

Fungal Sinusitis

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History

- **1971 McCarthy and Pepys.**
- **1981 Millar et al.**
- **1983 Katzenstein (allergic aspergillus sinusitis)**
- **1989 Robson AFS**
- **1996 Pediatric AFS**
- **1998 AFS without fungus**

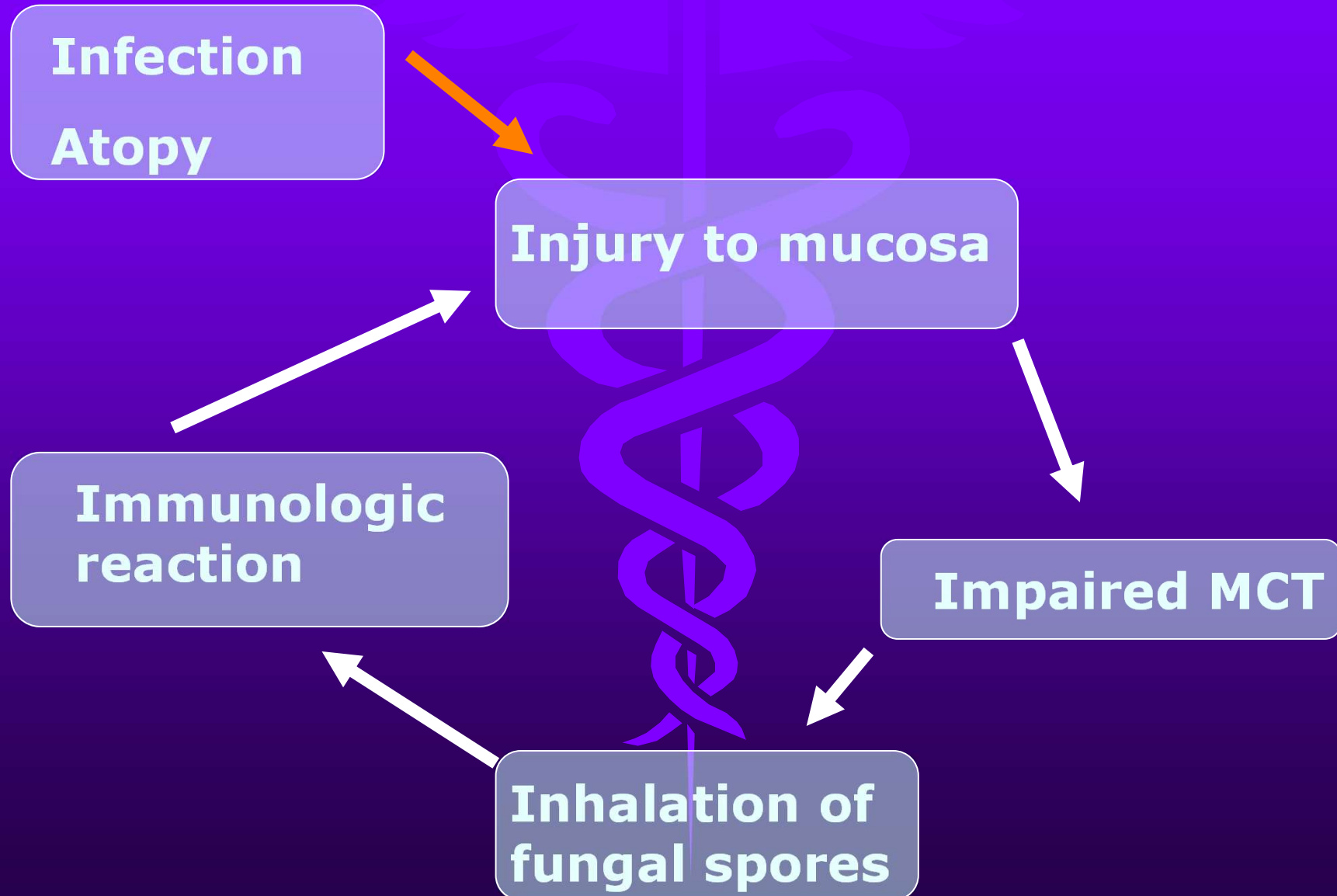
Classification

- **Fungal ball (Mycetoma, no allergic mucin)**
- **Non invasive (AFS and Saprophytic)**
- **Invasive (chronic and acute - immunocompromised patient)**

AFS, Geographic Distribution

- Memphis Tennessee 23% of CS**
- Southern States 10%**
- Northern States 0-4%**

How do you get AFS?



