بسم الله الرحمن الرحيم

Significance of Mast Cells In Patients With Chronic Nasal Symptoms

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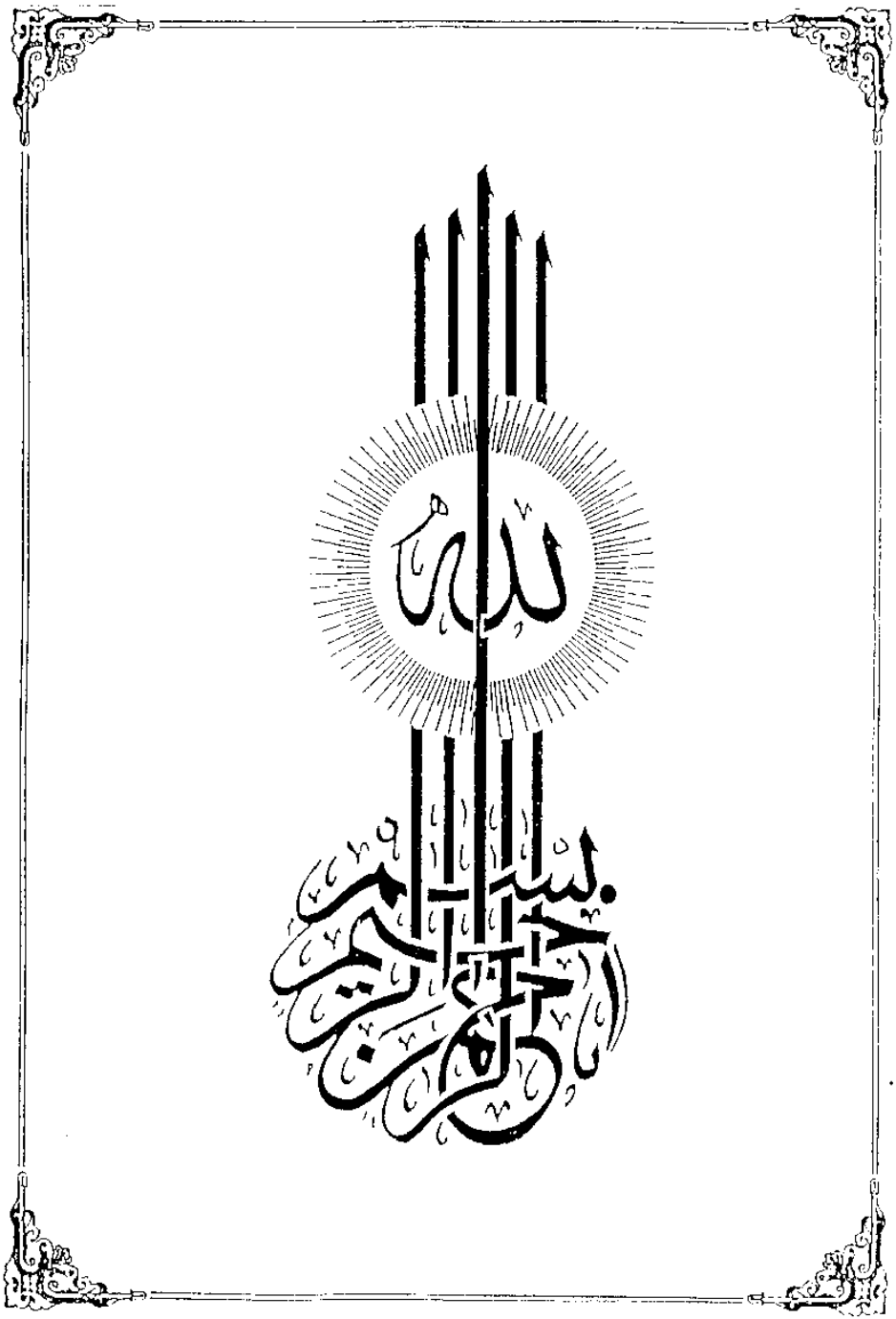
By
Khaled Mohamed El-sagheer Salem
M.B.B.ch
Ain Shams University
1990

