

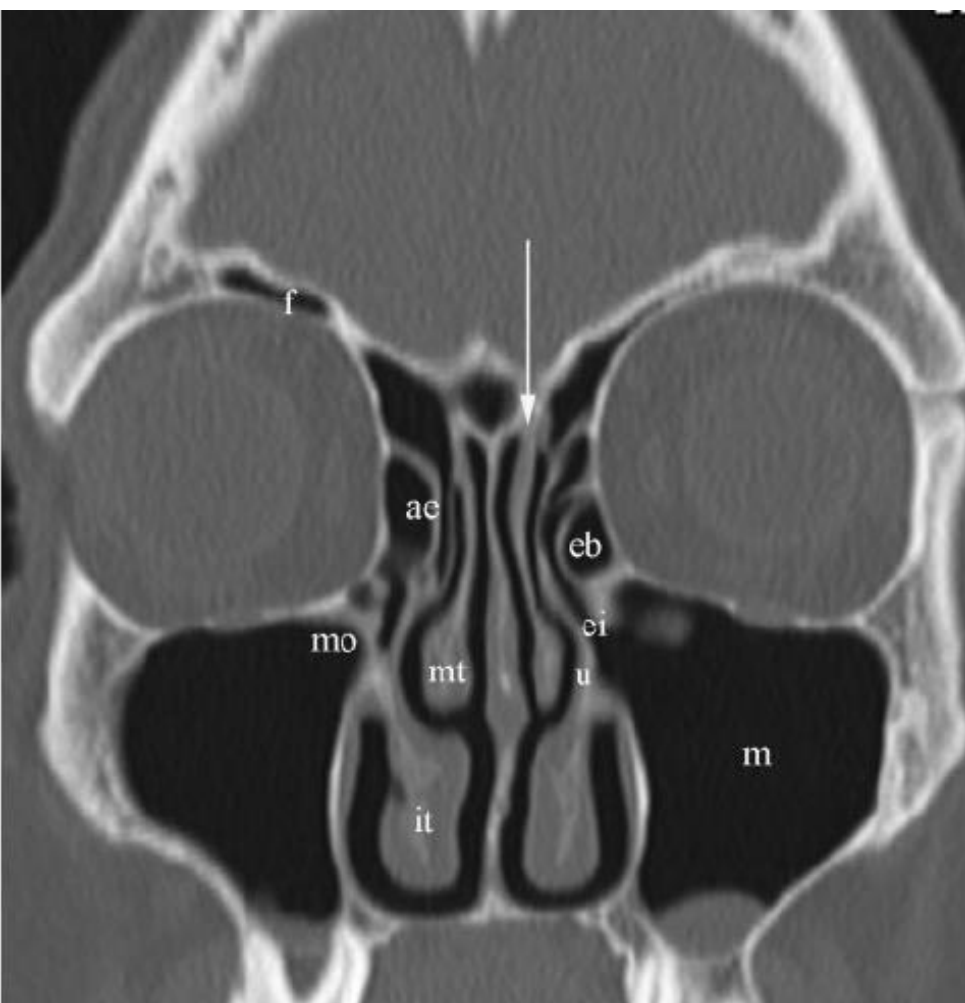
SINUS DISEASE, CHRONIC RHINOSINUSITIS, and ADVANCES IN SURGICAL MANAGEMENT

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Outline

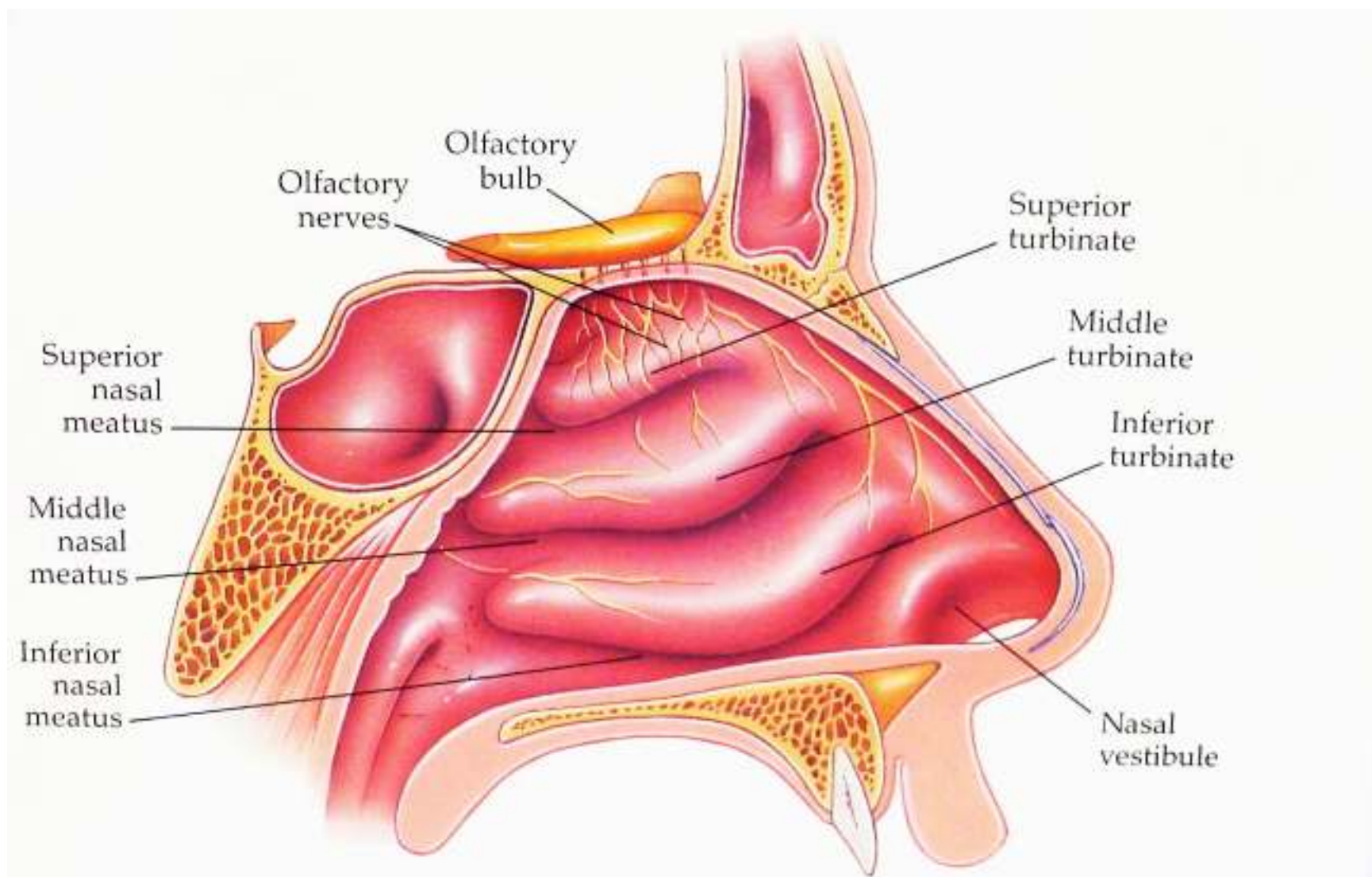
- Anatomy
- Acute Rhinosinusitis (ARS) - briefly
- Chronic Rhinosinusitis (CRS)
- Management algorithms
- Medical therapy
- Surgical management
- Surgical Complications

ANATOMY



ANATOMY (continued)

- Ciliated pseudostratified columnar epithelium
 - Two layers of mucus
 - Thick “basement” layer
 - Thin less viscous layer that the cilia moves to the ostia
 - Mucosal Changes After Surgery and Long Term Disease
- Neuroreceptors for smell (olfactory nerve) and airflow (located in the inferior and middle turbinates)



What is Rhinosinusitis?

SIGNS AND SYMPTOMS

- Nasal congestion and/or rhinorrhea
 - postnasal drainage
 - Purulent
 - color does not determine infection
- Obstruction
 - Deviated septum
 - Hypertrophy of turbinate(s)
 - Polyps

SIGNS AND SYMPTOMS

- Facial Pain and/or Pressure
 - Frontal, maxillary, upper teeth, retro-orbital, crown of the head
 - Temporal, parietal and occipital headaches general NOT associated with sinusitis
 - Children <12 yrs with headaches who point to the top of their head, anterior face, eye, or posterior skull may have sphenoid sinusitis until otherwise documented by CT or MRI scan