Katzenstein et al

- 7 otherwise healthy patients with allergic mucin (cottage cheese, peanut butter, green, brown or yellow)
 - Laminated mucin
 - Eosinophils
 - Charcot-Leyden crystals
 - Fungal hyphae

Diagnostic Criteria AFS

(deShazo 95)

- Sinusitis CT
- Allergic mucin
- Fungal elements in secretions or tissue
- Absence of invasive fungal disease
- Absence of immuno-compromising disease

Data on 99 cases of AFS

(deSchazo 95, Alabama, USA)

Age range	Sex	Atopy	Chronic sin.	Polyps	Bony erosion CT	Fungus culture pos	RAST pos	Elevated IgE	Pos skin prick	
7-58	52% M	76%	75%	80%	36%	76%	89%	74%	73%	

AFS, 67 consecutive cases (Schubert 98, USA southwest)

- **Atopy 100%**
- **Nasal polyposis 100%**
- **Young age (33 ± 13 years)**
- **Hypertrophic rhinosinusitis 100%**
- **Cast production 75%**
- **Elevated S-IgE (668 IU/ml)**
- **Growth of Bipolaris 67%**

European experience (Vennewald Germany 1998)

- 132 samples from 117 patients were taken if granulomatous material was found during surgery
- Fungus was found in 25% of patients
- *Aspergillus fumigatus* and Sporanax in the majority of cases (80%)
- No invasive cases

Swedish experience

Ydreborg et al 2001

- 23 patients nasal polyposis
- Culture from mucus 6 weeks
- Positive culture 48% of pat.
(Aspergillus 81%, Candida 19%)
- PAS staining negative for Hyphae
- All had benign polyposis on histology

When to suspect AFS

Symptoms

- **Chronic sinusitis**
- **Refractory to traditional treatment**
- **History of atopy**
- **Polyps**

