



CHRONIC RHINOSINUSITIS: SURGICAL PARADIGM AND TREATMENT

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OTOLARYNGOLOGY HEAD AND NECK SURGERY

ROYAL BRISBANE AND WOMEN'S HOSPITAL

OVERVIEW

- **CHRONIC RHINITIS**
 - NON-ALLERGIC
- **CHRONIC RHINOSINUSITIS (CRS)**
 - **DEFINITIONS**
 - ACUTE SINUSITIS
 - COMPLICATIONS OF SINUSITIS
 - **PATHOPHYSIOLOGY CRS**
 - **CLASSIFICATION**
 - PRIMARY
 - SECONDARY
 - **SPECIAL TYPES**
 - N-ERD
 - FUNGAL

CHRONIC RHINITIS

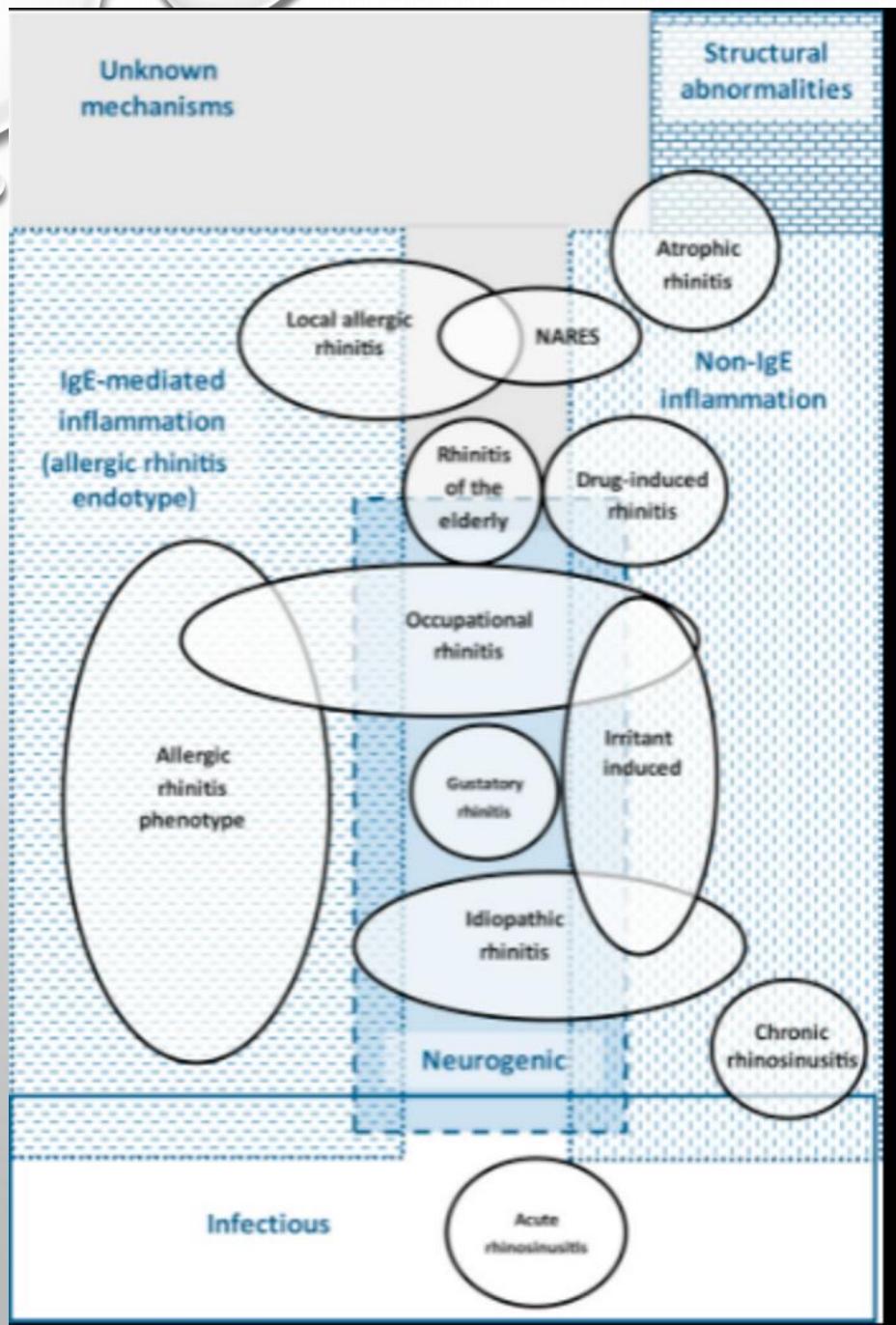
- RHINITIS = INFLAMMATION NASAL MUCOSA
 - ALLERGIC
 - SEASONAL
 - PERENNIAL
 - OCCUPATIONAL
 - INFECTIOUS
 - ACUTE (VIRAL)
 - CHRONIC (BACTERIAL/FUNGAL)
 - NON-ALLERGIC (NON-INFECTIOUS)

