ACUTE SEVERE EYE PAIN AND EPISTAXIS IN A 16-YEAR-OLD MALE TEENAGER - WHAT CLINICAL CLUES MAY AID A GP IN DIAGNOSING ACUTE SINUSITIS?

Dr Marie Stella P Cruz

ABSTRACT

A 16-year-old teenager presented with acute severe eye pain and mild epistaxis. The family physician diagnosed an ophthalmologic emergency requiring evaluation. Acute sinusitis was not entertained. Subsequently, ENT evaluation and CT scan confirmed maxillary and anterior ethmoidal sinusitis. This lead to a search for criteria to improve diagnosis of acute sinusitis in the GP setting. Two or more of these symptoms – mucopurulent rhinorrhoea, nasal obstruction/congestion, facial pain/pressure and decreased sense of smell increase its likelihood. Other important issues discussed include differential diagnosis of eyepain associated with epistaxis, potential orbital complications of sinusitis and causes of the quiet, non-red eye

Keywords:
Acute sinusitis, maxillary sinusitis, ethmoidal sinusitis, eye pain, quiet non-red eye, epistaxis

SFP2012; 38(3): 44-48

PATIENT'S REVELATION: WHAT HAPPENED?

WK, a 16-year-old Chinese-Singaporean male teenager presented to a family physician with severe right eye pain and mild right nose bleed.

The right eye pain, of 2 days duration, had rapidly increased in severity, rendering him supine and motionless. It was aggravated by any head or body movement. The eye pain was deep and orbital. Pain was also felt medial to the right eye, just lateral to the nose bridge. There was no redness, discharge, tearing, photophobia, decrease in visual acuity, double vision or history of trauma to the eye. He was not a contact lens user.

The right nose bleed, of 4 days duration, was small in amount but persistent. There was no known nose injury. He noted purulent nasal mucosal discharge prior to the onset of nose bleed, but had no other symptoms of a respiratory tract infection. There was no fever, headache or vomiting. This was his first episode of severe eye pain and persistent nose bleeding.

Significant medical history include myopia of 4 dioptres, an infected right ear polyp removed surgically a year ago, mild allergic rhinitis, mild persistent asthma, red-green colour blindness and G6PD deficiency. The allergic rhinitis did not necessitate treatment while low-dose inhaled beclomethasone diprioprionate was used occasionally for the asthma. Both conditions had been present since his primary school days.

Significant family history included allergic rhinitis and eczema in the father, and allergic rhinitis, red-green colour blindness and G6PD deficiency in an elder brother.

MARIE STELLA P CRUZ,
Family Physician, Bethany Methodist Nursing Home

On physical examination, WK was conscious, rational and alert. Blood pressure was 120/66 mmHg, pulse rate 72/minute and temperature afebrile. Examination of the right eye did not reveal any abnormality. No photophobia, tearing or discharge was noted. The conjunctiva was not injected and the cornea was clear. The pupil was reactive to light. There was no diplopia or limitation in his visual fields.

A small amount of fresh blood was seen in the right nostril. No tenderness was felt over the cheeks and forehead. Maxillary transillumination was not performed. There were no cranial nerve abnormalities nor neck stiffness and his gait was normal.

The family physician's diagnosis was that of an opthalmologic emergency requiring evaluation and referred WK to the Emergency Department. The attending doctor referred him immediately to the ophthalmologist on duty at the ED. Thorough evaluation including measurement of intraocular pressure, slit lamp examination, fluorescein staining of cornea and direct fundoscopy were normal. The left eye was also normal.

WK was then assessed by an ENT surgeon, who elicited mild facial tenderness just medial to the right eye. Dried blood was noted in the right nostril. Nasoendoscopy revealed pus oozing into the middle meatus.

A diagnosis of acute ethmoidal sinusitis was made and WK was warded. Intravenous Amoxycillin-Clavulanic Acid at a dose of 1.2 grams 8 hourly was instituted and regular paracetamol given as analgesic. Topical oxymetazoline hydrochloride and mometasone furoate sprays were given to alleviate nasal congestion.

CT scan of the nasal cavity and sinuses performed 12 hours after admission revealed sinusitis of both the right anterior ethmoidal and right maxillary sinuses. The right globe was unremarkable.

WK's symptoms improved rapidly after initiation of treatment. The eye pain resolved completely within three days. The epistaxis stopped soon after admission.

WK was discharged from hospital after 2 days with a prescription for Amoxycillin-Clavulanic Acid 625 mg 8 hourly for 2 weeks, steroid nasal spray for 1 month and the antihistamine Cetirizine to be taken when necessary. At review with the ENT specialist 2 weeks later, repeat nasoendosopy was normal and he was discharged from follow-up.