Under the supervision of :

Prof. Dr. Mostafa Mohamed Mostafa
Prof. of otolaryngology
Faculty of medicine
Ain Shams University

Dr. Mahmoud Nageib El-Tarabishy
Ass. Prof. of otolaryngology
Ain Shams University

Faculty of medicine
Ain Shams University
1995



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Introduction & Aim of the Study

Introduction & Aim Of The Study

A series of diagnostic modalities can help to classify nasal disorders. These include history, physical examination, rhinoscopy, rhinomanometry, provocation challenges, biochemical determination immunological studies in-vivo and in-vitro testing for specific IgE imaging blood flow, ciliary function analysis and examination of nasal cytology **(Meltzer EO. 1988).**

The nasal mucosa consists of ciliated columnar cells, non ciliated columnar cells, goblet cells and basal cells. The submucosa consists of various glands, blood vessels and numerous cells as plasma cells, mast cells, leucocytes, eosinophiles and macrophages which play an important role in immunological mechanism of the nose. **(Iang DM,et. al, 1988)**

Evaluating nasal cytology can assist in distinguishing between inflammatroy from non-inflammatory rhinopathies, allergic from non allergic and infectious rhinitis ,following the course of the disease and the response to treatment **(Meltzer EO. 1988 & Meltzer EO, et. al 1988).**

There are three populations of basophilic metachromatic cells in the nose basophil leucocytes and two histochemically distinct populations of mast cells **(Okuda M, et. al, 1977).** The Greater majority of these cells are located in the laimna propria but are only very rarely found in the ,epithelium or nasal secretions **(Lang, DM, et. al 1988)**. Through their mediators, they play an important role in the imunological mechanism of the nose **(American rev. respirat. Dis.J.1987).** They have been identified as being biologically active in allergic rhinitis. As the

number of these cells increase, the nasal symptoms increase and also the sensitivity of tests for confirming an allergic diagnosis increase to nearly 80% **(Otsuka H, et. al, 1985)**. The presence of eosliloplifis, and basophilic cells including mast cells in nasal secretions has been identified as being diagnostic for allergic rhinitis. **(Borres M.P. et. al 1990).**

THE AIM OF THIS STUDY is to review the role of mast cells in patient with chronic nasal symptoms and its significance in nasal secretions with special attention to significance of nasal mastocytosis in children with nasal symptoms.

Chapter I

Classifications of rhinopathies

The term rhinitis implies an inflammatory disease of the nasal mucous membrane. However, demonstration of local inflammation is not practical as the symptoms may occur without inflammation. Thus "rhinopathy", in strictly speaking is a more correct term **Connell, (1983).**

Mackay (1987), stated that as the lining of the nose and paranasal sinuses is continous, it would be rare for inflammation to affect one without the other, so rhinitis is inflammation of the lining of the nose and paranasal sinuses.

Mackay (1987) classified the aetiology of rhinitis as; allergic and non-allergic, allergic being divided into seasonal (hay fever) and non-seasonal (perennial), and the non-allergic rhinitis may be classified into infective and non-infective. Infective rhinitis may be acute or chronic. Chronic rhinitis may be specific or non-specific. Another group (non-allergic, non-infective rhinitis) is the most difficult to classify further and includes such conditions as, vasomotor rhinitis and factors which may cause or mimic rhinitis as anatomical obstruction, tumours and granulomatous conditions (table-1).

1. Allergic: a. Seasonal.

b. Perennial.

2. Non-allergic:

a. Infective: 1. Acute.

2. Chronic: * Specific.

* Non specific - Immune deficeancy.

-Clearence abnormality.

b. Non-infective.

1. Hyperactive (vasomotor rhinitis).

- Autonomic imbalance.
- Post-infective.
- Hormonal.
- Drug induced.
- Emotional.