- Fever

ACUTE RHINOSINUSITIS

- <12 weeks duration with complete resolution of symptoms
- Purulent drainage, fever, significant sinus pain and pressure
- Isolated acute infection without recurrent “sinus symptoms”
 - Most commonly secondary to upper respiratory viral infection or other inflammatory condition
 - perennial allergic rhinitis with inflammation
 - obstruction of the ostia/drainage passages of the sinuses
 - primarily neutrophilic inflammation with a small amount of eosinophils

COMMON BACTERIA

- *Streptococcus pneumoniae*
- *Haemophilus influenza*
- *Moraxella catarrhalis*

TREATMENT

- Acute sinusitis
 - Antibiotics – ten days to three weeks
 - Nasal steroids – six to eight weeks
 - Nasal saline irrigations – six to eight weeks
 - Mucocilia may take up to four to six weeks to resume normal function
 - CT scan of sinuses if indicated
 - Optional:
 - Nasal spray decongestants – three days only
 - Short course of oral steroids
 - Surgery if indicated



CHRONIC RHINOSINUSITIS



CHRONIC RHINOSINUSITIS

- Greater than 12 weeks duration *without* complete resolution of symptoms
 - multiple treatments or infections within one year
 - multiple year history of recurrent infections or episodes of sinus pain and pressure
 - symptoms that coincide with changes in altitude or weather
 - chronic nasal congestion and drainage