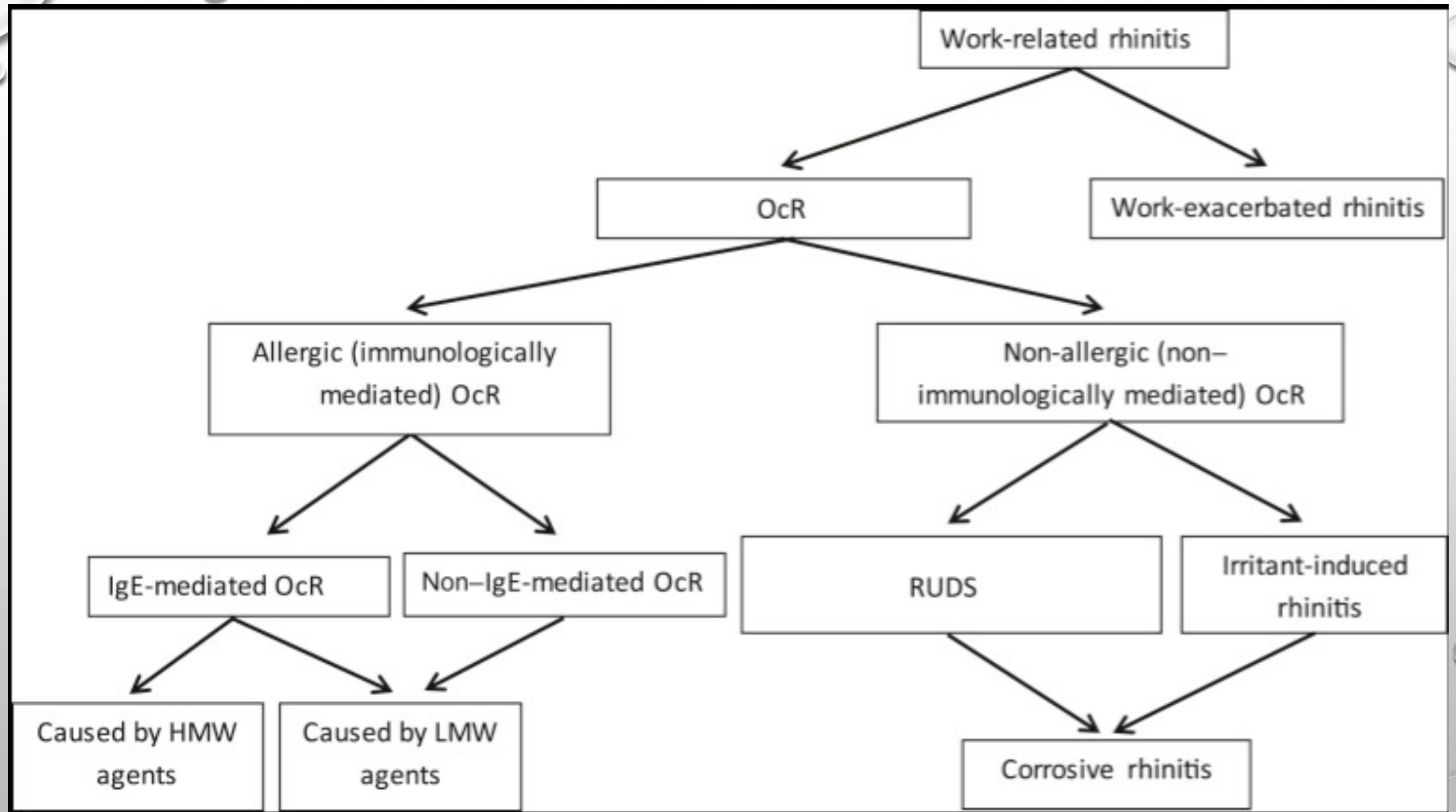
NON-ALLERGIC RHINITIS

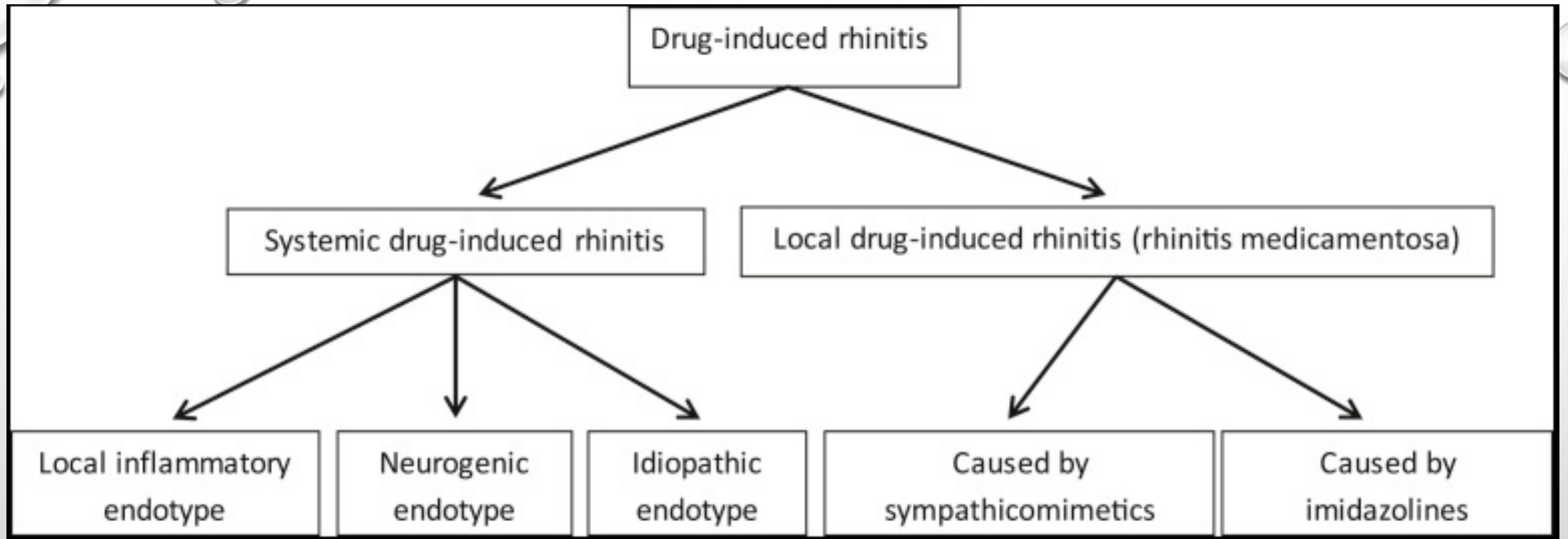
- CHRONIC HIGHLY PREVALENT CONDITION
- PRESENTS WITH NASAL CONGESTION, OBSTRUCTION, RHINORRHOEA IN THE SETTING OF A NEGATIVE ALLERGEN TEST
- EPIDEMIOLOGY
 - 200 MILLION PEOPLE WORLDWIDE
 - 1/3 OF PATIENTS PRESENTING WITH RHINITIS - NAR
 - CF ALLERGIC - PATIENTS OLDER AND MORE LIKELY TO BE WOMEN
 - 30-60S, F:M 2-3:1

CLASSIFICATION BY ENDOTYPE

- INFLAMMATORY (TYPICALLY EOSINOPHILIC INFLAMMATION)
 - NON ALLERGIC RHINITIS WITH EOSINOPHILIA SYNDROME (NARES)
 - LOCAL ALLERGIC RHINITIS (LAR)
 - SOME DRUG INDUCED FORMS
- NEUROGENIC
 - IDIOPATHIC RHINITIS
 - GUSTATORY RHINITIS
 - RHINITIS OF THE ELDERLY







