Diagnostic Imaging Pathways - Paediatric, Paranasal Sinus (Suspected)

Population Covered By The Guidance

This pathway provides guidance on imaging children with suspected paranasal sinus.

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Quick User Guide

Move the mouse cursor over the PINK text boxes inside the flow chart to bring up a pop up box with salient points.
Clicking on the PINK text box will bring up the full text.
The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

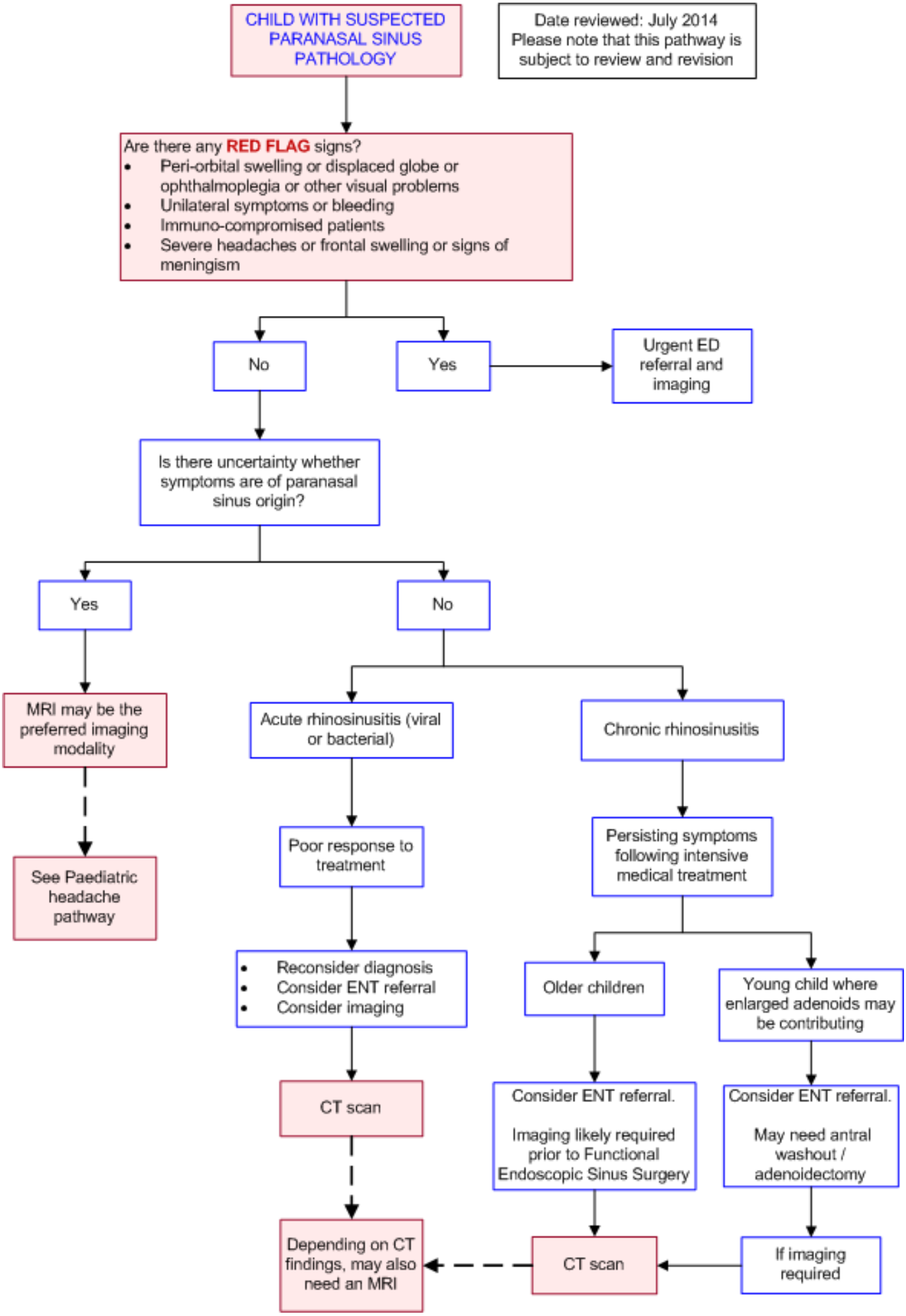

Image Gallery

Note: Images coming soon

Teaching Points

- When imaging is required, CT is generally considered the investigation of choice for both acute and chronic rhinosinusitis
- When paranasal sinus surgery is being considered CT is indicated as it provides excellent detail of bone anatomy and may show anatomical variations that predispose to sinus pathology
- MRI is the imaging modality of choice when intracranial complications such as epidural empyema or brain abscess are suspected clinically or on CT
- Where red flag signs are present this warrants urgent Emergency Department referral and subsequent imaging