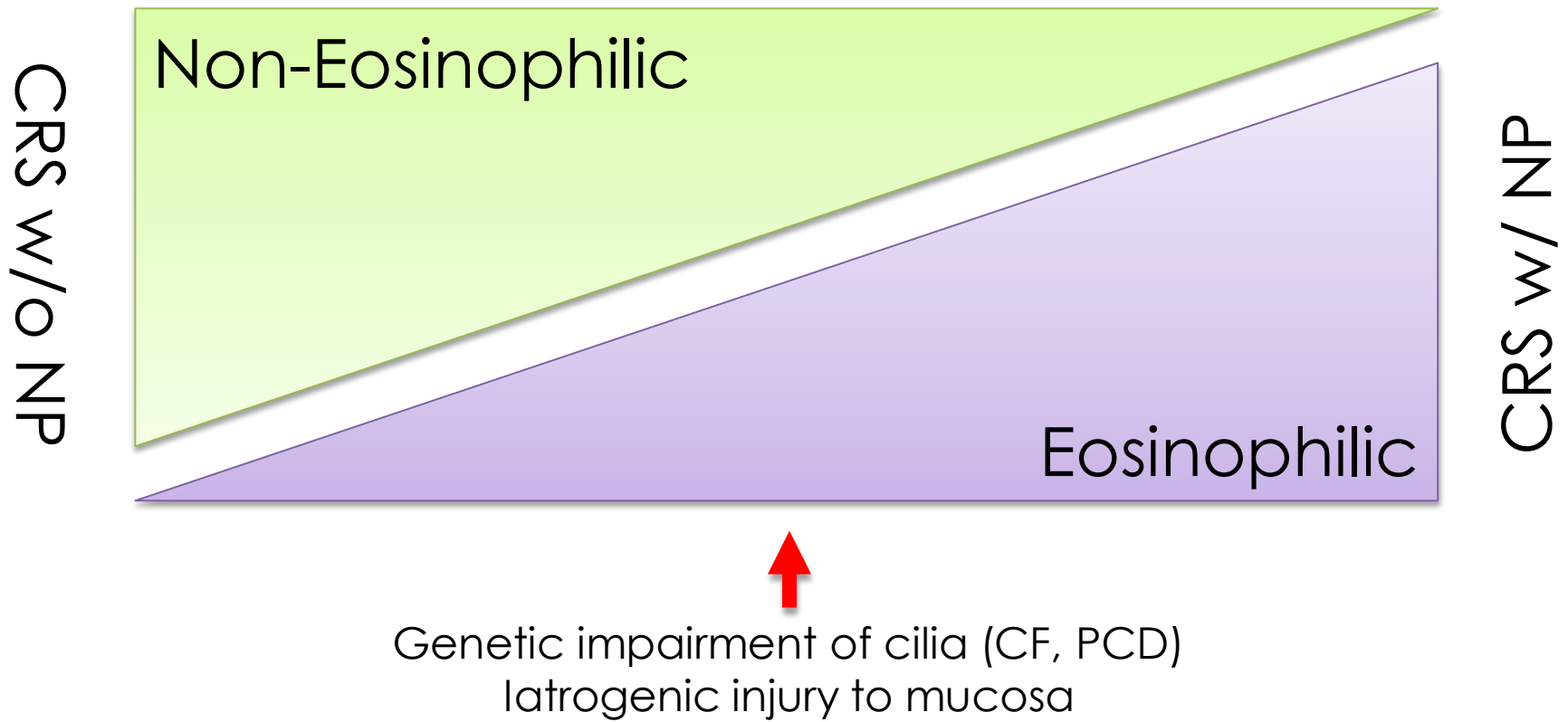
CHRONIC RHINOSINUSITIS

- In adults, defined as:
 - Inflammation of the nose and paranasal sinuses
 - Characterized by 2 or more symptoms:
 - Nasal symptom (obstruction/rhinorrhea/congestion)
 - \pm endoscopic findings (polyps, mucopurulent discharge, mucosal edema/inflammation)
 - \pm CT scan findings

