unclassifiable) (121/500 or 24%). 133 of the 500 patients (27%) had normal screening sinus CT.	4
50. van der Veken PJ, Clement PA, Buisseret T, Desprechins B, Kaufman L, Derde MP. CT-scan study of the incidence of sinus involvement and nasal anatomic variations in 196 children. Rhinology. 1990; 28(3):177-184.	Review/Other-Dx	196 patients	To examine rhinosinusitis in the developing sinuses with CT. Children aged 3-14 years were included.	Youngest age group–maxillary involvement in 63%, ethmoidal involvement in 58%, and sphenoidal sinus involvement in 29%. Maxillary sinusitis was frequent in the oldest age group (65%). Frontal involvement significant at the age of 7-8 years (7%) but never exceeds 15% (11-12 age group). Septal deviations occurred in 16% of the youngest up to 72% in the oldest age group.	4

Sinusitis–Child
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
51. Wolf G, Anderhuber W, Kuhn F. Development of the paranasal sinuses in children: implications for paranasal sinus surgery. Ann Otol Rhinol Laryngol. 1993; 102(9):705-711.	Review/Other-Dx	102 pediatric skulls and cadaver heads	To study development of the paranasal sinuses in children and relate clinical anatomy to sinus surgery.	Knowledge of anatomy and pneumatization of children's sinuses is an important prerequisite to understanding the pathogenesis of sinusitis and its complications. Useful for interpreting of radiographs and for sinus surgery.	4
52. Yousem DM. Imaging of sinonasal inflammatory disease. Radiology. 1993;188(2):303-314.	Review/Other-Dx	N/A	To review anatomy of the sinonasal cavity, imaging of uncomplicated and complicated sinusitis, and analyze the current role of each imaging modality.	Changes in imaging sinonasal inflammatory disease have paralleled changes in the treatment of chronic sinusitis. As functional endoscopic sinus surgery has become a more widespread technique, coronal computed tomography (CT) has become the primary imaging modality, replacing plain radiography. Knowledge of the plethora of sinonasal anatomic variations and the inherent surgical implications is critical to the interpretation of the CT scans and to the safe performance of endoscopic surgery. Currently, the role of magnetic resonance imaging is restricted to the evaluation of complicated sinusitis, intraorbital and intracranial manifestations of aggressive sinusitis, and sinonasal neoplasms.	4
53. Esposito S, Marchisio P, Tenconi R, et al. Diagnosis of acute rhinosinusitis. Pediatr Allergy Immunol. 2012;23 Suppl 22:17-19.	Review/Other-Dx	N/A	To examine the diagnosis of acute rhinosinusitis.	No abstract available.	4
54. Triulzi F, Zirpoli S. Imaging techniques in the diagnosis and management of rhinosinusitis in children. Pediatr Allergy Immunol. 2007;18 Suppl 18:46-49.	Review/Other-Dx	N/A	To discuss imaging techniques in the diagnosis and management of rhinosinusitis in children.	No abstract available.	4
55. Hein E, Rogalla P, Klingebiel R, Hamm B. Low-dose CT of the paranasal sinuses with eye lens protection: effect on image quality and radiation dose. Eur Radiol. 2002; 12(7):1693-1696.	Review/Other-Dx	127 patients	To assess effect of lens protection on image quality and radiation dose to the eye lenses in CT of the paranasal sinuses.	Shield reduced skin radiation from 7.5 to 4.5 mGy. Utilization of a radioprotection to the eye lenses in paranasal CT is an effective means of reducing skin radiation by 40%.	4