When to suspect AFS Signs

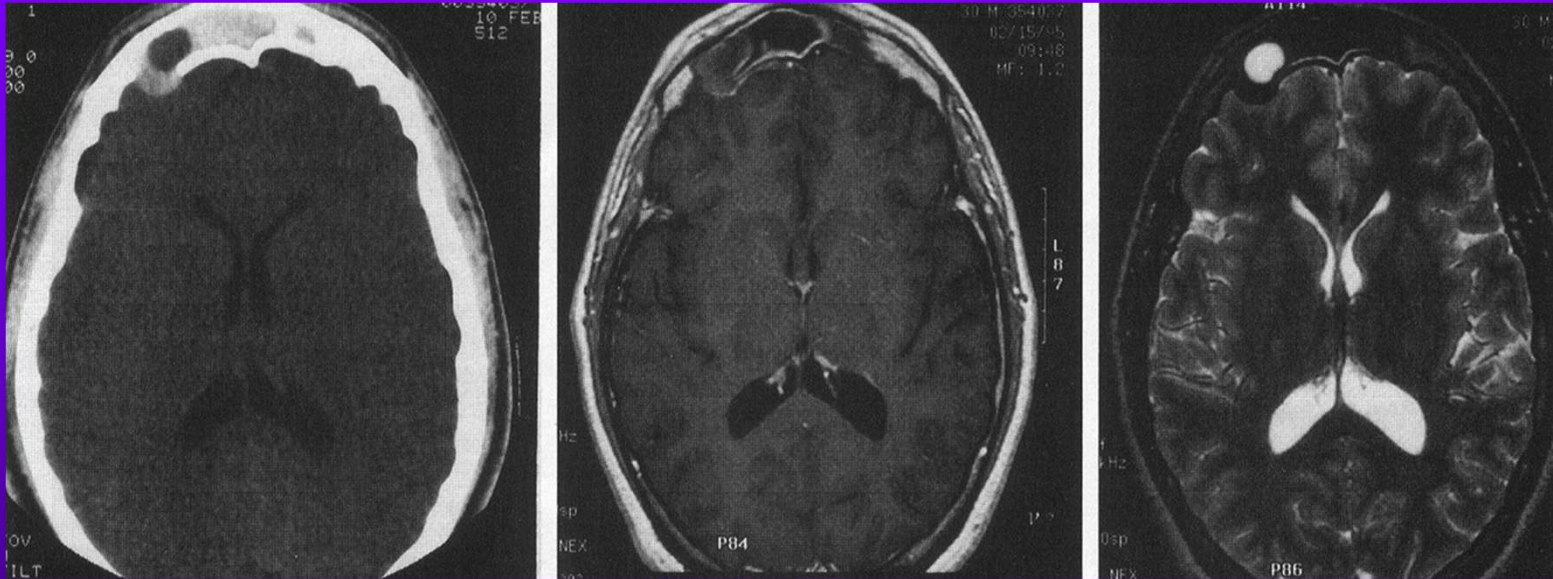
- Polyps
- Tenacious secretions
- Cheesy material
- Fungus balls



How to diagnose Culture

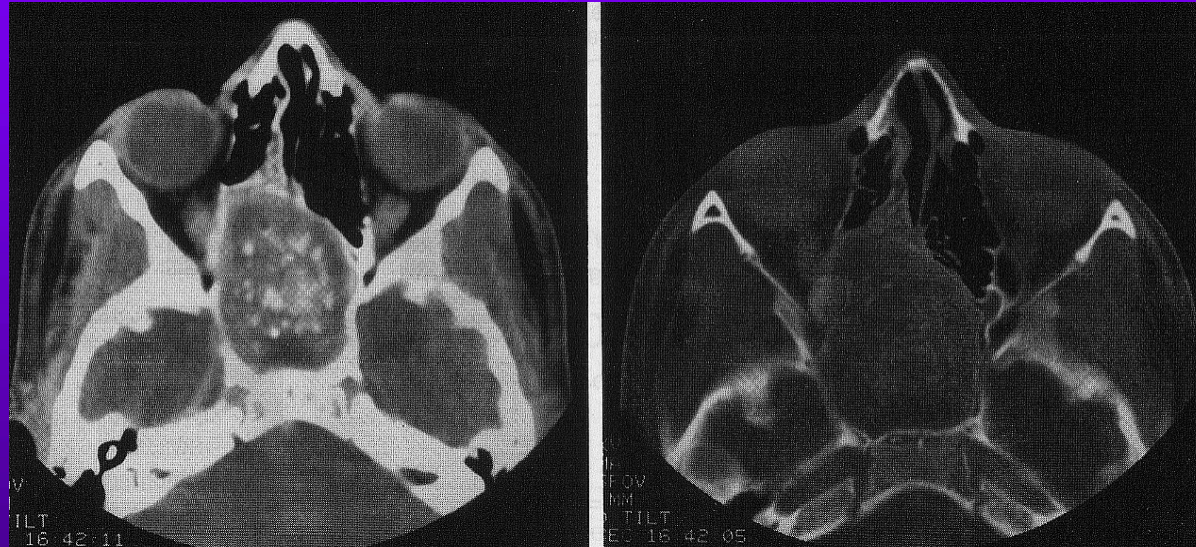
- Culture from mucus
- Sampling technique
- Culture technique (mucolytic treatment, medium, time)

How to diagnose Radiology



- CT shows high or variable attenuation
- MRI T1, Mucosal lining high signal
- MRI T2 Fungal infection; void

