Update in pathogenesis and treatment of nasal polyposis

Essay

Submitted for Fulfillment of
Master Degree in Otorhinolaryngology

By

Zaki Ahmed Alsayed Mohamed
M.B.,B.Ch.

Supervisors :

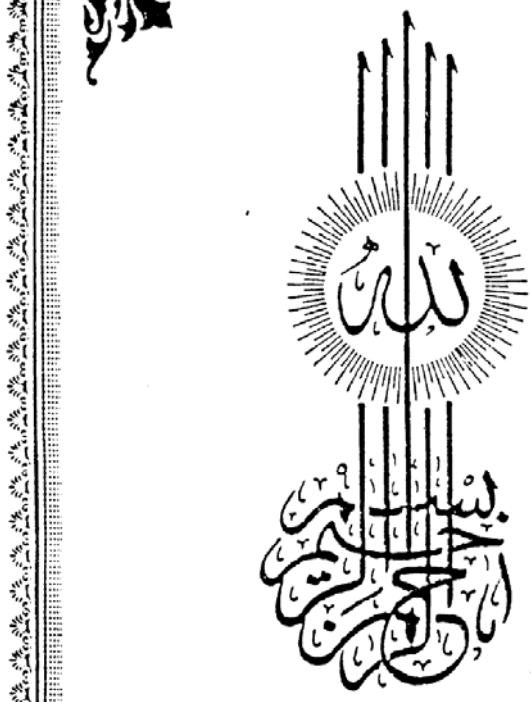
Prof. Dr. Sadek Wafek Zaher

Professor of Otorhinolaryngology
Faculty of Medicine
Cairo university

Prof. Dr.Mohamed Anwar Abd Al Hameed

Professor of Otorhinolaryngology
Faculty of Medicine
Cairo university

2010



قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ.

صدق الله العظيم
البقرة - ٣٢ -

Acknowledgement

First foremost, thanks to ALLAH to whom I relate any success in achieving any work in my life.

I would like to express my sincere thanks and deepest gratitude to my **Prof. Dr. Sadek Wafeek Zaher,** Pro. Of Otorhinolaryngology, faculty of Medicine, Cairo University, for his instructions and perfect supervisions all over this work.

I am much grateful to my **Pro. Dr. Mohamed Anwar Abd Al Hameed**, Pro. Of Otorhinolaryngology, faculty of Medicine, Cairo University for his great effort in supervising me step by step. I have taken much benefits from his experiences.

Also, my thanks and appreciation to my family and every one who gave me an unfailing support and assistance at this time.

Abstract

This type of treatment can serve as 'medical polypectomy'. When the blockage is a problem in spite of medical treatment, surgery is recommended. Simple polypectomy is still performed, but in the more severe and persistent cases, endoscopic surgery is recommended.

Key words

Pathogenesis

Treatment

Otorhinolaryngology

Contents

Figures

Figure **Page**

List of Abbreviations

AA	Arachidonic Acid
ABPA	Allergic bronchopulmonary aspergillosis
AERD	Aspirin-exacerbated respiratory disease
AIA	Aspirin Induced Asthma
ASA	Acetylsalicylic acid
ASNP	Aspirin-sensitive nasal polyps
ATNP	Aspirin-tolerant nasal polyps
BFGF	Basic fibroblast growth factor
CCR	Chemokine receptor
CFTR	Cystic Fibrosis Transmembrane Regulator
COX-2	Cyclo-oxygenase-2
CPAP	Continuous Positive Air Way Pressure
CSS	Churg–Strauss syndrome
Cys-LT	Cysteinyl leukotrienes
ECP	Eosinophil cationic protein
EG2+	Activated eosinophils
EGF	Epidermal Growth Factor
EMCRS	eosinophilic mucin chronic rhinosinusitis
eNOS	endothelial Nitric oxidase synthase
EP	Eprostanoid
ERK	Extracellular signal regulated kinase
ESS	Endoscopic Sinus Surgery
FR	Free Radical
GM-CSF	Granulocyte macrophage colony stimulating factor
GST	Glutathione -S-Transferase
ICAM-1	Intercellular adhesion molecule -1
IGFs	Insulin – Like Growth Factor
IFN-g	Interferon-gamma
IL-12	Interleukin 12
IL-13	Interleukin 13
IL-5	Interleukin-5
IL-5R	Interleukin-5 receptor