2. Anatomical (and mechanical).

- Choanal atresia.
- Septal deviation & abnormalities.
- Hypertrophic turbinates.
- Polyp.
- Foreign bodies.
- Adenoids.

3. Tumours:

- Benign.
- Malignant → 1ry, 2nd
- Non healing granulomas.

Tab. I : Classification of rhinitis (Adapted from, **Mackay, 1987).**

*ALLERGIC RHINITIS.

Connel (1970), stated that allergic rhinitis is a symptom complex; consisting of paroxismal bouts of sneezing, nasal congestion, watery nasal discharge and lacrimation. It may be seasonal relating to a particular pollen present during a spesfic season or may be perennial usually due to substanses present over the year, such as dust, moulds or animal danders.

Hill (1961), proved that the symptoms onset usually occur prior of age of forty, but can occur as early as 6 months of age. The condition is quite common, a nation survey in **1973** in united states estimated that 25.6 millions suffer from allergic rhinitis, asthma or both **(allergy statistics,1974)** and it occurs primarily in the so called atopic individuals to disignate allergies of hereditary or familial origin **Coca and Cooke, (1923)**

Depending on the degree of sensitivity and exposure to pollen **Connell (1970)** concluded that the symptoms may vary considerably in intensity and duration being mild and of short duration in some, while in others severe and often accompanied by asthma and associated with irritability, fatigue, asthenia or depression. The nose commonly becomes sensitive to non specific irritants such as odors, pollutants and atmospheric changes.

Taylor (1973), stated that severe symptoms with sinus drainage and or dysfunction of eustachian tubes resulting in impairement of hearing and headache. An accurate and detailed history is essential for proper diagnosis, as symptoms which are confined to a particular month or reason such as spring, mid spring are generally related to pollen (trees, grasses or weeds).

However, the assumption that symptoms are due to a particular allergen, is simply because they are repeated each year during a particular period. For

example, in the eastern sea board, symptoms usually begin in august and this could be due to ragweed or to worm wood or moulds. In contrast, perennial symptoms which by definition occur the year around are usually related to allergen exposure at home (animal danders, molds, feathers or dust) or due to inhalation of some occupational factors such as trimellitic anhydride **Sale et. al, (1981)**. So, it is necessary to go into details with reference to timing of apearance of symptoms, location and other symptoms such as conditioning use or nature of working habits and medication use **Connell, (1970).**

* *NON-ALLERGIC RHINITIS.* (Table 2)

Mullarkey, et. al (1980), stated that the term non allergic rhinitis has been applied to a large group of patients who have rhinitis of a chronic nature of unknown eitiology, the symptoms are related to non allergic factors such as irritants, emotional factors and climatic changes all of which are poorly defined. Nasal secretions are generally watery. A careful history should clarify the diagnosis because in general apart from a clearly related factor, there is no history of either personal or familial allergy. The condition is usually characterized by obstruction of one nasal side or other particularly at night depending on which side the patient sleeps. on examination, the major finding is a pale, boggy looking nasal membrane. The nasal smear may show no or many eosinophils and skin tests are negative but IgE levels are usually normal **Knight, et. al, (1979)**, or may occasionally be elevated **Jacobs, et. al, (1981)**.

**INFICTIVE RHINITS.*

Mackay, et. al (1987), proved that acute rhinitis or common cold is usually due to viral agents and that antibiotics play no useful role, however, nasal congestion may occasionally result in blockage of sinus ostia and secondary infection by bacteria resulting in acute bacterial sinusitis and increase oedema of

the sinus mucosa leads to further obstruction leading to a negative pressure and low oxygen concentration which is combined with a poor blood supply; this explains high frequency of anaerobic organism infection.

* *CHRONIC RHINITIS.*

Mackay, et. al (1987), found that chronic rhinitis are due to infection with a specific organism such as syphilis, tuberculosis, chronic diphtheritic rhinitis, rhinoscleroma, leprosy, yaws or chronic glanders (Loefferella Mallei), these conditions are called specific chronic rhinitis.