Aspirin, NSAIDs

PDE-5 inhibitors
Methyldopa

B-blockers
Ca-channel blockers
ACE inhibitors
HRT
OCP
Psychotropics

Amphetamine
Caffeine
Ephedrine
Phenylephrine
Pseudoephedrine

Oxymetazoline
Xylometazoline
Clonidine

OTHER TYPES NON-ALLERGIC RHINITIS

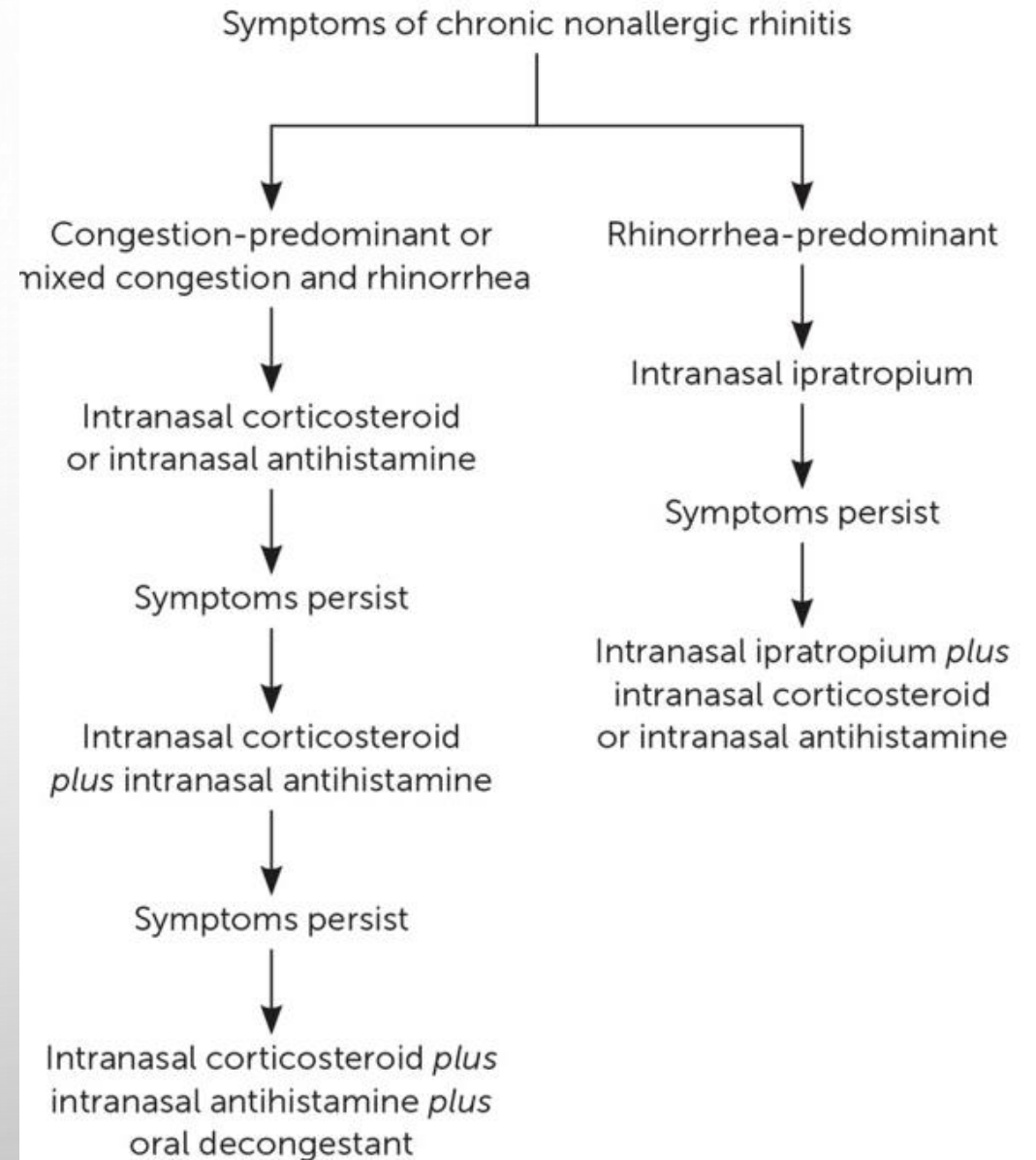
- HORMONAL
 - HYPOTHYROIDISM
 - PREGNANCY
 - MENSTRUAL CYCLE
 - OCP
 - GROWTH HORMONE
- IRRITANT
 - GUSTATORY
 - OCCUPATIONAL
 - ENVIRONMENTAL
- VASOMOTOR/IDIOPATHIC
 - DIAGNOSIS OF EXCLUSION - NEUROGENIC IMBALANCE (HYPER-REFLEXIVE RHINOPATHY)

ATROPHIC RHINITIS

- REPLACEMENT CILIATED COLUMNAR EPITHELIUM WITH STRATIFIED SQUAMOUS
- SYMPTOMS – CONGESTION, CRUSTING, PAIN/PRESSURE, HALITOSIS, CACOSMIA
- PRIMARY
 - AGING
 - HEREDITARY
 - INFECTION (KLEBSIELLA, PROTEUS, PSEUDOMONAS)
 - NUTRITIONAL
- SECONDARY
 - SURGERY
 - RADIATION
 - COCAINE
 - MEDICATION
 - SYSTEMIC DISEASE (GPA, SARCOID, SLE, SJOGREN'S, TB)

TREATMENT

- TRIGGER AVOIDANCE/ENVIRONMENT MODIFICATION
- **TOPICAL**
 - SALINE
 - CORTICOSTEROID – FLUTICASONE
 - ANTIHISTAMINE – AZELASTINE, OLOPATADINE
 - ANTICHOLINERGIC – IPRATROPIUM
 - CAPSAICIN (SINOL, RINAR)
 - PREGNANCY – BUDESONIDE, LORATADINE (CAT B)
- **SURGICAL**
 - TURBINOPLASTY
 - POSTERIOR NASAL NEURECTOMY – BOTOX, RADIOFREQUENCY ABLATION, CRYOTHERAPY
 - VIDIAN NEURECTOMY
- **SYSTEMIC**
 - ORAL DECONGESTANT
 - ORAL STEROID (TO ASSIST WEANING IN RHINITIS MEDICAMENTOSA)



The background features a light gray gradient with several realistic water droplets of various sizes scattered in the corners. The droplets have highlights and shadows, giving them a three-dimensional appearance.

CHRONIC RHINOSINUSITIS

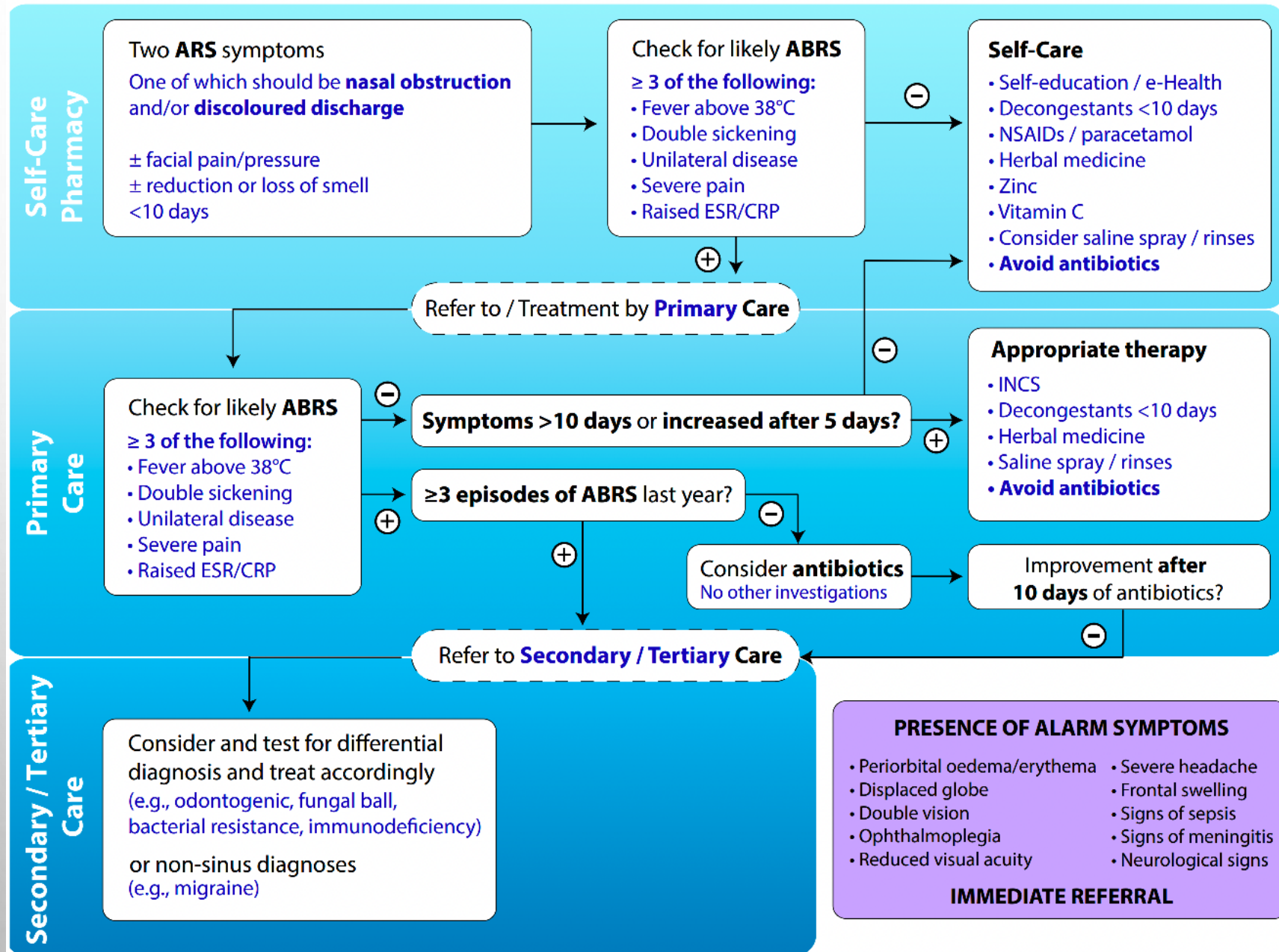
CHRONIC RHINOSINUSITIS (CRS)