GAINING INSIGHT: WHAT ARE THE ISSUES?

Analysis of this clinical encounter brought these questions to the fore:
1. What was the essence of this case? It was that the diagnosis of acute sinusitis was not entertained by the family physician as the overwhelming presenting symptom was severe eye pain.

2. What are the differential diagnosis of acute severe eye pain associated with epistaxis, such as in this patient?

3. What are the important causes of severe eye pain in a non-red eye that a GP should be aware of?

4. What are the symptoms and signs that may improve diagnosis of acute sinusitis in the GP setting?

5. What are the ophthalmic complications of acute ethmoidal and maxillary sinusitis?

STUDYING THE MANAGEMENT: HOW DO WE APPLY IN OUR CLINICAL PRACTICE?

1. The Case in a Nutshell
This 16-year old teenager presented with acute severe right eye pain and mild right epistaxis. Thorough physical examination of the eye was normal. Due to the magnitude of the eye pain that overwhelmed the epistaxis, the author had only considered an opthalmologic-related diagnosis and had not entertained acute sinusitis. The ENT surgeon diagnosed acute sinusitis based on the clinical picture and nasoendoscopic findings of pus in the middle meatus.

Subsequently, CTscan imaging confirmed the diagnosis as right maxillary and right anterior ethmoidal sinusitis. The right eye globe was normal.

While ruling out an opthalmologic cause as initial line of management is reasonable, the rationale being loss of vision is a possible and ominous consequence, it is imperative that clinical skills in diagnosing acute sinusitis by the GP also be improved.

2. Differential diagnosis of eye pain associated with epistaxis
In a patient presenting with eye pain and epistaxis, both symptoms may be related to a single diagnosis OR the eye pain and epistaxis may be due to co-existing separate distinct pathologies.

Acute sinusitis ties in the eye pain and epistaxis nicely. In this patient, the background history of allergic rhinitis (a known predisposing factor to sinusitis), the purulent nasal discharge that preceeded the onset of nose bleed, tenderness (elicited by the ENT surgeon) just lateral to the nosebridge and that is a likely sign of ethmoidal sinusitis, are all clues to the diagnosis of acute sinusitis.

How may his eye pain be explained? It is known that acute sinusitis may cause eye pain. Classically, maxillary sinusitis pain extends to the cheek and lower orbit and ethmoid sinusitis pain extends to the orbits or vertex of the skull.1 Both maxillary and ethmoid sinusitis being present in the patient resulted in severe eye pain. His eye pain was not due to orbital complications of sinusitis per se, as supported by normal physical examination by the ophthalmologist and CT scan findings of a normal globe.

Eye pain associated with sinusitis may be due to acute sinusitis with orbital complications. Thorough opthalmologic workup and CT scan is necessary along with prompt institution of antibiotics if confirmed, to avert loss of vision and even life.

Sinus neoplasms, though relatively uncommon, are also causes of eye pain with epistaxis. Workup includes CT scan and nasal endoscopy.

The eye pain and epistaxis could have been due to co-existing distinct conditions. Various opthalmologic conditions (discussed below) may cause the eye pain. Epistaxis may be due to a variety of local and systemic causes. Besides acute rhinosinusitis and nasal polyps, other common causes include self-induced trauma ie nose-picking, excessive nose blowing, trauma to the nasal bones or septum, rhinitis and topical medications eg topical corticosteroids.

Table 1: Causes of Pain in the Quiet, Non-red Eye

1. Opthalmologic conditions
Ocular causes
- Acute narrow-angle glaucoma
- Corneal diseases in initial stages eg infection, abrasion, foreign body
- Dry eyes

Orbital causes
- Optic neuropathy
- Orbital inflammation
- Orbital infection
- Orbital tumour
- Primary intraocular tumours eg choroidal melanoma
- Intraocular metastases from breast, lung, gastrointestinal cancers

Cranial conditions
- Paranasal sinusitis
- Cavernous sinus thrombosis
- Tolosa Hunt syndrome

Neurologic conditions
- Cluster headache
- Migraine headache
- Trimeginal neuralgia
- Elevated intracranial pressure

Vascular conditions
- Giant cell arteritis
- Subdural, epidural, subarachnoid or intracerebral haemorrhage
- Carotid artery disease eg inflammation, emboli, thrombosis, dissection

Information from reference 1

Neurologic conditions such as migraine or cluster headaches may also account for the eye pain. The lack of a history of recurrent headaches in this patient made this diagnosis less likely.