How to diagnose Radiology

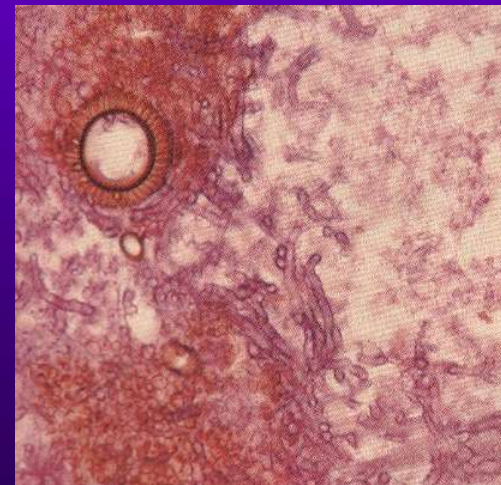
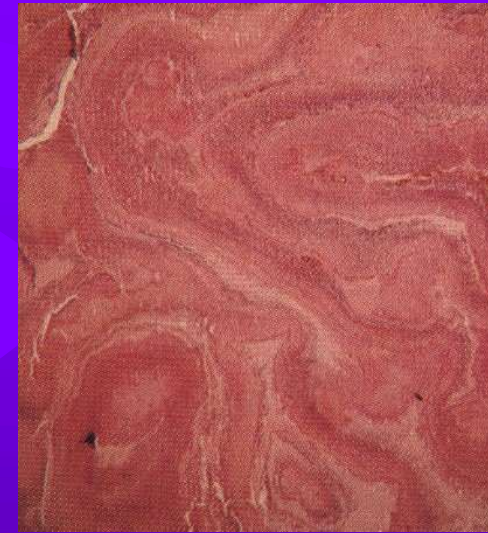


- CT shows calcification



How to diagnose Histology

- Onion skin layering of fungal masses (HE)
- Aspergillus Fumigatus, fruit head, spores and hyphae (PAS)
- Silver staining



Observe; Histology on mucus

How to diagnose Immunology

- **Skin Prick test**
- **Serum IgE**
- **RAST (specific IgE)**
- **ISH (Aspergillus and Penicillium rRNA)**
- **Specific IgE in mucus?**

Diagnostic criteria (summary)

- **CS (with Nasal polyposis)**
- **Histological evidence of eosinophilic mucus**
- **Positive fungal stain and / or positive culture**
- **Type I hypersensitivity (skin or RAST)**
- **Typical Radiological findings**

Treatment

- **Surgery**
- **Topical steroids**
- **Systemic steroids**
- **Anti-fungal therapy** (amfotericin B or itraconazole)
- **Immunotherapy**
- **Anti-Histamines**
- **Anti-Leukotriens**
- **Anti-IgE?**

Systemic steroids

- **Start with 1 mg/kg/day of prednisone**
- **Taper down to 5 - 10 mg per day**
- **Forever !?**

Immunotherapy (Folkers 1998)

- **22 patients with AFS, surgery and steroids and antibiotics.**
- **11 patients specific immunotherapy for 33 months**
- **Significant improvement in Sinus specific QoL, endoscopic scoring and less use of steroids**
- **Symptom improvement maintained after cessation of IT (2000)**

Pediatric AFS

- Does not differ from adults,
- Avoid long-term systemic steroids

Sammanfattning

- Allergisk, infektiös eller båda?
- Incidens i Sverige?
- Diagnoskriterier?
- Hur skall AFS behandlas?
- Hur misstänksamma skall vi vara i refraktära fall av sinuit?

Allergic Mucin Sinusitis without Fungus

- Eosinophilic Mucin Rhinosinusitis
- Ferguson, Laryngoscope 1998

To sum up

- **Allergic, Infectious or both?**
- **Incidents in Sweden?**
- **High Suspicion in Refractory cases**
- **How to diagnose**
- **Which treatment? Skin prick test available?**