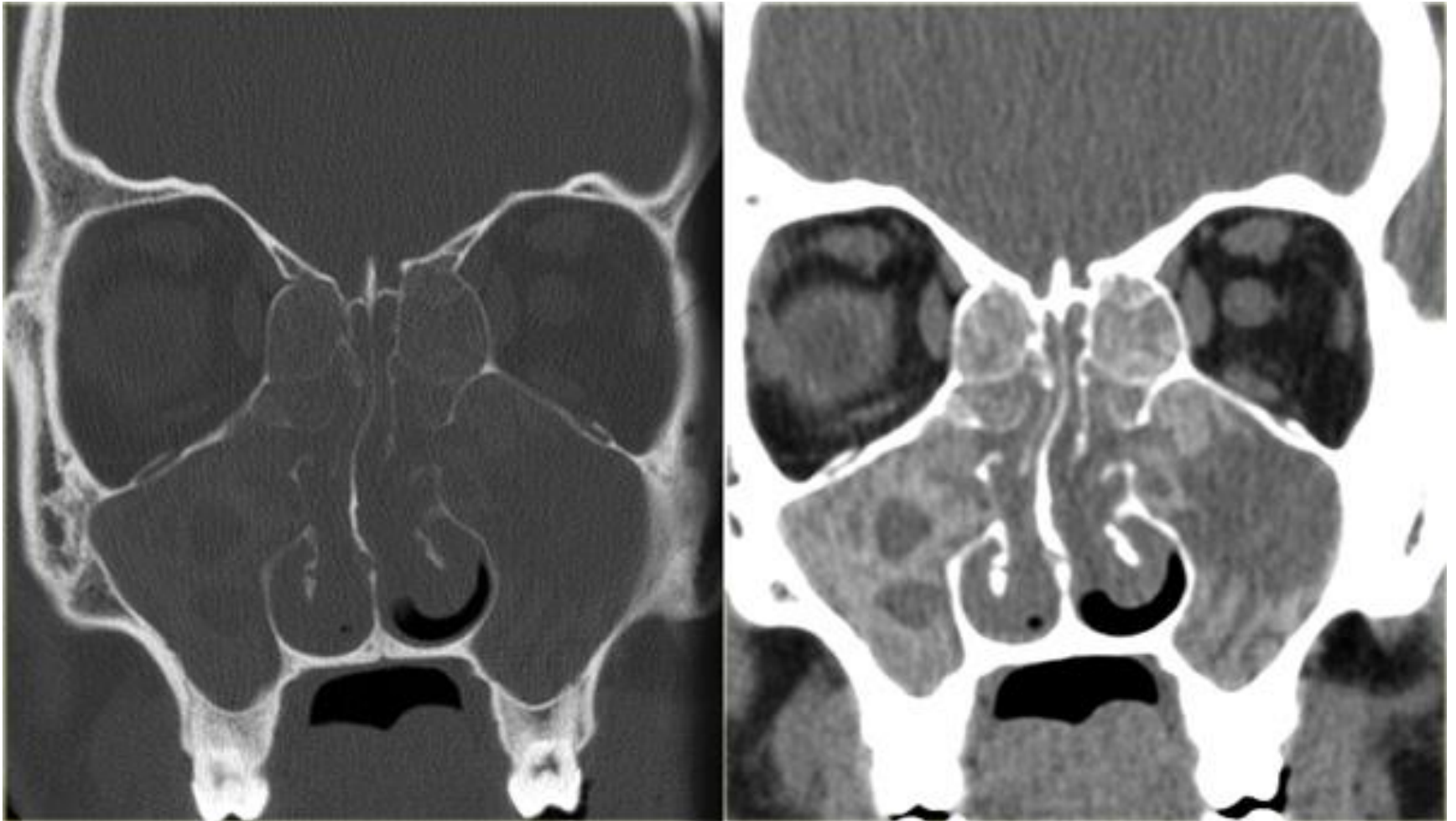
Factors associated with CRS

- Ciliary impairment (CF, PCD)
- Allergic rhinitis
- Asthma
- Aspirin sensitivity
- Environmental factors (smoking, irritants)
- Iatrogenic factors (repeat sinus surgery, trauma)
- H. pylori/GERD?
- Systemic disorders (granulomatosis with polyangiitis, sarcoidosis)

Nasal Polyposis...or not



CHRONIC RHINOSINUSITIS (CRS) WITH POLYPS



ALLERGIC FUNGAL SINUSITIS (AFRS)

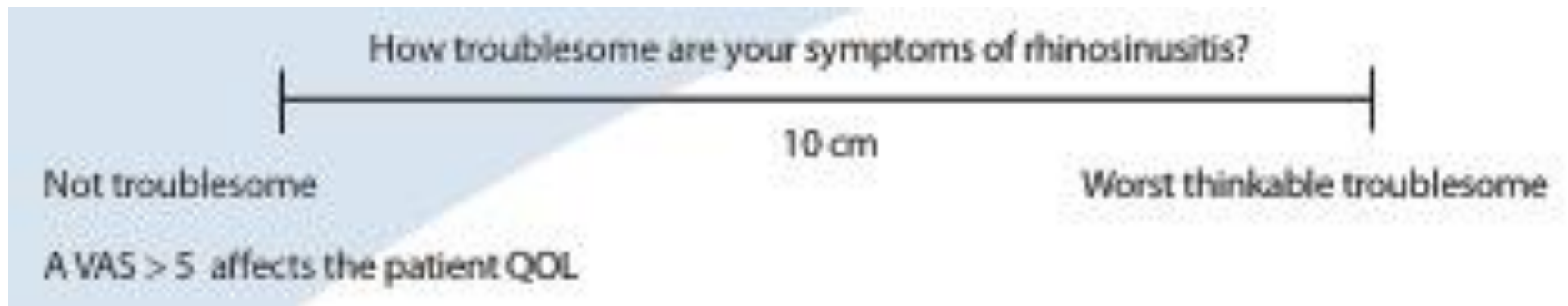
- Non-invasive
 - local fungal hyphae in the mucin
 - allergic response to the fungus
 - polyps with thick grey to brownish “greasy” mucin drainage
- Invasive
 - Microscopic invasion of fungus in the mucosa
 - Necrotic black tissue with nonpainful debridement is an emergent life threatening fungal infection





EPOS

Fokkens WJ, Lund VJ, Mullol J, Bachert C, Alobid I, et al. **European Position Paper on Rhinosinusitis and Nasal Polyps 2012**. Rhinol Suppl 2012 Mar(23) 1-298.