3. Important causes of pain in the quiet (non-red) eye

Pain in a quiet, non-red eye such as in this patient, can be the first sign of a vision-threatening condition, a more benign ophthalmologic condition, or a non-opthalmologic condition. Opthalmologic causes can be divided into ocular and orbital causes, while non-opthalmologic causes can be vascular, cranial and neurologic in eitiology. As the differential diagnosis is extensive, ophthalmologist evaluation to confirm diagnosis and initiate treatment is warranted.[1]

It is to be noted from this table that paranasal sinusitis may present with pain in a quiet, non-red eye. This is because maxillary sinusitis pain may extend into the lower orbit while both ethmoid and sphenoid sinusitis pain may extend to the orbit.

4. What are the symptoms and signs that may improve diagnosis of acute sinusitis in the GP setting?

It is timely to revisit the classification and diagnosis of acute sinusitis at this juncture.

The term rhinosinusitis is used because sinusitis is almost always accompanied by inflammation of the contiguous nasal mucosa. Over the last one and a half decades various international task forces and panels have revised and developed clinical practice guidelines on the classification and diagnosis of rhinosinusitis.[2]

In a clinical practice guidelines (CPG) illustrating the diagnosis and treatment of rhinosinusitis that was developed in 2007, diagnosis required two or more of the following symptoms [3]:

- Mucopurulent drainage (anterior, posterior or both)
- Nasal obstruction (congestion)
- Facial pain-pressure-fullness
- Decreased sense of smell

And inflammation by one or more of the following:
- Purulent mucus or edema in the middle meatus or ethmoid region
- Polyps in the nasal cavity or the middle meatus
- Radiographic imaging showing inflammation of the paranasal sinuses

Acute Rhinosinusitis

This is defined as up to 4 weeks of purulent nasal discharge accompanied by nasal obstruction, facial pain, facial pressure or fullness. Viral rhinosinusitis (VRS) can be distinguished from acute bacterial rhinosinusitis (ABRS) in that in viral rhinosinusitis, symptoms are present less than 10 days and are not worsening. In contrast, in bacterial rhinosinusitis, signs or symptoms are present 10 days or more beyond the onset of upper respiratory symptoms, and worsen within 10 days after an initial improvement ie. biphasic illness or double worsening.

In most cases, bacterial sinusitis is preceeded by a viral upper respiratory infection. Other common conditions that can predispose to acute sinusitis are cigarette smoke, anatomical factors such as nasal septum deformities, concha bullosa, and allergies. Approximately 2% of VRS progresses to bacterial rhinosinusitis in adults.

Three cardinal symptoms have been found to have high sensitivity and specificity for ABRS. These include purulent rhinorrhoea, facial pain/pressure and nasal obstruction. Secondary symptoms that support the diagnosis include anosmia, fever, aural fullness, cough and headache. The most common organisms responsible for ABRS are Streptococcus pneumoniae, Haemophilus influenzae and Moraxella catarrhalis.[2]

Chronic Rhinosinusitis

This is defined as an inflammatory condition of the nasal cavity and paranasal sinuses lasting longer than 12 weeks. The pathophysiology is multifactorial, resulting from interactions between host anatomy, genetics and the environment. Contributory factors include biofilms, osteitis, allergy, superantigens from Staphylococcus aureus, fungi and general host factors.

Nasal obstruction is the most common symptom (81 to 95%), followed by facial congestion-pressure-fullness (70 to 85%), discoloured nasal discharge (51 to 83%) and hyposmia (61 to 69%). High fevers are usually absent, although fatigue and myalgias are common.[2]

Table 2: Classification of Adult Rhinosinusitis

Classification	Duration
Acute	≤ 4 weeks
Subacute	4 to < 12 weeks
Chronic	≥ 12 weeks
Recurrent acute	≥ 4 episodes of acute rhinosinusitis per year, each episode lasting ≥ 7 to 10 days, with complete resolution between episodes
Acute exacerbations of chronic	Sudden worsening of chronic rhinosinusitis with a return to baseline after treatment

Information from reference 2

MOH Clinical Practice Guidelines on Management of Rhinosinusitis and Allergic Rhinitis 2/2010

Locally, the MOH CPG on Management of Rhinosinusitis and Allergic Rhinitis that was published in February 2010 has advised that diagnosis be based on symptoms, with nasal examination yielding supporting signs.

A sudden onset of two or more of the symptoms[4,5]:
- Blockage, congestion or stuffiness
- Nasal discharge or post nasal drip, often mucopurulent
- Facial pain or pressure, headache and
- Reduction / loss of smell

Signs include[4,5]:
- Nasal: swelling, redness, deformity
- Oropharyngeal: postnasal drip
- Oral: dental infection
- Otologic: otitis media

Anterior rhinoscopy remains the basic tool in primary care to determine the existence of pathology, but alone is limited to examining the anterior portion of the sinonasal passages.