- INFLAMMATION OF THE NOSE AND PARANASAL SINUS CHARACTERISED BY ≥ 2 SYMPTOMS
- 1 OF WHICH MUST BE
 - **NASAL BLOCKAGE/OBSTRUCTION/CONGESTION OR NASAL DISCHARGE**
- +/- **FACIAL PAIN/PRESSURE**
- +/- **REDUCTION OR LOSS OF SMELL (IN CHILDREN THIS SYMPTOM IS REPLACED BY COUGH)**
 - AND EITHER
 - ENDOSCOPIC SIGNS
 - NASAL POLYPS AND/OR
 - MUCOPURULENT DISCHARGE (PRIMARILY FROM MIDDLE MEATUS) AND/OR
 - OEDEMA/MUCOSAL OBSTRUCTION
 - CT CHANGES
 - MUCOSAL CHANGES WITHIN THE OSTEOMEATAL COMPLEX AND OR SINUSES

DEFINITIONS

- ACUTE RHINOSINUSITIS (ARS) < 12 WEEKS
 - RECURRENT ARS – 4 EPISODES/YEAR
- CRS > 12 WEEKS
 - ACUTE EXACERBATION CRS = WORSENING SX INTENSITY WITH RETURN TO BASELINE CRS (OFTEN AFTER ANTIBIOTICS AND/OR CORTICOSTEROIDS)

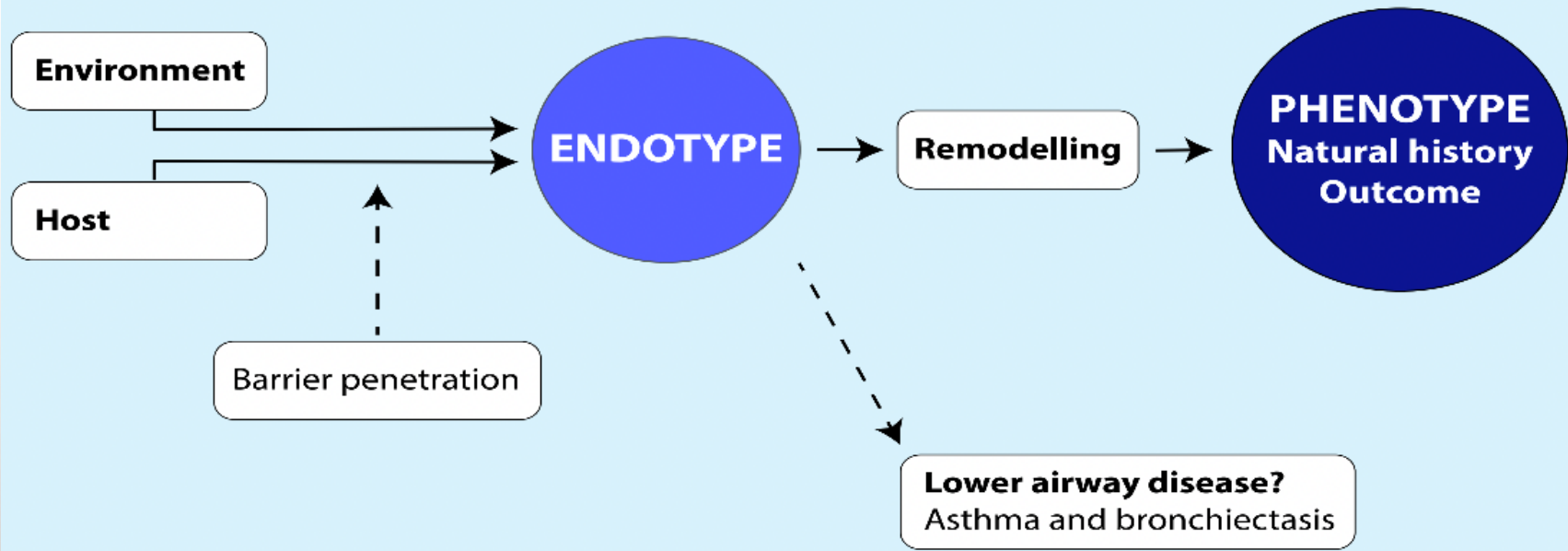
EPOS 2020: Care pathways for acute rhinosinusitis (ARS)



COMPLICATIONS OF SINUSITIS

- LOCAL
 - MUCOCELE
 - SILENT SINUS SYNDROME
- ORBITAL (70%, CHILDREN)
 - PRE-SEPTAL CELLULITIS, ORBITAL CELLULITIS, SUBPERIOSTEAL ABSCESS, ORBITAL ABSCESS, CAVERNOUS SINUS THROMBOSIS
 - ORBITAL APEX SYNDROME, ORBITAL FISSURE SYNDROME
- INTRACRANIAL (20%, ADOLESCENTS)
 - MENINGITIS
 - ABSCESS – EXTRADURAL, SUBDURAL, INTRACEREBRAL
 - CAVERNOUS SINUS THROMBOSIS
- OSSEOUS (10%)
 - OSTEOMYELITIS (INCL POTT'S PUFFY TUMOUR)

Etiology and Pathogenesis of CRS



- **WITH OR WITHOUT NASAL POLYPS**

•Type 1 inflammation

- Th1 polarization
- Neutrophil infiltration
- interferon gamma (IFN γ) production
- Most common East Asian