The disease can be divided into MILD, MODERATE and SEVERE based on total severity visual analogue scale (VAS) score (0 - 10 cm):

- MILD = VAS 0-3
- MODERATE = VAS >3-7
- SEVERE = VAS >7-10

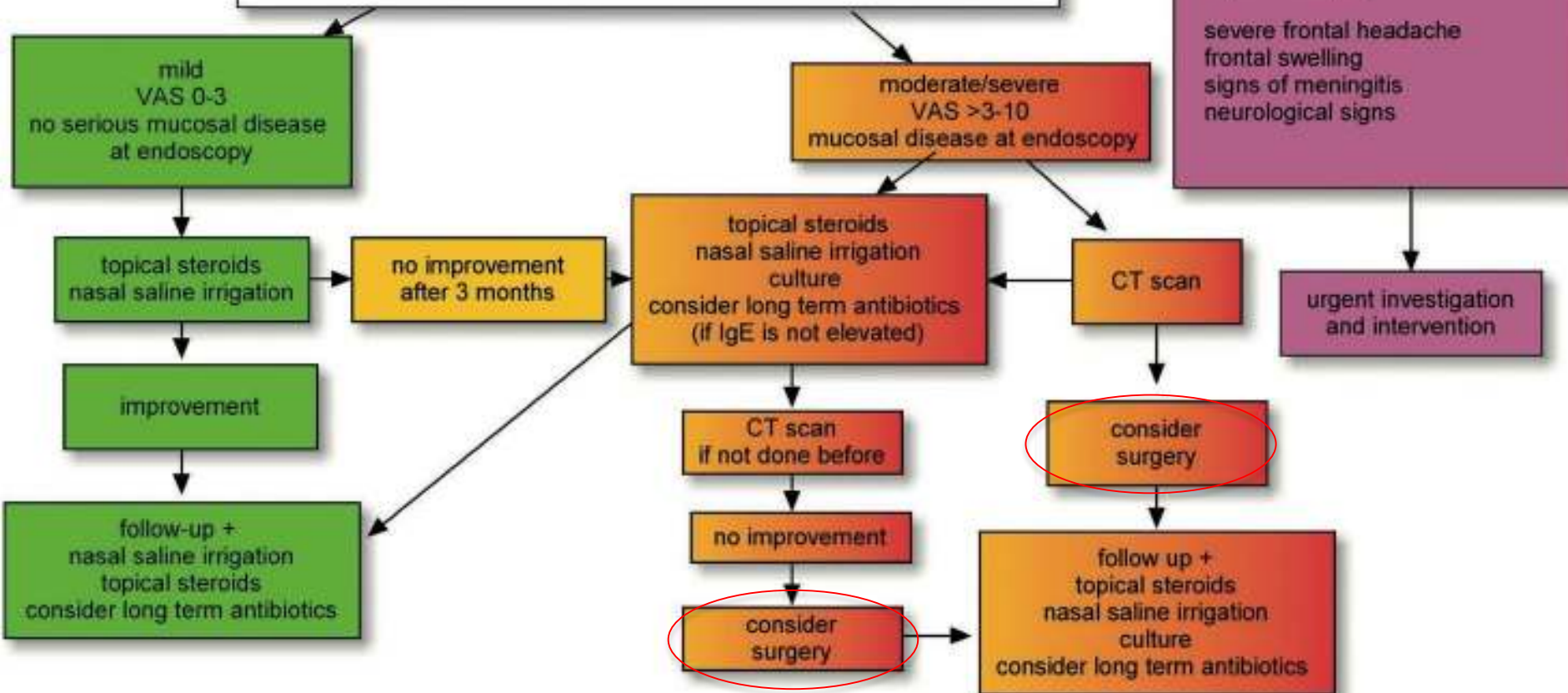
CRSsNP in adults management scheme for ENT-specialists

2 symptoms: one of which should be nasal obstruction
or discoloured discharge
+/- frontal pain, headache
+/- smell disturbance
ENT examination including endoscopy
consider CT scan
check for allergy
consider diagnosis and treatment of co-morbidities eg. asthma

consider other diagnosis
unilateral symptoms
bleeding
crusting
cacosmia

orbital symptoms:
peri-orbital oedema/erythema
displaced globe
double or reduced vision
ophthalmoplegia

severe frontal headache
frontal swelling
signs of meningitis
neurological signs



CRSwNP management scheme for ENT-specialists

2 symptoms: one of which should be nasal obstruction
or discoloured discharge
+/- frontal pain, headache
+/- smell disturbance
ENT examination including endoscopy (size of polyps)
consider CT scan
consider diagnosis and treatment of co-morbidities

consider other diagnosis
unilateral symptoms
bleeding
crusting
cacosmia

orbital symptoms:
peri-orbital oedema/erythema
displaced globe
double or reduced vision
ophthalmoplegia

severe frontal headache
frontal swelling
signs of meningitis
neurological signs

urgent investigation
and intervention

mild
VAS 0-3
no serious mucosal disease
at endoscopy

topical steroid spray

review after 3 months

improvement

continue with
topical steroids

review every 6 months

moderate
VAS >3-7
mucosal disease
at endoscopy

topical steroid spray
consider increase dose
consider drops
consider doxycycline

review after 3 months

no improvement

severe
VAS >7-10
mucosal disease
at endoscopy

topical steroids
oral steroids
(short course)