Atrophic rhinitis is a chronic rhinitis possibly due to infection with specific organism **(Coccobacillus foetidus ozaena)** but may due to other causes or follow nasal surgery.

The nose and sinuses may be chronically infected by fungi and yeasts; Rhinosporidosis, phycomycosis, Asprigillosis, Blastomycosis, Cryptococcosis, Actinomycosis, Candiasis, Histoplasmosis and Sporotrichosis. Nasal myaisis is due to infection by fly larvae **(genus chrysomia).** Also, **Mackay, et. al (1987),** added that nonspecific chronic infection of the nose and paranasal sinuses "**rhinosinusitis**" is frequently the first presentation of systematic immune deficiency diseases.

Afzelius, et. al (1976), stated that kartagener syndrome which consists of : bronchiectasis, sinusitis and situs inversus is associated with immotility or partial motility of the cilia **(primary ciliary dyskinaesia)** and muco ciliary clearance abnormality which leads to stagnation of mucous in the sinuses causing sinusitis.

* *NON-ALLERGIC, NON-INFECTIVE RHINITIS.*

This is considered under three headings: Hyperreactive, anatomical and tumours.

1) Hyper reactive rhinitis

Eccles, et. al (1981), stated that the non allergic, non infective, hyperreactive rhinitis is sometimes called ***"Vasomotor rhinitis"***. In this condition hyper reactivity in the form of excessive watery rhinorrhea usually follows exposure to the minimal changes in temperature, posture, stress and emotions (sexual arousal). This occurs due to autonomic imbalance in the autonomic supply of the nose;In the case of prolonged exposure to stress, this could result in failure of hypothalamic control over the sympathatic innervation and stimulation of parasympathatic supply which will cause nasal blockage and increased secretions.

2) Anatomical

Anatomical and mechanical obtruction may cause nasal blockage leading to infection due to retained secretion. These conditions include bilateral or unilateral posterior choanal atresia, adenoids, deviation of septum, enlarged turbinates due to any cause, nasal polyps and foreign bodies **Mackay, et al, (1987).**

3) Tumours.

Tumours of the nose and paranasal sinuses are fortunately rare. The symptoms include nasal obstruction, mucoid rhinorrhea and facial pain are too easily confused with rhinosinusitis. So X-Ray or C.T. scan and tomogram of paranasal sinuses should be requested whenever any doubt exists or prior to taking biopsy **Mackay, et al, (1987).**

* *NON-HEALING GRANULOMAS* *"Wegener's granuloma"*

Usually presents with symptoms of a persistent **"colds"** complicated by blood-stained nasal discharge and by nasal examination reveals some hypertrophy of nasal mucosa with granulation tissue, blood clots and crusting which can be associated with an unpleasent odour. The diagnosis will depends on taking an adequate biopsy **(Mackay, et. al, 1987).**

* *RHINITIS MEDICAMENTOSA :*

Black and Remen (1980), proved that the excessive use of nasal decongestants as naphthazoline hydrochloride can lead to chronic nasal congestion, usually accompained by watery disharge but absent pruritis, this has been ascribed to **"rebound phenomenon"** in which the agent is locally applied into the nares with relief which is followed by more severe obstruction requiring more of the same medication. Thus, a correct diagnosis can be made by cessation of that drug, this will often lead to complete disappearance of the symptoms and the use of nasal steriods is often a helpful therapy.

* *HORMONAL RHINITIS.*

Rose, et. al (1946), stated that it is not uncommon for either rhinitis or asthma to make its first appearance during pregnancy about the third trimester. Curiously, the opposite may occur that is a patient with allergic seasonal rhinitis or asthma may remain free during pregnancy. Two reasons are proposed to explain the regression of allergic rhinitis during pregnancy; the first is the increased production of cortisol during pregnancy and the second is the marked increase in blood histaminase secretred by the plancenta and it continues till parturition. Also, rhinitis of chronic nature is also sometimes associated with hypothyroidism and disappears when the thyroid deficiency is corrected **(Mackay, 1987).**