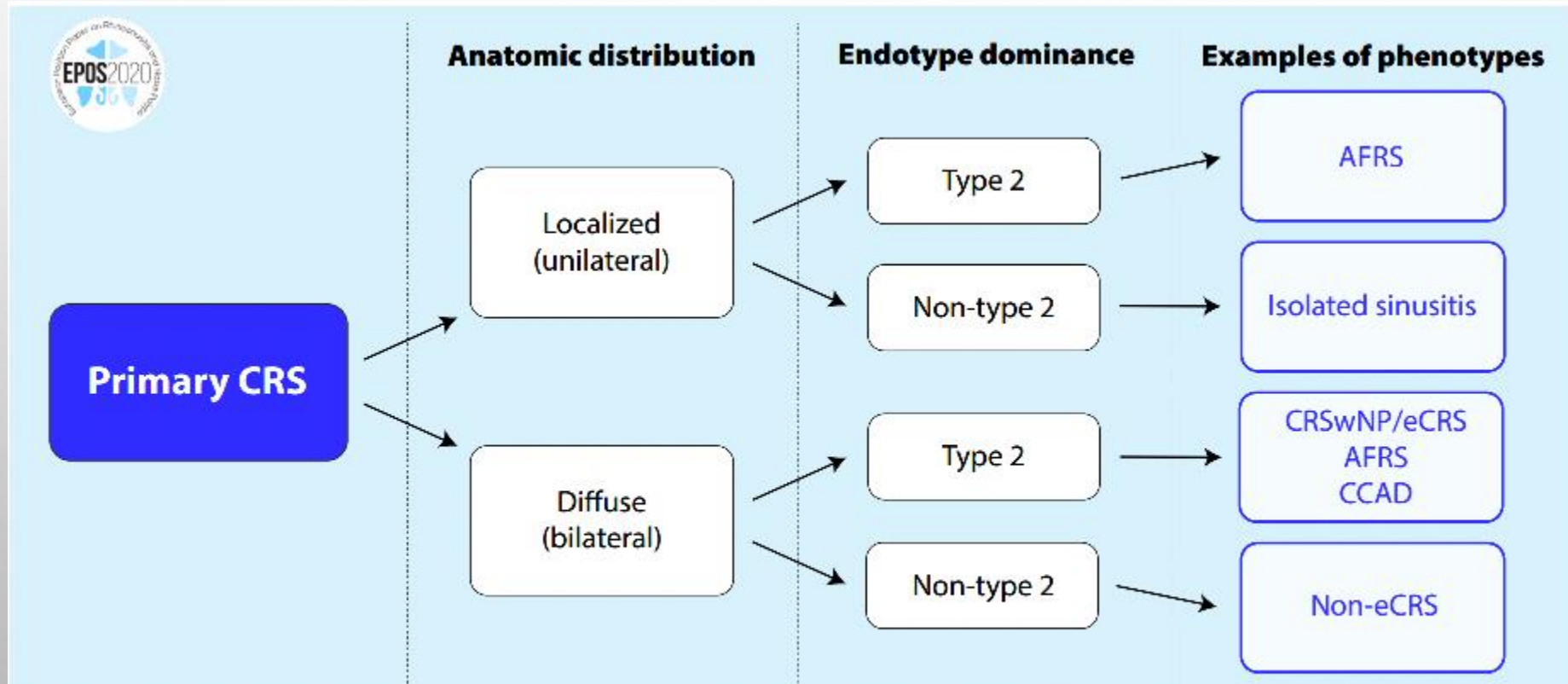
•Type 2 inflammation (80-85%)

- Th2 polarization
- Eosinophils, mast cells
- Interleukin 4, 5, 13
- Most common in Western/Europeans

•Type 3

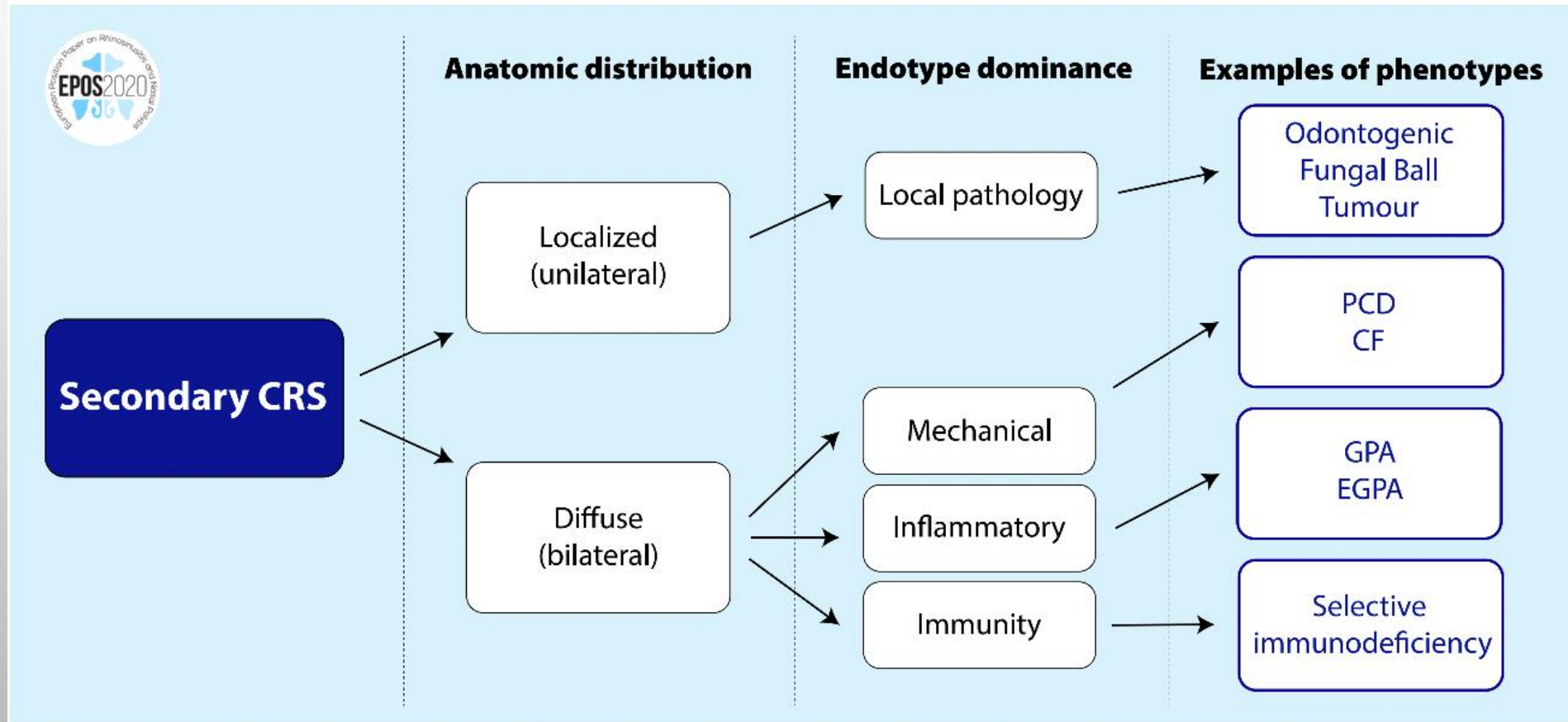
- Th17 and Th22 cells
- Increased release of IL-17
 - Mixed inflammatory cell pattern - neutrophils, mast cells