iNOS	Inducible Nitric oxidase synthase
KGF	Keratinocyte Growth Factor
LFA-1	Lymphocyte function associated antigen -1
LO	Lipoxygenase
LTA	Lipoteichoic acid
LTC4	Leukotriene C4
Mab	Monoclonal antibody
MAPK	Mitogen-activated protein kinase
MBP	Major basic protein
MCP	Monocyte Chemoattraction protein
MFNS	Mometasone Furoate Nasal Spray
MHC	Major histocompatibility complex
MMP	Metalloproteinase
NF-k B	Necrosis factor-k B
NKCC	Na+/K+/2Cl cotransporter
NM	Nasal Mucosa
NOS	Nitric oxidase synthase
NP	Nasal polyps
NSAIDs	Nonsteroid anti-inflammatory drugs
PBMCs	Peripheral blood mononuclear cells
PG E2	Prostaglandin E2
RANTES	Regulated on activation, normal T expressed and secreted.
ROS	Reactive Oxygen Species
SAE	*Staphylococcus aureus* enterotoxin-like toxins
SAE-IgE	IgE antibodies to SAE
SCF	Stem cell factor
SE A, SE B	Staphylococcus aureus enterotoxin A, B
SEA–SEU	Staphylococcal enterotoxin A–U secreted (cytokine, member of IL-8 superfamily).
S IgE	Specific Immunoglobulin E
SOD	Superoxide Dismutase
SOL IL-5R	Soluble IL-5 receptor

SPA	Protein A
TCR	T cell receptor
TCR-MHC	T cell receptor-major histocompatibility complex
TGF	Tumor growth factor
TGF-b	Transforming growth factor-beta
Th	T helper
TM IL-5R	Membrane anchored IL-5 receptor
TNF	Tumor necrosis factor
TNF-a	Tumor necrosis factor-alpha
TGF	Transforming Growth Factor
TSST-1	Toxic shock syndrome toxin-
TX A2	Thromboxane A2
UARS	Upper Air Way Resistance Syndrome
VCAM	Vascular cell adhesion molecule
VEGF	Vascular Endothelial growth factor
VLA	Very late antigen (expressed by most leukocytes)

Introduction

The ear, nose and throat (ENT) surgeon may consider nasal polyps to be a trivial disease, as the diagnosis is easy to make by endoscopy and the treatment consists of corticosteroids and surgery. The patient will experience nasal polyps to be an unpleasant disease, which severely interferes with the quality of life **(Radenne et al, 1999).**The scientist will find nasal polyps to be a challenge because the aetiology , in the large majority of cases, is unknown and because the pathogenesis of polyp formation is poorly understood. Why do polyps often develop in same types of inflammatory airway diseases and not in others? Why do polyps only develop in a few square centimeters of a generally inflamed airway mucous membrane? **(Mygind and Lund, 2008).**

Even the name is problematic. Polyp is derived from Greek, meaning many footed (poly, many; pous, footed), but a polyp has only one 'foot'(stalk). Finally, a disease characterized by the occurrence of multiple polyps is most correctly named nasal polyposis and, strictly speaking, it is not a nasal but a sinonasal disease. According to the

European Position Paper on Rhinosinusitis and Nasal Polyposis document, released recently by the European Academy of Allergology and Clinical Immunology and European Rhinologic Society, nasal polyposis is considered a subgroup of chronic rhinosinusitis **(Fokkens et al, 2005).**

