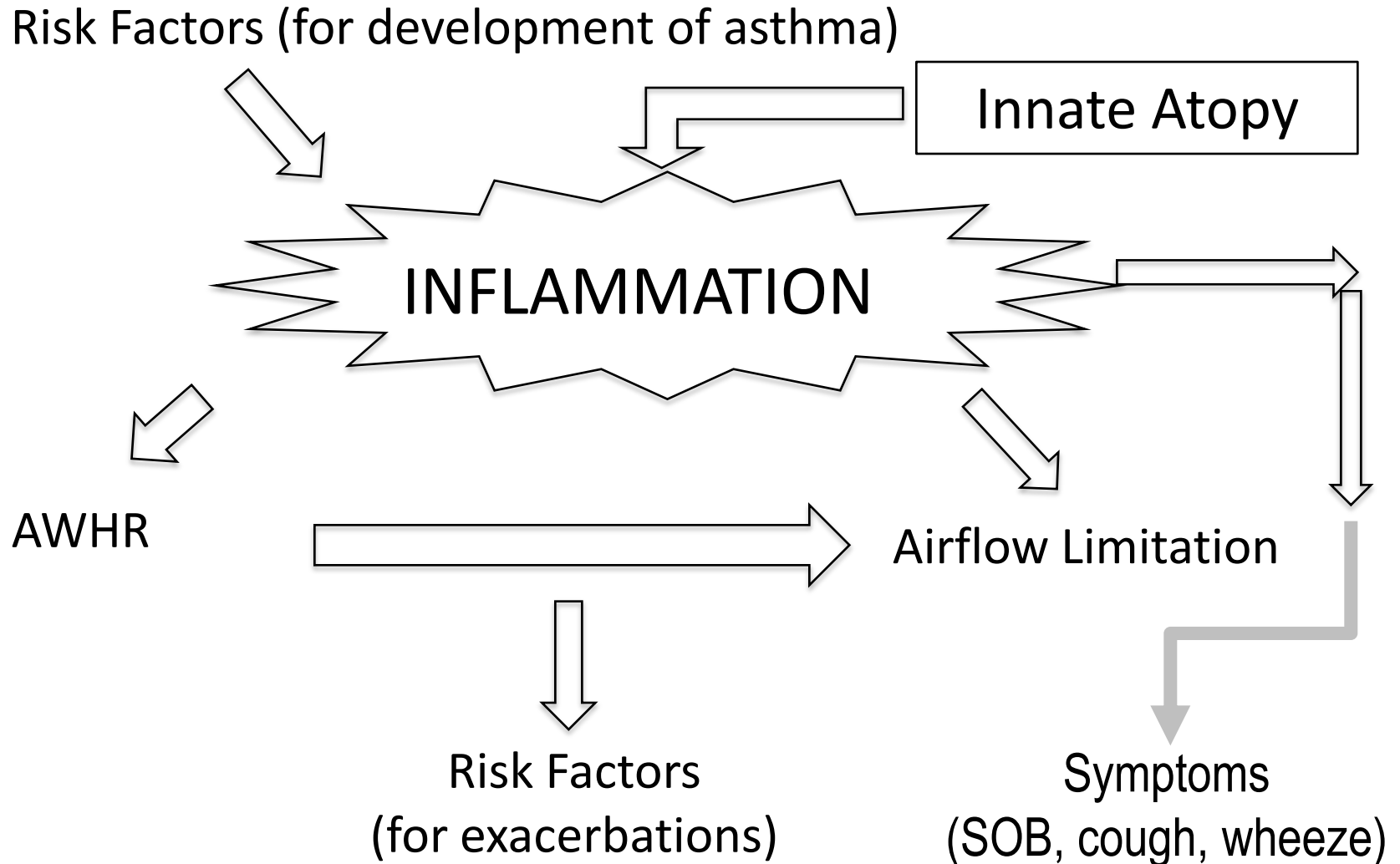


# What Is Asthma ?

- Primarily – Allergic inflammation of AW
- Secondary – Bronchoconstriction
  - Airway Hyper-reactivity - AWHR
  - Recurrent wheezing, coughing and SOB
  - Airflow limitation is variable and often reversible
  - Infiltration of dendritic cells, mast cells, eosinophils and lymphocytes

# Mechanism of Asthma



# Risk Factors for Asthma

## Causal Factors

- Indoor Allergens
  - Domestic mites
  - Animal Allergens
  - Cockroach Allergens
  - Fungi moulds
- Outdoor Allergens
  - Pollens
  - Fungi, RSV
- Occupational exposure

## Host Factors

- Genetic Atopy (↑ IgE), AWHR

## Contributing Factors

- Respiratory infections
- Small size at birth, Obesity
- Air pollution
  - Outdoor pollutants
  - Indoor pollutants
- Smoking – Active / Passive
- Dietary factors

# Patient History

Recurrent attacks or episodes of wheezing?

Troublesome cough, worse particularly at night

Cough after physical activity (e.g. playing)?

H/o seasonal attacks of breathing problems.

Do the patient's colds 'go to the chest' or take >10 d to resolve?