PRIMARY CRS

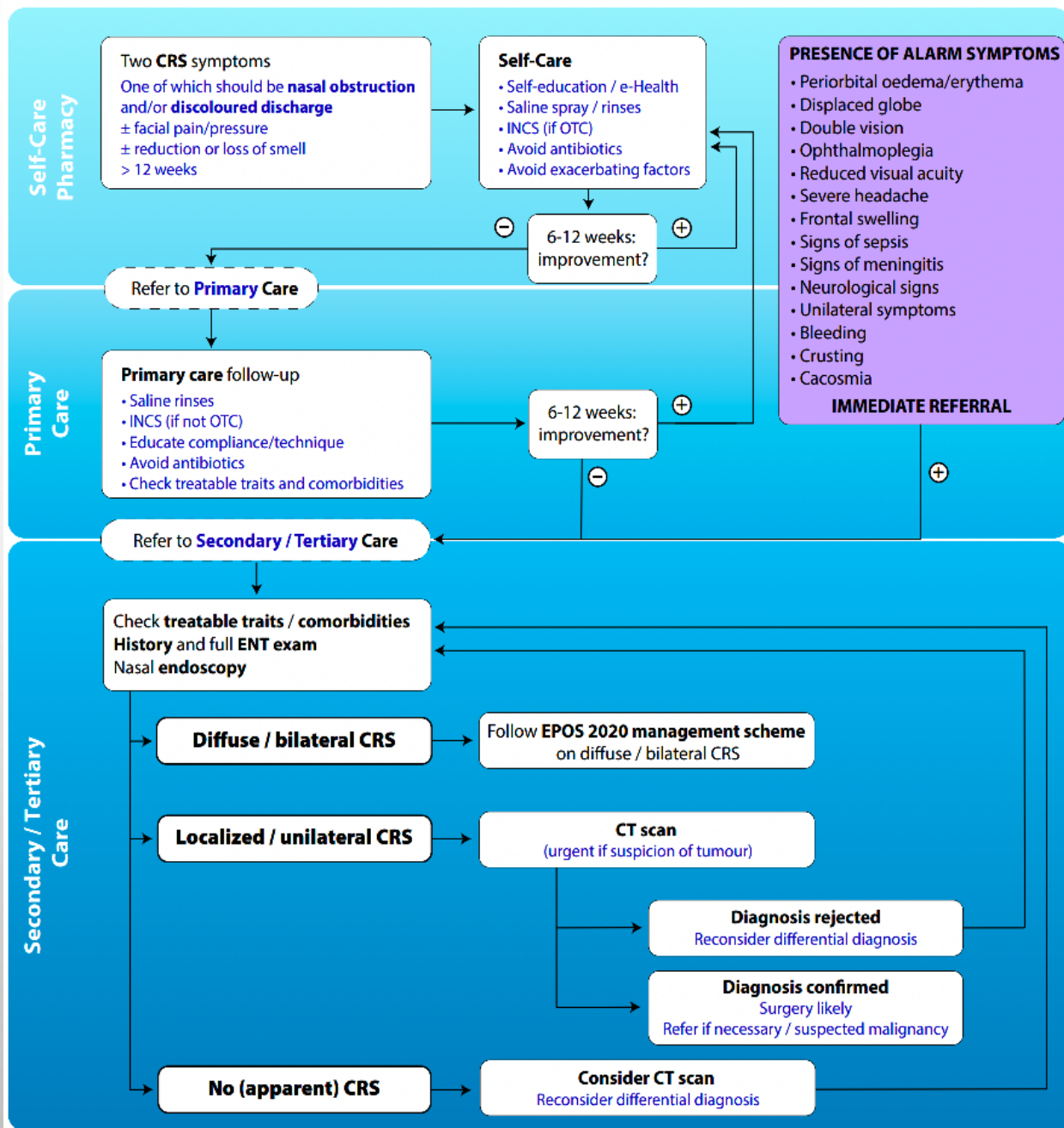


AFRS, allergic fungal rhinosinusitis; CCAD, central compartment allergic disease; CRSwNP, chronic rhinosinusitis with nasal polyps; eCRS, eosinophilic CRS.

SECONDARY CRS



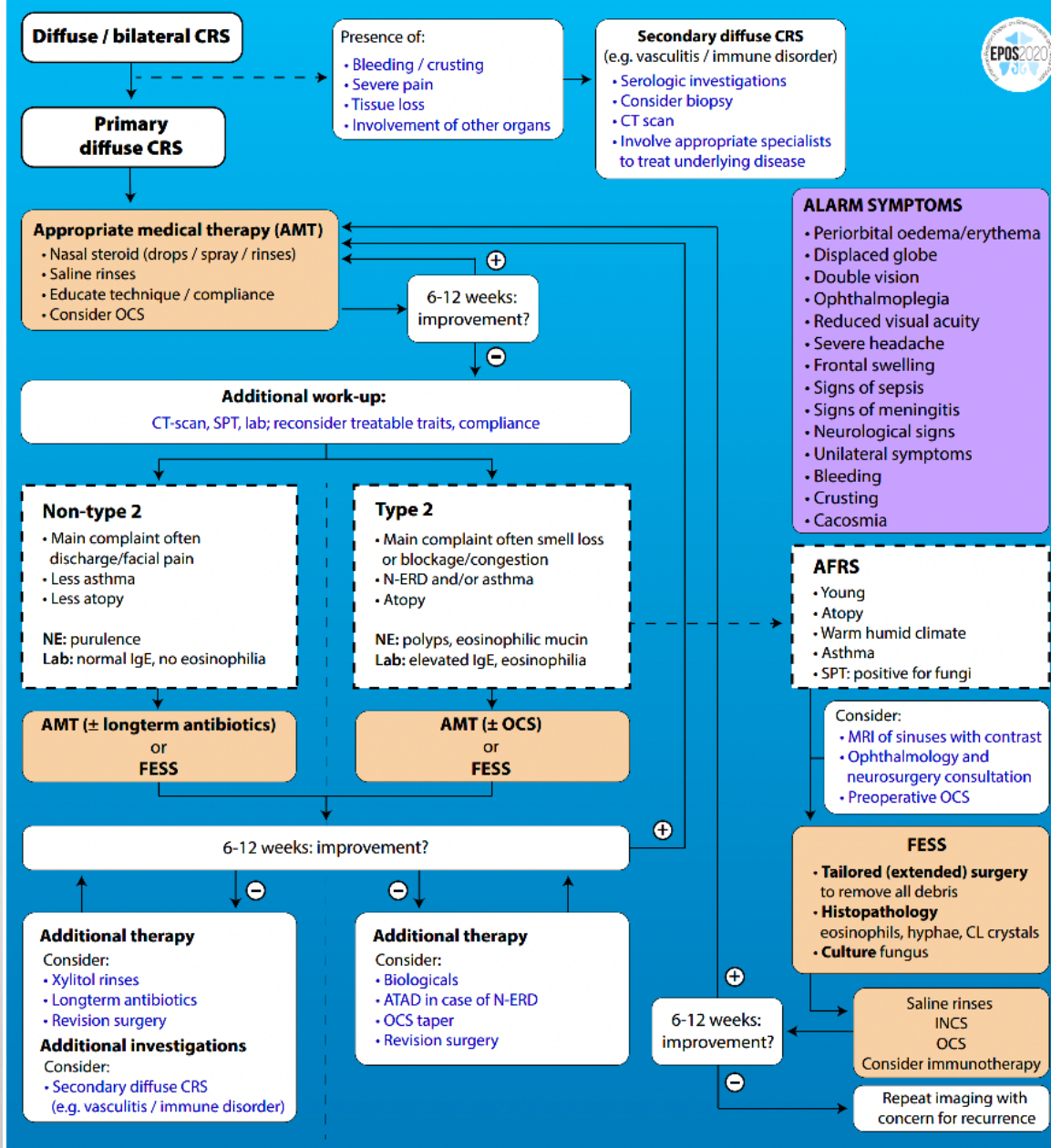
CF, cystic fibrosis; EGPA, eosinophilic granulomatosis with polyangiitis (Churg-Strauss disease); GPA, granulomatosis with polyangiitis (Wegener's disease); PCD, primary ciliary dyskinesia.



