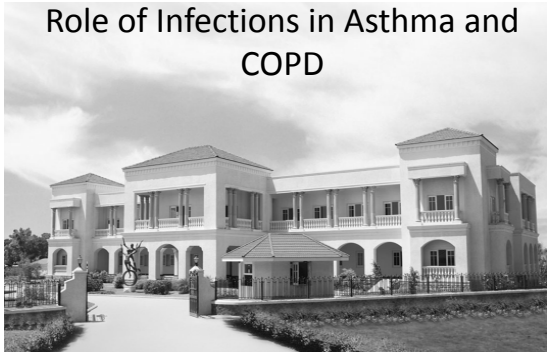
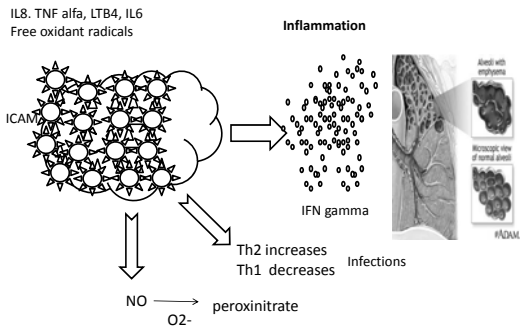
Role of Infections in Asthma and COPD



Role of Viruses in asthma and COPD

Epithelial cells/ macrophages



Major viruses implicated in in Asthma and COPD exacerbations


Rhinovirus: Most common respiratory virus

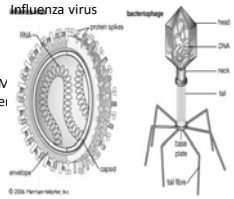

Respiratory Synctial Virus (RSV):M
cause of wheeze in young childre
latter child hood


Human meta pneumonia virus


Parainfluenza virus


Cornavirus

Influenza virus



Influenza Vaccine

- Recommend vaccination of the patients especially of severe COPD and asthma
- Every year, due to antigenic shifts of the virus

Treatment modalities: Viral Infections

ANTIVIRAL AGENTS

Ribavirin: 5mg inhaled or oral BD x 5d

Amantadine /Rimantadine: 200mg/d within 48hrs of s/s

Zanavir: 10mg inhaled BD for 5 days

Oseltamivir: 75mg BD-5days

IMMUNIZATIONS

Influenza vaccine: yearly

RSV Immune Globulin: monthly administration in winter months

Palvizumab: IM One dose – helps in reducing Infectious episodes

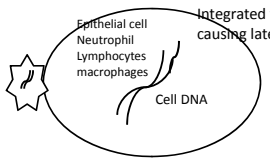
ALTERNATIVE THERAPIES

- **Salbutamol: apoptosis of virus infected cells**
- **Low dose Macrolides (Anti-inflammatory effects)**
- *Modulate functions of inflammatory cells, PMNs, Lympho, Macrophages*
- *Inhibit synthesis and secretion of pro-inflammatory cytokines*
- Clarithromycin 500mg OD x 6 weeks
  Roxithromycin 150mg OD x 6 weeks

INTERFERONS

Interferon beta, lambda

LATENT VIRAL INFECTIONs in Pathogenesis of COPD and asthma



Adenovirus DNA stays Integrated with host DNA causing latent viral infection

Is also responsible for steroid Unresponsiveness seen in COPD and asthma

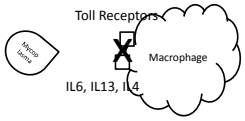
Provides continuous source of viral proteins leading to persistent inflammation in the airways

Bacteria in obstructive airway diseases

Role of Bacteria in Asthma

- Evidence of :
- Chlamydia Pneumonia
- Mycoplasma Pneumonia

It could have:
.Causative role
.Exacerbations



- Bacteria is not killed Survives in the airway.
- Chlamydia causes a state of dormancy in the macrophages and epithelial cells and keeps on releasing stress proteins and inflammatory mediators

Role of Antibiotics in Asthma management

- Anecdotal evidence and some asthma studies have shown that treatment with low dose of Macrolide antibiotics such as
- Roxithromycin (150mg/day)
- Erythromycin (500 mg/day)
- Azithromycin (500mg/day)
- Clarithromycin (500mg/day)

given over a period of 6 weeks has a beneficial role in asthma management in <u>some patients</u>.