Paranasal Sinus Pathology

- The paranasal sinuses are divided into four pairs 1
    - Maxillary antra (present at birth)
    - Ethmoid air cells (present at birth)
    - Sphenoid sinuses (begin to develop at approximately 9 months)
    - Frontal sinuses (begin to develop at approximately 5 years)
- Acute rhinosinusitis is preferred over the term sinusitis for the following reasons 2
    - Symptoms of rhinitis generally precede those of sinusitis
    - Sinusitis without rhinitis is unusual
    - The nasal and paranasal sinus mucosa are continuous
- Acute rhinosinusitis is defined as the sudden onset of two or more of the following symptoms that have been present for less than 12 weeks: there may be disease free intervals if the problem is recurrent 3
    - Discoloured nasal discharge
    - Nasal blockage/obstruction/congestion
    - Cough at daytime and night-time
- Most cases of acute rhinosinusitis are viral in aetiology 3
    - The following features suggest acute bacterial acute rhinosinusitis 3,4
    - Symptoms persisting for greater than 10 days without improvement
    - Abrupt increase in severity of symptoms following a period of improvement
    - Fever greater than 38 degrees
    - Discoloured discharge with unilateral predominance
    - Purulent secretion in cavum nasi
    - Elevated ESR / CRP
- Chronic rhinosinusitis is defined as two or more of the following symptoms present continuously for more than 12 weeks, one of which should be the first two listed 3
    - Nasal blockage / congestion / obstruction

    - Anterior/posterior nasal drip
    - Facial pain /pressure
    - Cough
- Chronic rhinosinusitis is a challenging diagnosis in children as the symptoms overlap with a range of other conditions including viral URTI, adenoid hypertrophy/adenoiditis and allergic rhinitis. Physical examination can also be difficult in young children and nasal endoscopy, which can assist with making the diagnosis, is often not possible in young children 3
- Previously children with persistent or severe symptoms were evaluated with sinus radiographs. It is now recognised that radiographs can both overestimate and underestimate the extent of sinus disease. They are technically difficult to perform in young children and are now generally not indicated. This is supported by the American College of Radiology guidelines 5
- Although the diagnosis of acute sinusitis should be made on clinical grounds, the accuracy of this is not well documented when compared with the gold standard of direct sinus puncture. Direct sinus puncture is rarely performed due to its invasiveness and cost 6

Computed Tomography (CT)

- When imaging is required, CT is generally considered the investigation of choice for both acute and chronic rhinosinusitis 7
- When paranasal sinus surgery is being considered CT is indicated as it provides excellent detail of bone anatomy and may show anatomical variations that predispose to sinus pathology 8
- Although complications of rhinosinusitis are relatively rare they can result in permanent neurological deficit or fatality. One of the main aims of imaging is to detect these complications 9
- CT can over diagnose rhinosinusitis with incidental mucosal changes a common finding on scans performed for other indications 10,11
- Complications of rhinosinusitis are most commonly orbital in nature. When patients with sinusitis symptoms present with orbital swelling, ptosis, visual changes and cranial nerve palsies contrast enhanced CT is recommended to diagnose orbital cellulitis +/- abscess formation 6
- Isolated sphenoid sinusitis is a relatively rare form of sinusitis that can be detected on both CT and MRI. Sphenoid sinusitis is more commonly seen as part of pansinusitis but isolated sphenoid sinusitis can have devastating consequences due to its critical anatomical relations12

Magnetic Resonance Imaging (MRI)

- MRI is the imaging modality of choice when intracranial complications such as epidural empyema or brain abscess are suspected clinically or on CT 6,9
- MRI provides better soft tissue resolution over CT and is helpful in defining the true extent of a paranasal sinus soft tissue tumour 13
- Paranasal sinus tissue/fluid changes can last for 8 weeks of more on MRI following an acute infection and are commonly found as an incidental finding 14,15
- Is inferior to CT at depicting osteomeatal complex osseous detail

References

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. Download the document

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Consent to Procedure or Treatment Radiation Risks of X-rays and Scans	Computed Tomography (CT) Magnetic Resonance Imaging (MRI)

Computed Tomography (CT) Magnetic Resonance Imaging (MRI)	Radiation Risk of Medical Imaging for Adults and Children Making Your Child's Test or Procedure Less Stressful

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