Sinusitis–Child

EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
56. Mulkens TH, Broers C, Fieuws S, Termote JL, Bellnick P. Comparison of effective doses for low-dose MDCT and radiographic examination of sinuses in children. AJR Am J Roentgenol. 2005; 184(5):1611-1618.	Observational-Dx	69 children - radiography 125 children - MDCT	To examine the effect of lowering the dose in CT of the sinuses to an effective dose that is comparable to the effective dose of a radiographic examination in children.	Low-dose CT of the sinuses can yield diagnostic image quality using an effective dose comparable to that used for standard radiography.	3
57. Steele RW. Chronic sinusitis in children. Clin Pediatr (Phila). 2005; 44(6):465-471.	Review/Other-Dx	N/A	Review chronic sinusitis to develop specific recommendations and offer practical treatment options in children.	Endoscopic sinus surgery and antral irrigation have the highest probability of substantial symptom improvement in clinical ranking.	4
58. Terrell AM, Ramadan HH. Correlation between SN-5 and computed tomography in children with chronic rhinosinusitis. Laryngoscope. 2009;119(7):1394-1398.	Observational-Dx	32 children	To evaluate the correlation of the SN-5 with the CT score in children.	The mean SN-5 score was 4.1 (SD = 1.03) and the mean Lund-Mackay CT score was 6.8 (SD = 4.3). There was a significant correlation between the SN-5 score and Lund-MacKay CT score (rho = 0.68; P < .0001) for all children in the study. Twelve (38%) children had asthma, and for those children the correlation was poorer and did not reach statistical significance (rho = 0 .57; P = .057). For nonasthmatics the correlation was stronger (rho = 0.73; P = .0003).	3
59. Leopold DA, Stafford CT, Sod EW, et al. Clinical course of acute maxillary sinusitis documented by sequential MRI scanning. Am. J. Rhinol. 1994; 8(1):19-28.	Review/Other-Dx	N/A	To document course of sinusitis by serial MRI.	Mucosal changes in bacterial sinusitis can last months.	4
60. Som PM, Shapiro MD, Biller HF, Sasaki C, Lawson W. Sinonasal tumors and inflammatory tissues: differentiation with MR imaging. Radiology. 1988; 167(3):803-808.	Review/Other-Dx	53 patients	To determine if MRI can be used to distinguish tumor from sinonasal inflammatory disease. In 53 patients, MRI was compared with CT. MRI of 60 patients with inflammatory disease were also studied. 47 additional MRI were also examined of patients with tumors showing histologic characteristics.	95% of sinonasal tumors have an intermediate T2 signal, while 5% have bright T2 signals. MRI was more accurate than CT.	4
61. McAlister WH. Imaging of sinusitis in infants and children. In: Lusk RP, ed. Pediatric Sinusitis. New York, NY: Raven Press; 1992:15-42.	Review/Other-Dx	N/A	Book chapter.	N/A.	4

Sinusitis–Child
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
62. Lusk RP, Lazar RH, Muntz HR. The diagnosis and treatment of recurrent and chronic sinusitis in children. Pediatr Clin North Am. 1989; 36(6):1411-1421.	Review/Other-Dx	N/A	Review anatomy, diagnosis, surgery, and follow-up of chronic sinusitis in children.	No results.	4
63. Watt-Boolsen S, Karle A. The clinical use of radiological examination of the maxillary sinuses. Clin Otolaryngol Allied Sci. 1977; 2(1):41-43.	Review/Other-Dx	286 patients	To examine clinical use of radiological examination of the maxillary sinuses.	Children >12 years, radiologically normal sinuses contained fluid in 15.3% and when under that age in 39%. Radiological findings should not override one's clinical judgment, and the age of the patient should be considered when conclusions are to be drawn from the radiological findings.	4
64. Konen E, Faibel M, Kleinbaum Y, et al. The value of the occipitomental (Waters') view in diagnosis of sinusitis: a comparative study with computed tomography. Clin Radiol. 2000; 55(11):856-860.	Observational-Dx	134 patients	To evaluate the diagnostic accuracy of a single Waters' view in the diagnosis of paranasal sinusitis using high resolution CT as gold standard.	Mean sensitivity for diagnosis of any abnormality in the maxillary sinus was 67.7%, specificity 87.6%, accuracy 78.6%, PPV 82.5% and NPV 76.9%. Waters' view has limited value in the diagnosis of maxillary sinusitis and is less sensitive for abnormalities in the other sinuses. Low-dose high-resolution CT study of the paranasal sinuses is highly recommended.	2
65. Zinreich SJ, Kennedy DW, Malat J, et al. Fungal sinusitis: diagnosis with CT and MR imaging. Radiology. 1988; 169(2):439-444.	Observational-Dx	25 patients with diagnosis of fungal sinusitis	To compare CT and MRI in diagnosis of fungal sinusitis.	22/25 had foci of increased attenuation at CT. 19/22 (76%) met the CT criterion of this study (there was a 12% false-positive and a 12% false-negative diagnostic rate). 6/19 and one additional patient underwent MRI and all demonstrated remarkably hypointense signal characteristics on T2-weighted images. MRI is better in diagnosing fungal sinusitis.	3
66. Lee WK, Mossop PJ, Little AF, et al. Infected (mycotic) aneurysms: spectrum of imaging appearances and management. Radiographics. 2008;28(7):1853-1868.	Review/Other-Dx	N/A	To review the clinicopathologic and imaging manifestations of infected aneurysms.	No results stated in abstract.	4