review after 1 month

improvement

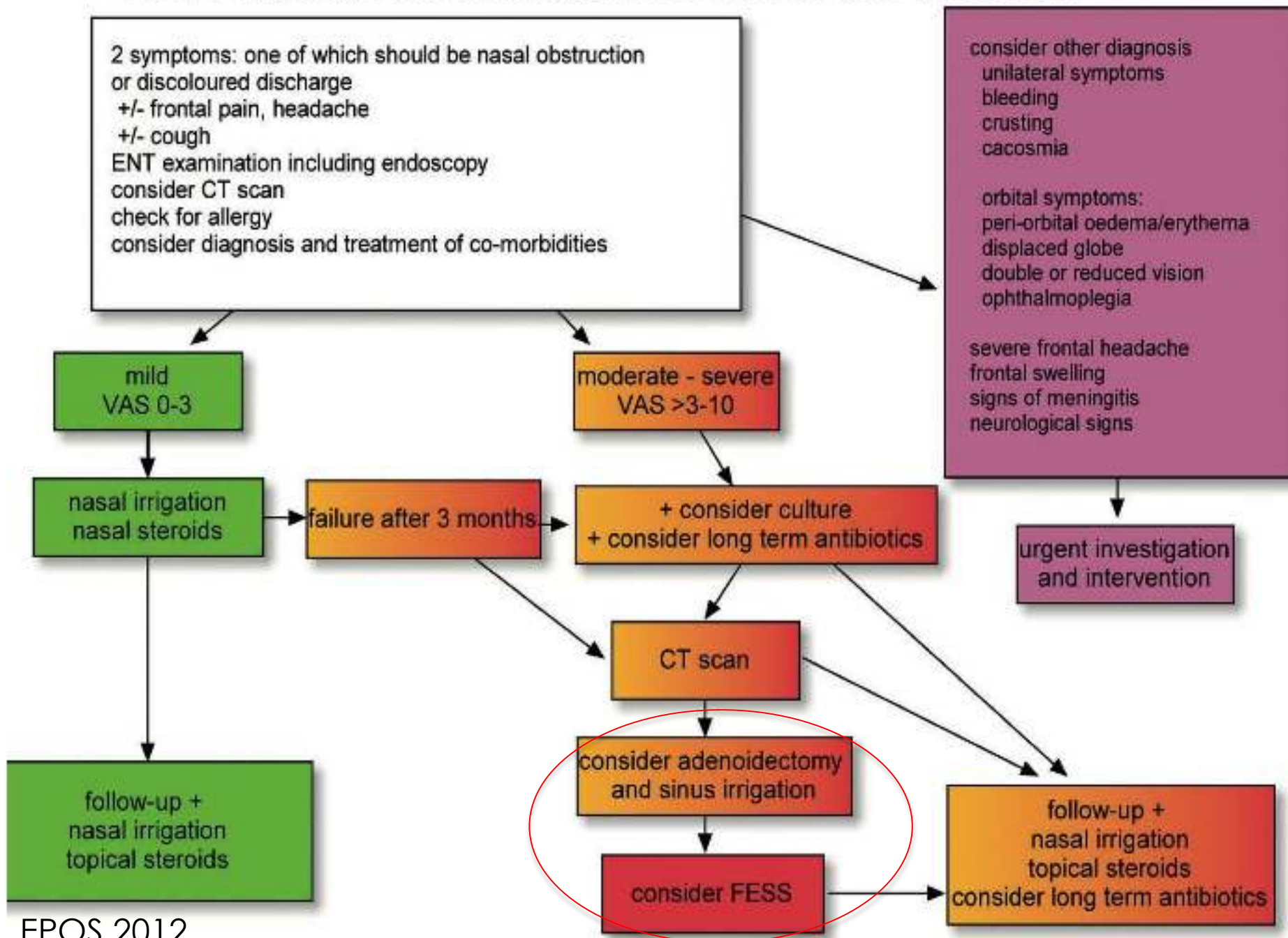
no improvement

CT scan

surgery

follow up
+ nasal irrigation
+ topical ± oral steroids
± long term antibiotics

CRSsNP in young children management scheme for (ENT-) specialists



NON-SURGICAL TREATMENT

- Chronic or recurrent sinusitis without polyps
 - Nasal steroids – long-term treatment
 - Nasal saline irrigation – long-term treatment
 - Antibiotics with acute intermittent sinus infections up to six weeks
 - CT scan sinuses
 - Otolaryngologist evaluation
 - Surgery

NON-SURGICAL TREATMENT

- Chronic rhinosinusitis with polyps
 - Otolaryngologist evaluation
 - Nasal steroids – long-term treatment
 - Nasal saline irrigation – long-term treatment
 - Antibiotics with acute intermittent sinus infections up to six weeks
 - Allergy testing
 - Surgery

NON-SURGICAL TREATMENT

- Allergic Fungal Sinusitis (AFRS)
 - Nasal steroids – long-term treatment
 - Nasal saline irrigation – long-term treatment
 - Amphotericin B, mucopricin, steroid or gentamycin irrigations
 - Most common organism – *Aspergillus fumigates*
 - Antibiotics with acute intermittent sinus infections up to six weeks
 - CT scan sinuses
 - Otolaryngologist evaluation and management
 - Surgery