PRESENCE OF ALARM SYMPTOMS

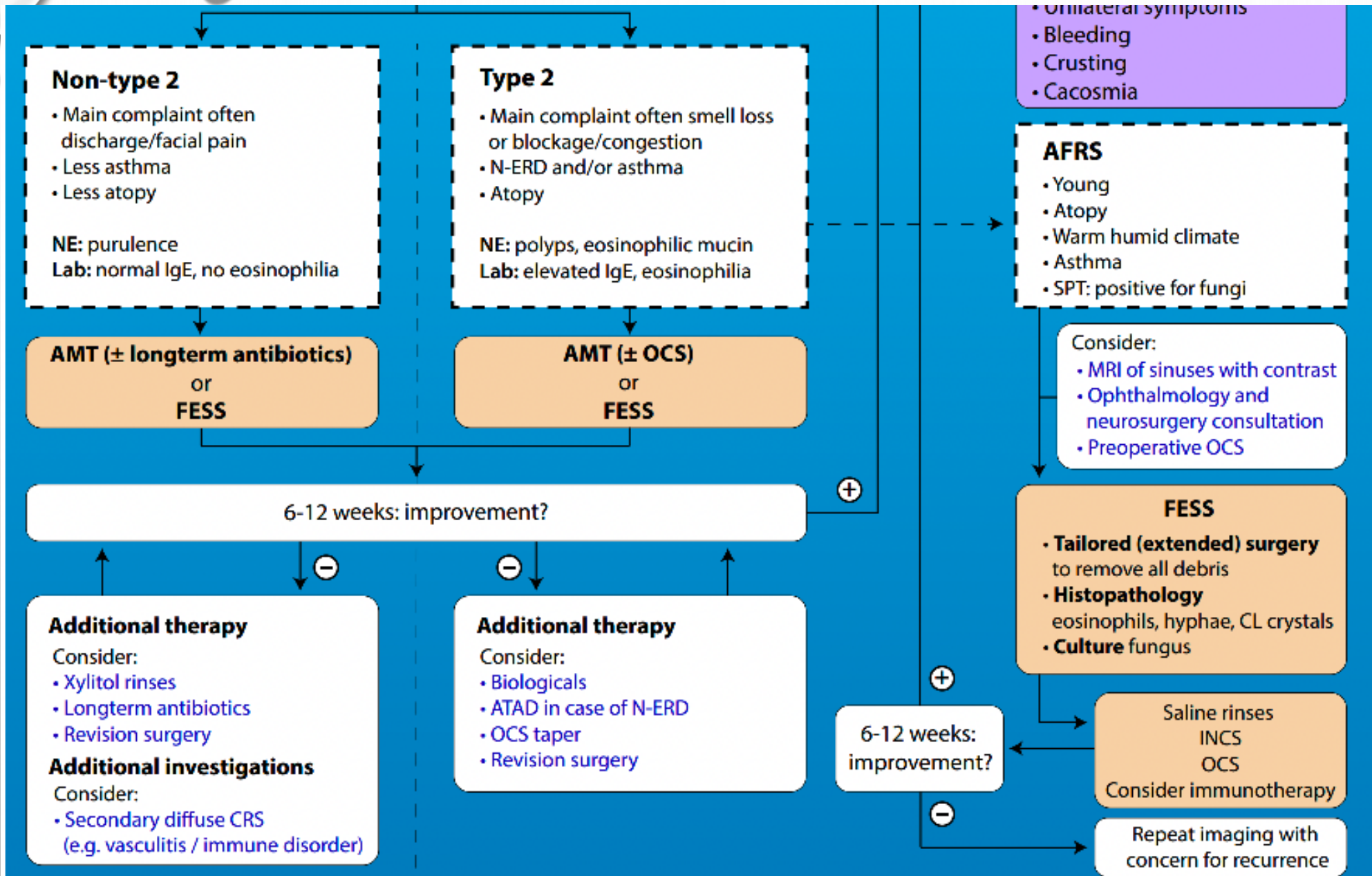
- Periorbital oedema/erythema
- Displaced globe
- Double vision
- Ophthalmoplegia
- Reduced visual acuity
- Severe headache
- Frontal swelling
- Signs of sepsis
- Signs of meningitis
- Neurological signs
- Unilateral symptoms
- Bleeding
- Crusting
- Cacosmia

IMMEDIATE REFERRAL



For explanation of (primary and secondary) diffuse CRS see 1.2.3.

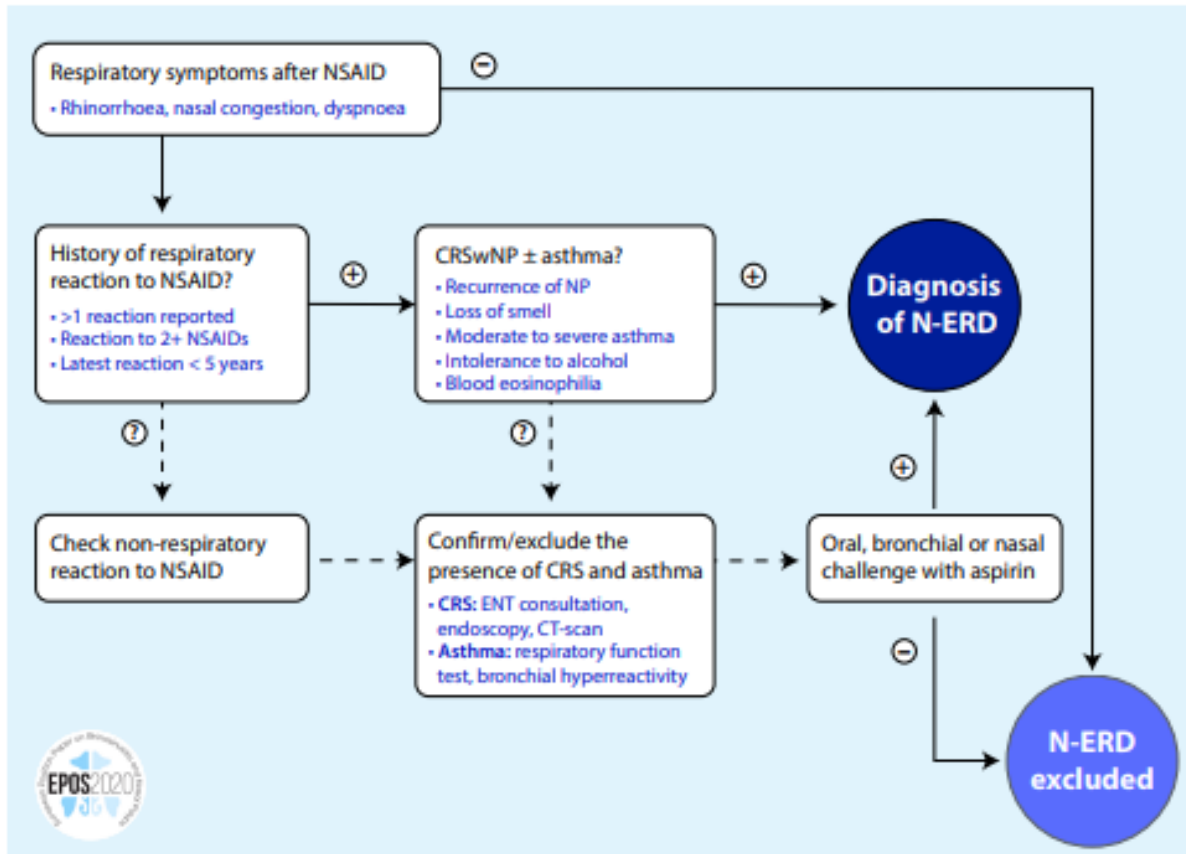
AMT, appropriate medical therapy; ATAD, Aspirin treatment after desensitisation; CRS, chronic rhinosinusitis; CT, computed tomography; FESS, functional endoscopic sinus surgery; INCS, intranasal corticosteroid spray; MRI, magnetic resonance imaging; NE, nasal endoscopy; N-ERD, NSAID-exacerbated respiratory disease; OCS, Oral corticosteroids; SPT, Skin prick test.