Sinusitis–Child
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
67. Finkelstein A, Contreras D, Pardo J, et al. Paranasal sinuses computed tomography in the initial evaluation of patients with suspected invasive fungal rhinosinusitis. Eur Arch Otorhinolaryngol. 2011;268(8):1157-1162.	Observational-Dx	34 patients	To determine the imaging findings that suggest invasive fungal rhinosinusitis (IFR) in patients with hematological malignancies.	In the retrospective case/control study, we included 14 patients with hematological malignancies that developed IFR in the Hospital Clinico de la Pontificia Universidad Catolica de Chile between January 2005 and June 2009. Twenty patients with hematological malignancies, with suspected sinonasal infectious involvement requiring a PCT for initial evaluation, were chosen as the control group. Thirteen imaging parameters were compared between both groups. Osseous erosion and facial soft tissue thickening were statistically associated with the presence of IFR ($p < 0.05$). The presence of osseous erosion, facial soft tissue thickening, extrasinus extension or unilateral involvement had a positive predictive value of 100%, with an incidence among the total group of 12, 15, 9 and 9%, respectively. No patients with IFR had a normal PCT. Most PCTs in the initial evaluation of suspected IFR had nonspecific findings.	2

Sinusitis–Child
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
68. Gupta K, Saggar K. Analysis of computed tomography features of fungal sinusitis and their correlation with nasal endoscopy and histopathology findings. Ann Afr Med. 2014;13(3):119-123.	Observational-Dx	16 patients	To analyze the computed tomography (CT) features of fungal sinusitis and to correlate them with nasal endoscopy and histopathological findings.	Out of total 16 patients, 12 showed immunocompromised status and had infection with mucormycosis. Out of 12, 9 patients (75%) showed extension of disease beyond the sinonasal cavities and 4 (33.3%) showed evidence of bone destruction. All patients with candidiasis showed soft-tissue attenuation with hyperdense areas on CT scan. Nearly, 66.6% patients with aspergillosis showed soft-tissue attenuation with hyperdense areas and expansion of sinonasal cavities. Fifteen patients (93%) were proved to be of fungal sinusitis on histopathology. One patient of non-specific granulomatous infection showed bone destruction and mimicked fungal sinusitis on CT.	3
69. Mossa-Basha M, Ilica AT, Maluf F, Karakoc O, Izbudak I, Aygun N. The many faces of fungal disease of the paranasal sinuses: CT and MRI findings. Diagn Interv Radiol. 2013;19(3):195-200.	Review/Other-Dx	N/A	To describe the different manifestations of fungal sinusitis on computed tomography and magnetic resonance imaging to optimize differentiation, and includecorrelation with the pathologic classifications.	No results stated in abstract.	4

Sinusitis–Child
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
70. Groppo ER, El-Sayed IH, Aiken AH, Glastonbury CM. Computed tomography and magnetic resonance imaging characteristics of acute invasive fungal sinusitis. Arch Otolaryngol Head Neck Surg. 2011;137(10):1005-1010.	Observational-Dx	17 patients	To determine radiographic findings on computed tomography (CT) and magnetic resonance imaging (MRI) predictive of acute fulminant invasive fungal sinusitis (AFIFS) in an immunocompromised patient population.	No significant differences with regard to baseline characteristics between the 2 groups were identified. There was moderate or substantial agreement (kappa = 0.40-0.77) between the 2 radiologists for all imaging parameters except MRI loss of contrast enhancement (kappa = 0.16). Magnetic resonance imaging was more sensitive than CT for the diagnosis of AFIFS (sensitivity 85% and 86% for both reviewers compared with 57% and 69%). Extrasinus invasion with MRI was the most sensitive individual parameter (87% and 100%). Magnetic resonance imaging and CT had similar specificities, and perisinus invasion was the most specific individual parameter (83% and 83% for MRI compared with 81% and 83% for CT). The positive predictive values were high for both imaging modalities (93% and 94% for MRI compared with 89% and 93% for CT). The negative predictive values were lower for both modalities and varied more between reviewers (71% and 100% for MRI compared with 45% and 67% for CT).	2
71. American College of Radiology. ACR Appropriateness Criteria® Radiation Dose Assessment Introduction. Available at: https://www.acr.org/-/media/ACR/Files/Appropriateness-Criteria/RadiationDoseAssessmentIntro.pdf.	Review/Other-Dx	N/A	Guidance document on exposure of patients to ionizing radiation.	No results stated in abstract.	4

Evidence Table Key

Study Quality Category Definitions

- *Category 1* The study is well-designed and accounts for common biases.
- *Category 2* The study is moderately well-designed and accounts for most common biases.
- *Category 3* There are important study design limitations.
- *Category 4* The study is not useful as primary evidence. The article may not be a clinical study or the study design is invalid, or conclusions are based on expert consensus. For example:
  a. The study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description);
  b. The study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence;
  c. The study is an expert opinion or consensus document.
- Meta-analysis
  a. *Good quality* – the study design, methods, analysis, and results are valid and the conclusion is supported.
  b. *Inadequate quality* – the study design, analysis, and results lack the methodological rigor to be considered a good meta-analysis study.

Abbreviations Key

Dx = Diagnostic

Tx = Treatment