SURGICAL TREATMENT

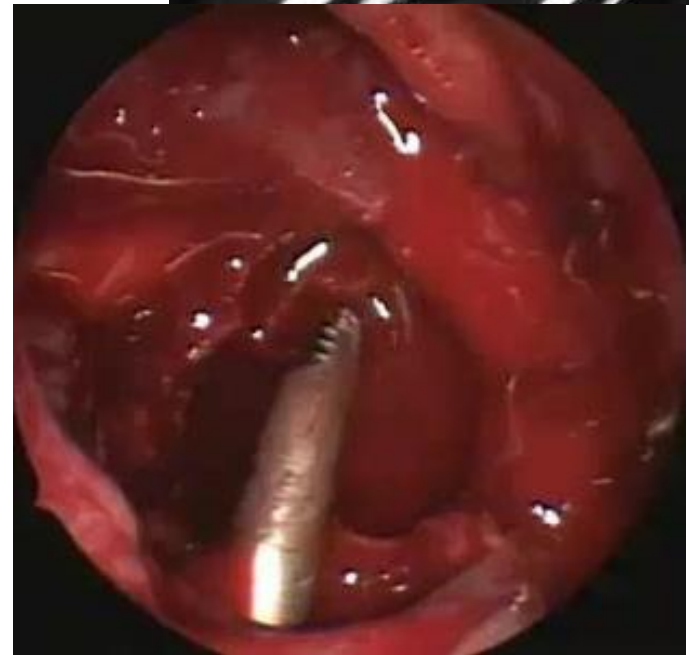
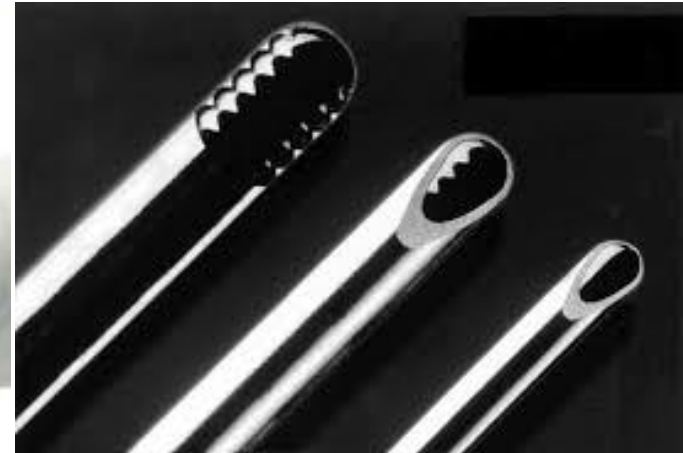
- Open sinus procedures
 - Caldwell Luc
 - Trephination
 - Frontal sinus osteoplastic flap
- Nasal Surgeries
 - Septoplasty
 - Inferior turbinate reduction/turbinoplasty



Functional endoscopic sinus surgery (FESS)