Does the patient use any medication ? Is there (relief) ?

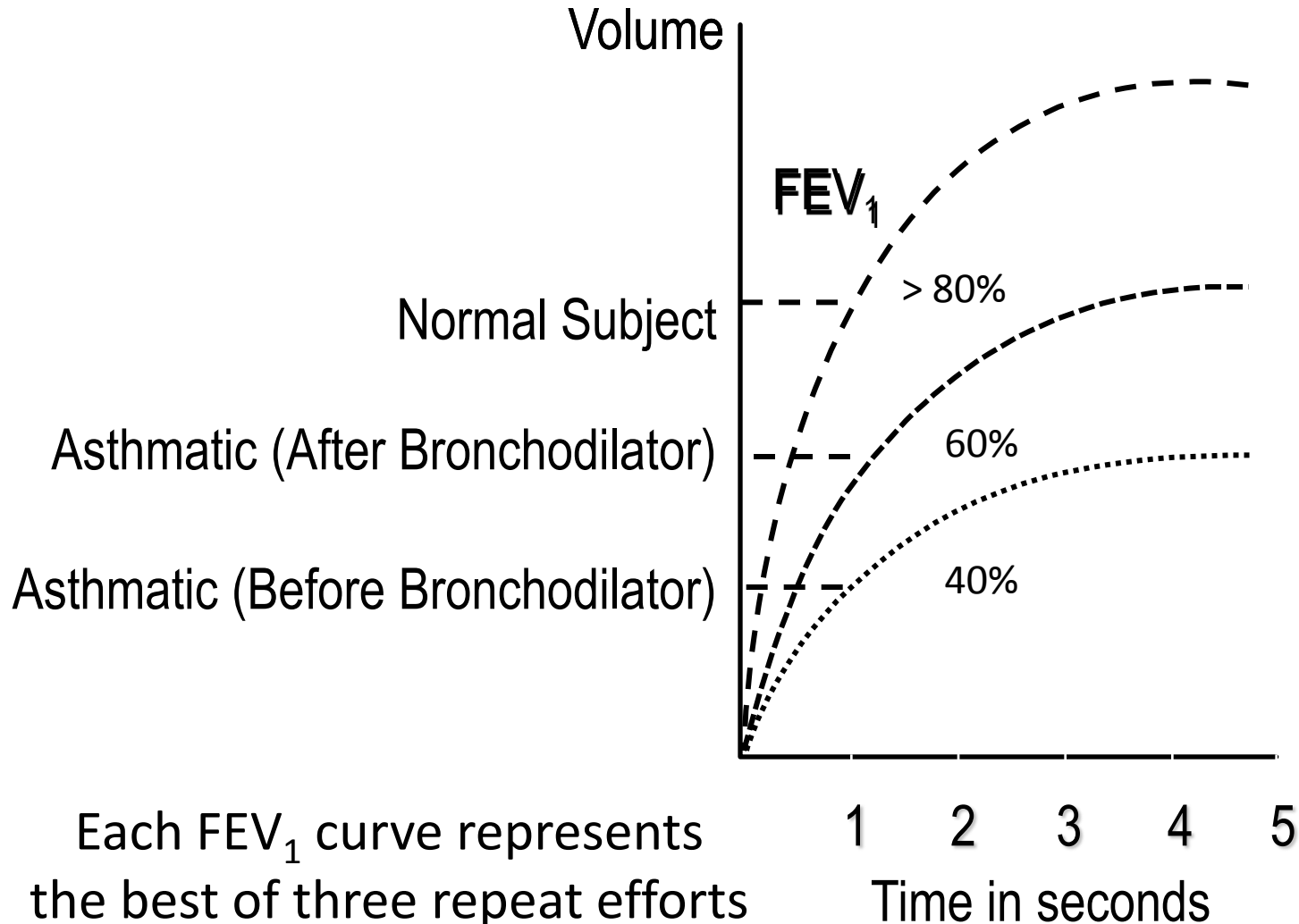
If "YES" to any of the above questions, suspect asthma.

The commonest cause of persistent cough is asthma

# Spirometry Normal Values

1. There are no fixed 'Normal' values
2. Dependent on age, sex, ht, wt, ethnicity
3. Observed value expressed as predicted value %
  - FVC Normal if > 80% of predicted
  - FEV1 Normal if > 80% of predicted
  - FEV1/FVC At least 75%
  - PEFr Normal if > 80% of predicted
  - FET Less than 4 seconds

# Typical FEV<sub>1</sub> Tracings



# Obstructive v/s Restrictive

Parameter	Normal	Obstructive	Restrictive
Problem	'Air out' and 'Air in' normal	Unable to get 'Air out'	Unable to get 'Air in'
FVC	80 % of pred	Normal or ↓	↓, ↓TLC
FEV1	80 % of pred	↓-80% or less	Normal
FEV1 ÷ FVC	Min. of 75%	↓-70% or less	Normal or ↑
PEFR	80 % of pred	↓-80% or less	Normal
FET in sec	Less than 4	Prolonged > 4	Normal - < 4