SPECIAL GROUPS

- N-ERD
- FUNGAL SINUSITIS

N-ERD – NSAID EXACERBATED RESPIRATORY DISEASE



FUNGAL SINUSITIS



Fungi and the human immune response

Allergic fungal rhinosinusitis

Fungal ball

Invasive fungal rhinosinusitis

**IMMUNE
HYPERSENSITIVITY**

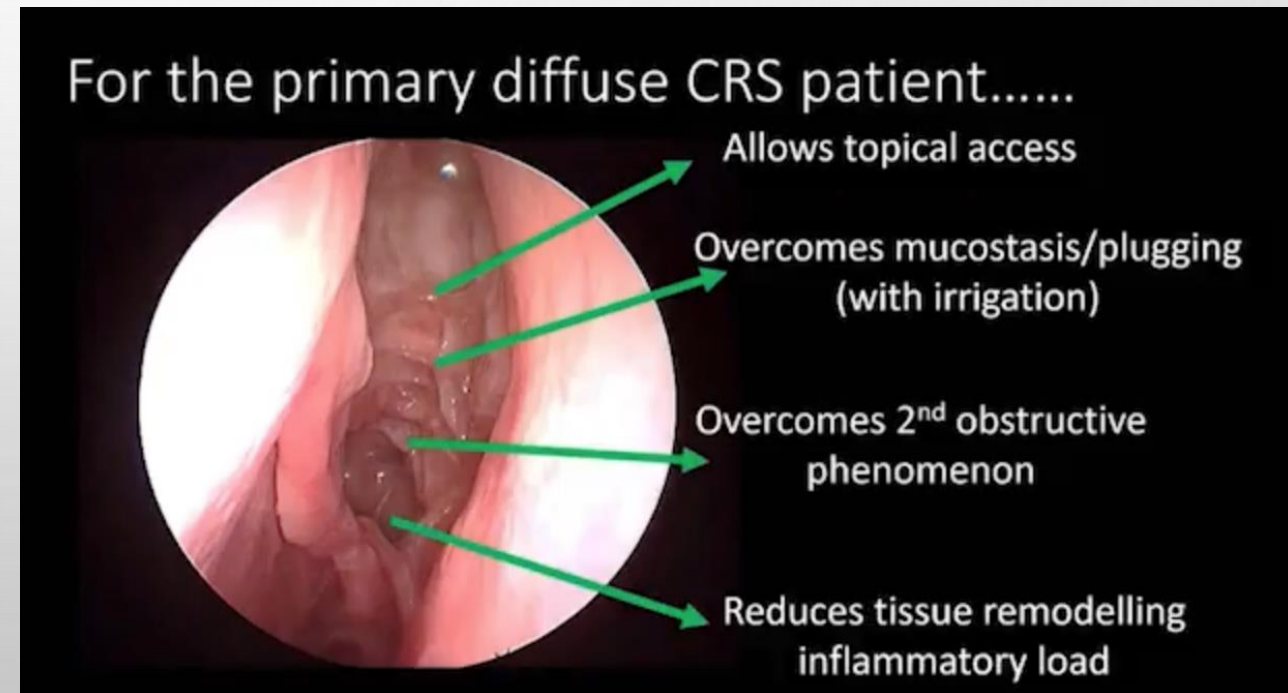
IMMUNOCOMPETENT

**IMMUNE
SUPPRESSION**

FESS – FUNCTIONAL ENDOSCOPIC SINUS SURGERY

GOALS OF SURGERY = RESTITUTION OF PHYSIOLOGY

- CREATE FUNCTIONAL SINUS CAVITY
- INCORPORATE NATURAL OSTIA
- ALLOW ADEQUATE SINUS VENTILATION
- FACILITATE MUCOCILIARY CLEARANCE
- FACILITATE TOPICAL THERAPIES



Chronic Rhinosinusitis Histopathology report

Tissue		
	Tissue present	<input type="checkbox"/> Respiratory mucosa <input type="checkbox"/> mucoserous glands <input type="checkbox"/> bone
	Overall degree of inflammation	<input type="checkbox"/> Absent <input type="checkbox"/> Mild <input type="checkbox"/> Moderate <input type="checkbox"/> Severe
	Eosinophil Count	<input type="checkbox"/> <10 per HPF <input type="checkbox"/> 10-100 per HPF <input type="checkbox"/> >100 per HPF
	Neutrophil Infiltrate	<input type="checkbox"/> Absent <input type="checkbox"/> Focal <input type="checkbox"/> <20 per HPF <input type="checkbox"/> >=20 per HPF
	Inflammatory predominance	<input type="checkbox"/> Lymphocytic <input type="checkbox"/> Lymphoplasmocytic <input type="checkbox"/> Eosinophilic <input type="checkbox"/> lymphohistiocytic <input type="checkbox"/> Neutrophilic <input type="checkbox"/> Other_____
	Basement Membrane thickening	<input type="checkbox"/> <7.5µm (normal) <input type="checkbox"/> 7.5 - 15µm <input type="checkbox"/> >15 µm
	Sub-epithelial oedema	<input type="checkbox"/> Absent <input type="checkbox"/> Mild (focal or perivascular only) <input type="checkbox"/> Moderate (distortion of mucosal structure) <input type="checkbox"/> Severe (diffuse/polypoid change)
	Hyperplastic/papillary change	<input type="checkbox"/> Absent <input type="checkbox"/> Present
	Mucosal ulceration	<input type="checkbox"/> Absent <input type="checkbox"/> Present (with reactive changes)
	Squamous metaplasia	<input type="checkbox"/> Absent <input type="checkbox"/> Present
	Fibrosis	<input type="checkbox"/> Absent <input type="checkbox"/> Partial <input type="checkbox"/> Extensive
Mucin		
	Fungal elements	<input type="checkbox"/> Not assessable <input type="checkbox"/> Absent <input type="checkbox"/> Present
	Charcot-Leyden Crystals	<input type="checkbox"/> Not assessable <input type="checkbox"/> Absent <input type="checkbox"/> Present
	Eosinophil aggregates	<input type="checkbox"/> Not assessable <input type="checkbox"/> Absent <input type="checkbox"/> Present

WHEN FESS FAILS?

- RECONSIDER THE DIAGNOSIS – SECONDARY CAUSES (CILIARY DYSFUNCTION, IMMUNODEFICIENCY, SYSTEMIC DISEASE)
- IN PRIMARY EOSINOPHILIC CRS – CONSIDER SYSTEMIC IMMUNOTHERAPY

Monoclonal antibodies

	Omalizumab	Mepolizumab	Benralizumab	Dupilumab	Reslizumab
Trade name	Xolair	Nucala	Fasenra	Dupixent	Cinqair
Target	IgE	IL-5	IL-5	IL-4/IL-13	IL-5
Cost Private - PBS	\$391 - \$41	\$1638 - \$41	\$3358 - \$41	\$1754 - \$41	not available
Dosing	Subcutaneous every 2 weeks	Subcutaneous every 4 weeks	Subcutaneous every 4 weeks for 3 months, then every 8 weeks	Subcutaneous every 2 weeks	

If systemic steroid use is over 500 mg/year, consider Biologicals