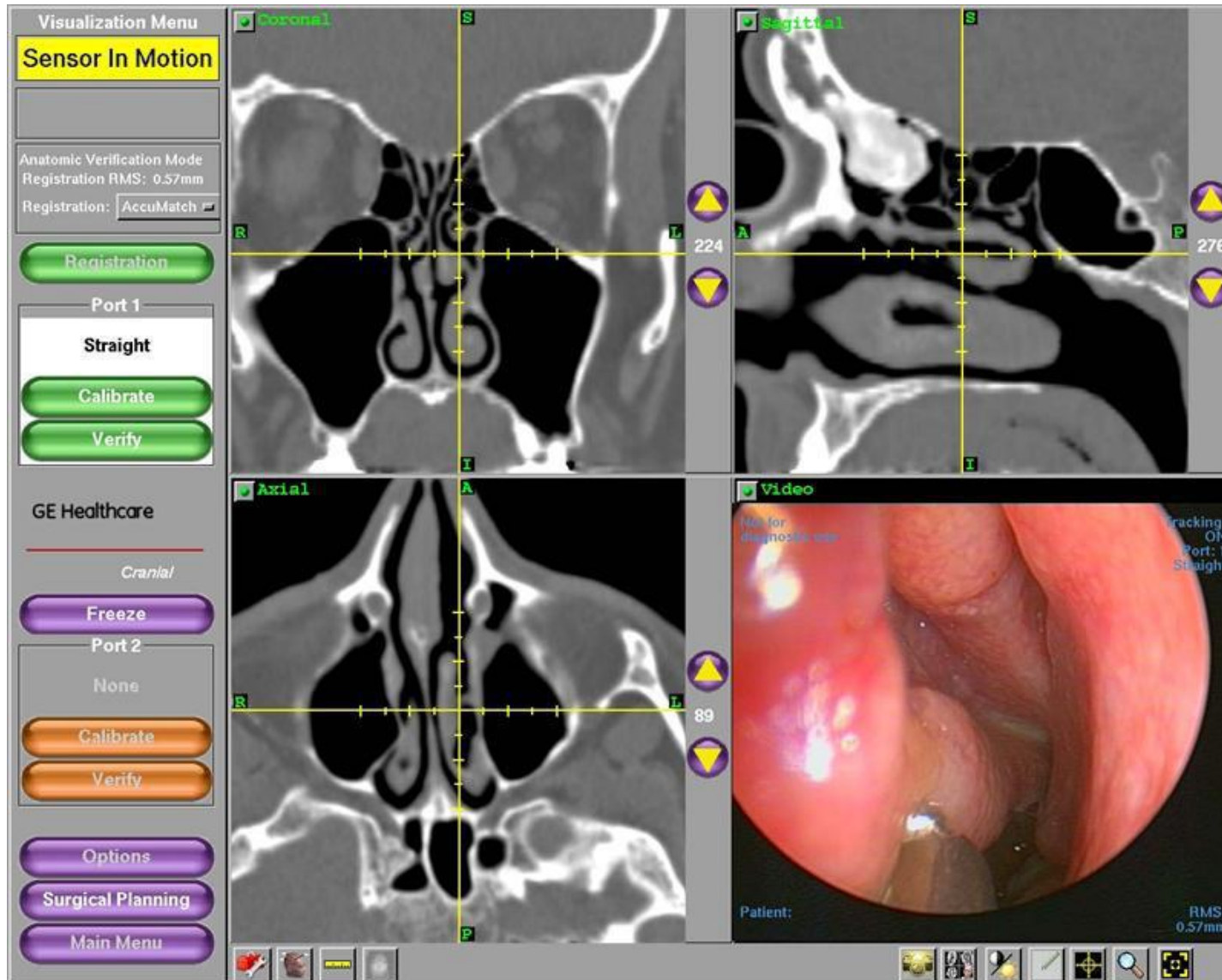
MICRODEBRIDER



Navigation-Assisted FESS



Navigation-Assisted FESS



A photograph of a surgical instrument tray and various medical devices on a blue drape. The tray contains numerous surgical instruments, including forceps, scissors, and a large syringe. A green container holds a blue bulb. A large, clear, cylindrical device with a black handle and a pressure gauge is also visible.



Steps in using the **Balloon Sinuplasty™** technology

The technology is used by qualified Ear, Nose, and Throat physicians.

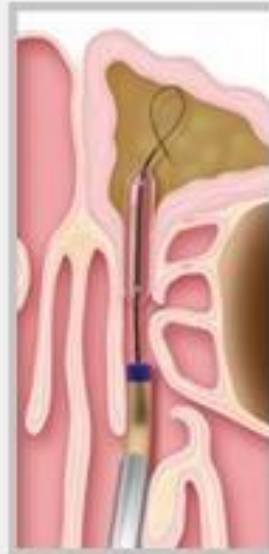
1



Gain Access to the Sinus.

To gain initial sinus access, our sinus guide catheter is introduced into the nasal cavity to target the sinus ostia under endoscopic visualization. Our sinus guidewire or our sinus illumination system is introduced through the sinus guide catheter and gently advanced into the target sinus.

2



Inflate Balloon Across Ostium.

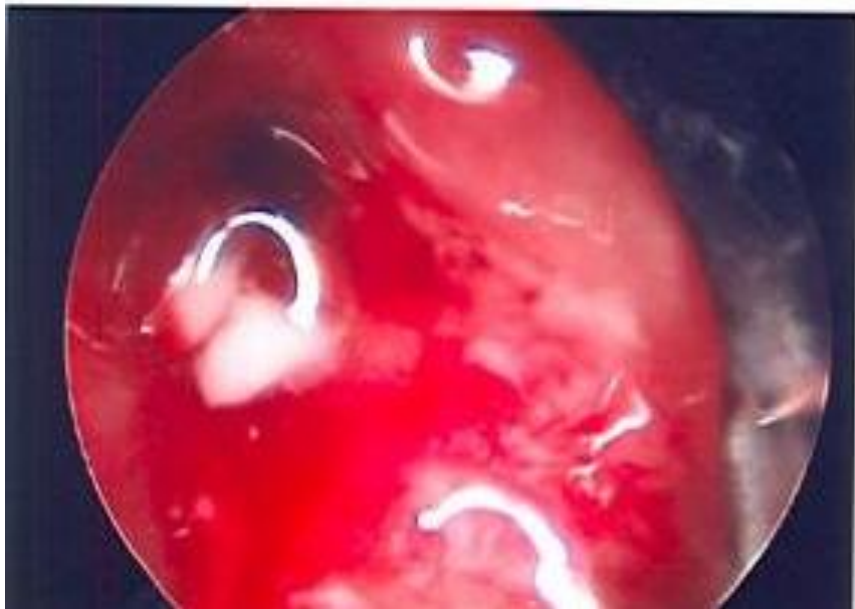
The sinus balloon catheter is introduced over the sinus guidewire or sinus illumination system and positioned across the blocked ostium. The position of the sinus balloon catheter is confirmed and the balloon is gradually inflated to open and remodel the narrowed or blocked ostium.

3



Deflate and Remove Balloon.

The sinus balloon catheter is then deflated and removed, leaving the ostium open allowing the return of sinus drainage. There is little to no disruption to mucosal lining.



Complications of FESS

- Rates vary based on experience
 - 29% rate for neophytes; 2% for experienced surgeons
- Minor complications:
 - Disruption of lamina papyracea
 - Periorbital hematoma, emphysema
 - Synechiae
 - Scarring of natural ostia

Complications of FESS

- Major Complications:
 - Hemorrhage
 - Ethmoid arteries
 - Sphenopalatine artery
 - Carotid artery
 - Intraorbital injury
 - Muscles, optic nerve, visual impairment
 - Skull base and Intracranial injury

Summary

- Rhinosinusitis is a wide spectrum of inflammatory nasal and paranasal disorders including a number of chronic entities
- For all types, medical therapy is first-line treatment
- Surgery reserved for refractory or complicated cases
- FESS has revolutionized surgical management of ARS/CRS
- Surgical complications can be severe and debilitating

Questions and comments