A polyp present in the nasal cavity with a grap like appearance, having a 'body' and a' stalk'. The surface is smooth and the colour is more yellow than the pink mucous membrane. Nasal polyps originate in the upper part of the nose around the opening to the ethmoidal sinuses **Fig. (1)**. the polyps protrude into the nasal cavity from the middle and superior meatus, resulting in nasal blockage and abolishing airflow to the olfactory region. Nasal polyposis, consisting of multiple, bilateral polyps, is part of an inflammatory reaction involving the mucous membrane of the nose, the paranasal sinuses and often the lower airway **(Settipane et al, 1997).**

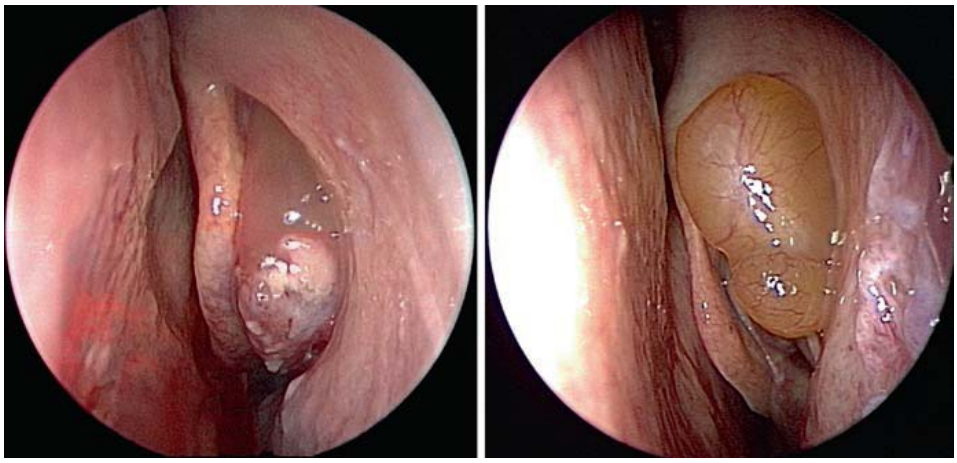


Fig. (1) Endoscopic still **a b** pictures of patients with moderate nasal polyposis. Smooth glistening expansile lesions can be seen originating from the middle meatus. As previously described, polyps are generally lined with pseudostratified columnar epithelium. A portion of the polyp seen in (**a**) has undergone metaplasia to squamous cell epithelium. Note the vascularity in the second polyp (**b**)

Nasal polyps are characterized by massive tissue edema, resulting from a leakage of plasma through widened endothelial junctions of blood vessels. Based on histological findings classified polyps into four types: (I) Eosinophilic edematous type (edematous stroma with a large number of eosinophils). (II) Chronic inflammatory or fibrotic type (large number of inflammatory cells mainly lymphocytes and neutrophils with fewer eosinophils). (III) Seromucinous gland type (Type I+ hyperplasia of

seromucous glands). (IV) Atypical stromal type **(Kirtsreesakul, 2005)**.

The prevalence rate of nasal polyposis is about 2 percent **(Settipane, 1987)**, it increase with age, reaching a peak in those aged 50 years and older, the male: female ratio is about 2: 1. Nasal polyposis occurs with a high frequency in groups of patients having specific airways diseases , it is noteworthy that nasal polyps are very rare in allergic children in contrast to children with cystic fibrosis and that the disease is more frequent in non allergic than in allergic adult patients with rhinitis and asthma**(Larsen and Tos,1996).**

Although historically many have believed polyps to be a manifestation of allergy, in part because of the histological prominence of eosinophils, epidemiologic evidence for this is lacking. The incidence of allergy is not higher in patients with nasal polyps than in the population as a whole **(Lane and Kennedy, 2003*)***, nor do polyp patients have elevated rates of positive allergy skin tests **(Drake et al, 1984).**