Nasal endoscopy helps identify oedema, inflammation, mucopurulent discharge, scarring, crusting and nasal polyps.

5. Opthalmologic complications of acute sinusitis

There are four pairs of sinuses: frontal, ethmoid, maxillary and sphenoid sinuses. Each of the sinuses is closely related to important structures, which as a result, can become involved in diseases affecting the sinuses.[6]

Table 3: Important Structures Related to the Sinuses

Maxillary	Ethmoid	Sphenoid	Frontal
Orbit	Orbit	Internal carotid	Orbit
Teeth	Cribriform plate	Cavernous sinus	Brain
Cheek	Optic nerve	Pituitary	

Table from reference 6

Table 4: Potential Complications of Sinusitis

Orbital complications (see Table 5)
Intracranial complications • Meningitis (extension from ethmoid or sphenoid sinusitis) • Epidural abscess (from frontal sinusitis)
Pott Puffy tumour • Frontal osteomyelitis (from frontal sinusitis)

Information from reference 2

The progression of sinonasal orbital infections has been divided into five stages. The first stage, periorbital edema, presents with cellulitis of the eyelids without visual loss or opthalmoplegia. The second stage, orbital cellulitis describes infection extending through the orbital septum and presents with pain, proptosis and chemosis. There may be opthalmoplegia related to edema of the extraocular muscles and decrease in visual acuity related to corneal edema. The third stage involves formation of a subperiosteal abscess. The fourth stage is the formation of an orbital abscess. Severe proptosis, chemosis, opthalmoplegia and visual loss are usually present. The fifth stage results from retrograde thrombophlebitis of the valveless ophthalmic veins that can lead to cavernous sinus thrombosis.[2]

Table 5: Potential Orbital Complications of Sinusitis

1. Periorbital oedema
Infection is anterior to the orbital septum
No limitation of extraocular movements and vision is normal.

2. Orbital cellulitis
Infection of the soft tissue posterior to the orbital septum

3. Subperiosteal abscess
Pus collection beneath the periosteum of the lamina papyracea
Globe is usually displaced in inferolateral direction

4. Orbital abcess
Pus collection in the orbit
Associated with limitation of extraocular movements, exophthalmos and visual changes

5. Cavernous sinus thrombosis
Septic thrombosis of the cavernous sinuses
Fever, opthalmoplegia, ptosis, proptosis, chemosis, blindness, meningitis

Table from reference 2

CONCLUSION

The three main lessons learnt by the author from this patient are:

1. Consider acute sinusitis in a patient presenting with eye pain and epistaxis. To do so, a family physician must be familiar with the major symptoms and signs that will aid in making the diagnosis. A high index of suspicion for acute sinusitis at the outset is important as immediate and appropriate treatment will help avert known complications.

2. Diagnostic criteria for acute sinusitis include two or more of these symptoms – mucopurulent rhinorrhoea, facial pain/pressure, nasal obstruction/congestion and decreased sense of smell.

3. Know that the causes of eye pain in a quiet (non-red eye) is extensive and includes both opthalmologic and non-opthalmologic causes of cranial, vascular and neurologic conditions. Prompt referral to an ophthalmologist to rule out vision-threatening conditions is warranted.

REFERENCES

1. Fiore D, Pasternak A, Radwan R. Pain in the quiet (not red) eye. Am Fam Physician. 2010 July 1;82(1):69-73.
2. Lalwani A. Acute & Chronic Sinusitis. Otolaryngology Head and Neck Surgery - Current Diagnosis and Treatment. Chpt 15. Published 2012 by McGraw Hill.
3. Rosenfeld RM, Andes D, Bhattacharyya N. Clinical practice guideline: Adult sinusitis. Otolaryngology – Head and Neck Surgery 2007; 137 (Suppl) :S1 – S31. doi:10.1016/j.otohns.2007.06.726
4. MOH Clinical Practice Guidelines 2/2010. Management of Rhinosinusitis and Allergic Rhinitis.
5. European Position Paper on Rhinosinusitis and Nasal Polyposis. Rhinology, Supplement 20, 2007 [www.rhinologyjournal.com; www.eaaci.net]
6. Corbridge R. The Paranasal Sinuses. Essential ENT second edition. Chpt 11. Published 2011 by Hodder Arnold.
7. Aring A and Chan M. Acute Rhinosinusitis in Adults. Am Fam Physician. 2011 May 1; 83(9): 1057 – 1063.