# It is a Dual Problem

## 1. Bronchial inflammation – perpetual

1. Allergic inflammation and edema
2. Inflammatory mediators – perpetuate
3. edema and excite bronchospasm
4. Bronchial hyper reactivity to triggers

## 2. Bronchospasm – acute attacks

Needs two different types of medicines

Relievers & Controllers

# Relievers and Controllers

## Spasm needs reliever

- Bronchodilator drugs
- Rescue medications
- Quick relief of symptoms
- Used during acute attacks
- Action lasts for 4-6 hrs
- Not for regular use at all

## Prevent future attacks

- Reduce allergic inflammation
- ↓ inflammatory mediators
- Reduce hyper-responsiveness
- Long term control of asthma
- Prevent airway remodeling
- For regular use – well or ill

# Relievers

- Rapid-acting inhaled  $\beta_2$ -agonists
  - Salbutamol, Levo Salbutamol
- Anti-cholinergics
  - Ipratropium, Tiotropium
- Short-acting oral  $\beta_2$ -agonists
  - Salbutamol, Levo Salbutamol, Terbutaline
- Systemic glucocorticosteroids (status asthmaticus)
- Theophylline (oral) – (evidence C)

## What Are Controllers ?

### Prevent future attacks

- Reduce allergic inflammation
- Reduce inflammatory mediators
- Reduce hyper-responsiveness
- Long term control of asthma
- Prevent airway remodeling
- For regular use – well or ill

## What Changes the life?

### Inhaled ICS and IBD

- All Asthma drugs should ideally given through inhaled route
- ICS - Inhaled corticosteroids are the main stay of treatment
- ICS are the most potent and effective anti-inflammatory medication for Asthma

# Why Inhalation Treatment

## Oral

- Slow onset of action
- Large dosage used
- Greater side effects
- Erratic absorption
- Not useful in acute illness

## Inhaled route

- Rapid onset of action
- Less amount of drug
- Drug delivered to the site
- Better tolerated
- Treatment of choice in acute symptoms

# ICS – How safe are they?

## They are very safe

- Even in small children for several years
- 30% of Olympic athletes use ICS
- Not anabolic (performance-enhancing) steroid
- Even highest ICS dose is safer than low dose oral steroid or beta agonist
- Best “Addiction” for asthmatics

## Leukotrine Modifiers

- Oral Leukotrine antagonist
- They are anti inflammatory
- Control release of vasokines
- Not as effective as ICS
- First-line for 2 to 5 yr olds
- Montelukast 4, 5 & 8 mg
- Can be add on to ICS or IBD

## Lessons to unlearn

- Adrenaline s/c, thank heavens, we forgot !!
- Deriphyllin + Betnesol I.V. Must give up please !!
- Oral SABA and LABA. Please restrict their use !!
- Beware of Theophylline. It is potentially dangerous
- Systemic steroids – Give up

# Step Up and Down – Acute Asthma

- SABA (IBD) in full doses
- SABA Increase frequency or Nebulize
- SABA as above + IPA (IBD), then add
- OCS (Methyl prednisolone) 30-60 mg for 3 to 10 days - add
- ICS (1000 mcg) / day and maintain for 6 weeks minimum
- Gradually bring down doses and maintain with ICS
- If symptoms are not relieved – Check the technique compliance
- Look for aggravating factors like
  - GE Reflux, Emotions/ Stress, Sinusitis, Allergic Rhinitis
- ? Role for Theophylline; Oral SABA or LABA not very useful

# The Step Care Approach - Prevent

- ICS
- ICS + LABA (IBD)
- ICS + LABA (IBD) + Double Dose ICS
- ICS (DD) + LABA + LTA (oral)
- ICS (DD) + LABA + LTA + OCS
- ICS (DD) + LABA + LTA + OCS + TIO (IBD)
- SR Theophylline may be an add on
- SABA or LABA Oral + IPA (IBD) may be a useful add on
- No long acting steroid injections
- No injectable or short acting Theophylline

# Not All Are Same !!

- Beclomethasone 6 hrly + Salbutamol 6<sup>th</sup> hrly
- Budesonide 12 hrly + Salmeterol 12 hrly
- Salmeterol 12 hrly + Ipratropium 12 hrly
- Fluticasone 24 hrly + Formoterol 24 hrly
- Formoterol 24 hrly + Tiotropium 24 hrly

Choice is based on

1. If need is urgent and uncontrolled – 6 hrly
2. If need is maintenance, well contr. – 12 hrly
3. If stabilized and wants convenience – 24 hrly

# Nebulizer Therapy

1. Severe breathlessness despite using inhalers
2. Assessment should be done for improvement
3. Choice between a facemask or mouth piece
4. Equipment servicing and support are essential
5. 0.5 ml of Ipa + 0.5 ml of Sal + 5 ml of Nacl (not DW)
6. If decided to use ICS (FEV1 < 50%) - 0.5 ml of Buduso.
7. 15 minutes and slow or moderate flow rate
8. Can be repeated 2 to 3 times a day – Mouth Wash