Other Antibiotics

- Tetracyclines
- Quinolones *(Levofloxacin,Gatifloxacin,Moxifloxacin)*

Role of bacteria In COPD

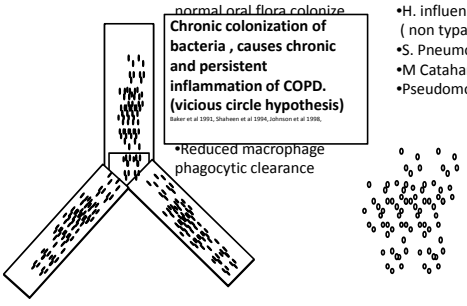
In COPD the bacteria of normal oral flora colonize

Chronic colonization of bacteria , causes chronic and persistent inflammation of COPD. (vicious circle hypothesis)

Baker et al 1991, Shaheen et al 1994, Johnson et al 1998,

•Reduced macrophage phagocytic clearance

Pathogenitic:
•H. influenza (non typabale)
•S. Pneumonia
•M Cataharalis
•Pseudomonas



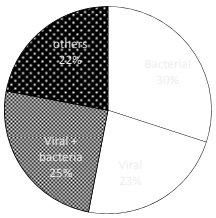
Taylor et al: ERJ 2010

Bacteria in Pathogenesis of COPD

- Chronic inflammation alters the host immune system to an extent the inflammatory cells start reacting against the lung tissues producing an autoimmune response

Baker et al 1991, Shaheen et al 1994, Johnson et al 1998,

COPD Exacerbations



Celli et al; *ERJ 2007*

Bacteria in COPD Exacerbations

Commonest Pathogens:
- H. influenza (non typabale)
- S. Pneumonia
- M Catarhhalis
- Pseudomonas

The bacterial load increases due to Change in the immune status such as viral infections.

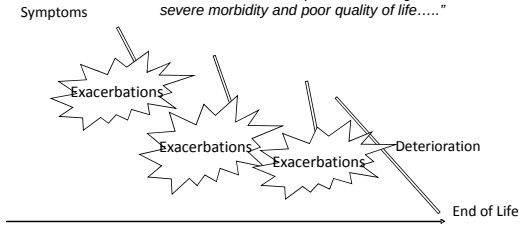
Acquisitions of new bacterial strains as a natural course

How do you differentiate Bacterial exacerbations from other exacerbations

- Increased cough
- Increased sputum volume
- Increased Purulence of sputum

Disease Trajectory of a Patients with COPD

"Infectious exacerbations in Asthma and COPD are associated with a steep decline in lung functions and severe morbidity and poor quality of life….."



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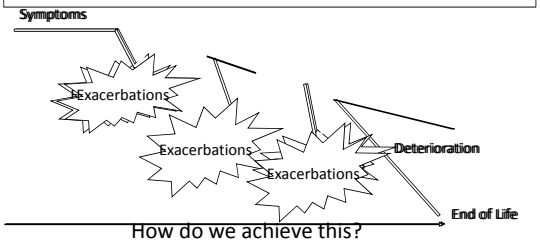
What are the right antibiotics?

- Amoxicillin/ Clavulanic acid
- Trimethorprim-sulfamethoxazole (septran)
- Second and third generation cephalosporin
- Newer macrolide Antibiotics (Azithromycin and Clarithromycin)
- Fluoroquinolones (ciprofloxacin, Gatifloxacin, Gemifloxacin Moxifloxacin)

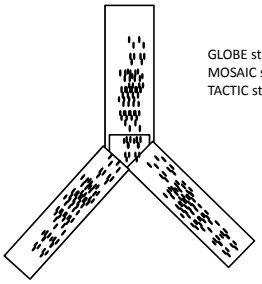
Which is the best antibiotic?

- The Antibiotics should be as such that it increases the time to next exacerbation



How do we achieve this?

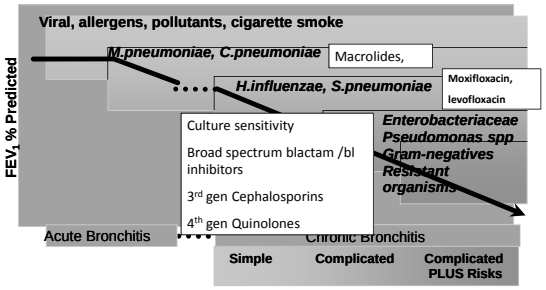
Fully Eradicate the specific bacteria which has caused exacerbations



GLOBE study
MOSAIC study
TACTIC study

Fluroquinolones such as moxifloxacin and Gemifloxacin can achieve this

Relationship Between Pulmonary Function, and Airway Bacterial Load



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Canadian guidelines: Antibiotics according to patient subsets

Simple chronic bronchitis

- Any age
- < 4 exacerbations/yr
- No cardiac disease
- FEV_1 >50%

Macrolide (azithro-mycin, clarithromycin) or new cephalosporin, doxycycline

amoxicillin, TMP/SMX

Thur

Thank you