**Bronchial Asthma**

Bronchial asthma is a chronic respiratory problem associated with reversible airflow obstruction. It has now become an established fact that airway inflammation plays a major role in the pathogenesis of asthma. Clinically it is characterized by episodic shortness of breath, usually accompanied by wheezing and coughing. Common precipitating factors include exposures to cold weather, upper respiratory tract infections, bad smells, exercise, ingestion of drugs like aspirin and beta-blockers…etc. The course of an acute asthmatic attack is often unpredictable. Therefore, one should never underestimate the severity of a given asthmatic attack and. close monitoring and appropriate management should be employed until the patient clearly comes out of the attack. Concerning the chronic form of the disease, one should always try to classify the disease based on severity before initiating treatment. Accordingly, it is classified as intermittent or persistent asthma. The latter is again divided into mild, moderate and severe persistent asthma.

**Diagnosis**

-Suggestive clinical history
- Objective tests by using peak flow meters and spirometers are essential not only to make the diagnosis for certain but also to grade severity of the disease.

**Treatment**

**Non-drug treatment**

Prevention of exposure to known allergens and inhaled irritants.

**Drug treatment**

Drugs are required for the treatment of acute asthmatic exacerbations as well as for the treatment of chronic asthma.

**TREATMENT OF ACUTE ASTHMA ATTACKS IN ADULTS:**

**General measures**:

• Patient's condition should be carefully monitored to assess severity, and to detect signs of improvement or deterioration. In the absence of blood gas monitoring facilities, clinical evaluation by using some important physical signs, such as the respiratory rate, pulse rate, use of accessory muscles, color, paradoxical movement of the diaphragm, speech, level of consciousness are essential.

• Humidified oxygen by mask at high concentration (6 litres/min) is important.

• Rehydrate the patient if necessary.

• Antibiotics should not be routinely given unless there is a convincing evidence for bacterial respiratory infection, such as fever, pleuritic chest pain and bronchial breath sound or chest x-ray evidence of consolidation.

**Drug Treatment**

**I. INITIAL MANAGEMENT**

***First line***

**Salbutamol**, MDI, 200 micrograms by aerosal inhalation. Could be repeated every 20 minutes for the first hour.

***S/E***: headache, nervousness, dizziness, palpitation, tachycardia, fine tremor, muscle cramp, paradoxical broncho-spasm.

***C/I****:* cardiac arrythmias

***Dosage forms:*** Oral inhalation (aerosol) preparation, 100mcg per dose; tablet, 2 mg, 4mg; syrup, 2 mg/5ml; nebulizer solution, 5 mg/5 ml, 20 ml ampoule.

***OR***

**Aminophylline,** 5mg/kg by slow i.v push over 5 minutes. The same dose could be repeated after 30 minutes.

***S/E***: GI disturbances, headache, irritability, nervousness, insomnia, and tremor

***C/I:*** hypertension, ischemic heart disease, epilepsy, hyperthyroidism, congestive cardiac failure

***Dosage forms:*** Tablet, 100mg, 225mg, 350mg; injection, 250mg/10ml in 10 and 20 ml ampoule

***OR***

**Salbutamol,** 2.5-5 mg undiluted could be given via a nebulizer over 3 minutes, repeat every 20 minutes for the first one hour

(For ***S/E****,* ***C/I*** *and* ***Dosage forms,*** see above)

***Alternatives***

**Adrenaline,** 1:1000, 0.5ml sc. Repeat after ½ to 1 hour if patient doesn't respond.

***S/E*:** headache, nervousness, dizziness, cardiac arrythmias

***C/I****:* cardiac arrythmias

***Dosage forms:*** injection, 0.1% in 1 ml ampoule

***II. IF RESPONSE TO INITIAL THERAPY IS POOR, GIVE THE FOLLOWING****:*

***First line***

Insert intravenous line and start **aminophylline,**

• If patient has taken oral theophedrine or aminophylline in the past 8 hours, start i.v. infusion at 0.6 mg/kg/hr

• If patient has not been taking theophylline preparation, give a loading dose of 3-5 mg/kg in dextrose and water over 20 minutes. Thereafter, the maintenance dose can be given with a continuous infusion in dextrose 5 % at a dose of 0.6 mg/ kg /hour until recovery.

**(**For ***S/E****,* ***C/I*** *and* ***Dosage forms***, see page 107)

***OR***

**Nebulized salbutamol** as above but the dose may be increased to 10 mg if side effect permits (For ***S/E****,* ***C/I*** *and* ***Dosage forms***, see page 107)

***PLUS***

**Hydrocortisone,** i.v., 200 mg as a single dose. Further i.v. doses are needed only if oral dosing is not possible.

***S/E***: GI disturbances, hyperglycemia, headache, and psychiatric reactions

***Caution****:* hypertension, infection, diabetes, osteoporosis

***Dosage forms:*** tablet (acetate), 5mg, 10mg,; powder for injection; 25mg/ampoule, 500mg vial; injection (sodium succinate), 50mg/ml in 2ml ampoule, 125mg/ml

***AND / OR***

**Prednisolone,** 40-60 mg p.o**.** should be started immediately, preferably after the first bolus of hydrocortisone, and given at least for a minimum of 5-7 days.

***S/E****:* GI disturbances, such as dyspepsia and peptic and oesophageal ulcers; candidiasis; musculoskeletal effects, such as osteoporosis, bone fractures and proximal myopathy; endocrine effects, such as adrenal suppression, Cushing's syndrome, menstrual irregularities, weight gain, hirsutisim; increased susceptibility to infection and impaired healing; euphoria, depression, isomnia, aggravation of epilepsy and schizophrenia; glaucoma; hypersensitivity reaction including anaphylaxis.

***C/I:*** systemic infection; use of live vaccines in those receiving immunosuppressive therapy.

***Dosage forms:*** Tablet, 1 mg, 3.5 mg, 5 mg, 10 mg; injection, 10 mg/ml, 25 mg/ml in 2 ml ampoule.

***Caution***: Use the lowest effective dose for the shortest period possible; withdraw gradually after systemic use.

**III. MAINTENANCE THERAPY FOR CHRONIC ASTHMA IN ADULTS:**

**Requires prolonged use of anti-inflammatory drugs mainly in the form inhalers.**

**1.INTERMITTENT ASTHMA**:

**First line:**

**Salbutamol**, inhalation -,200 microgram/puff, not more than 3 times a week (For (***S/E****,* ***C/I*** *and* ***Dosage forms,*** see page 107)

**Alternative:**

**Ephedrine + Theophylline (11mg + 120mg)** p.o. 100 mg, two to three times a day

***S/E***: GI disturbances, headache, irritability, nervousness, insomnia, tremor

***C/I****:* hypertension, ischemic heart disease, epilepsy, hyperthyroidism, congestive cardiac failure

***Dosage forms:*** Tablet, 120 mg theophylline + 11 mg ephedrine; syrup, 0.30% theophylline + 0.24% ephedrine; elixir, 30 mg theophylline + 6 mg ephedrine per 5 ml

**2. PERSISTENT MILD ASTHMA:**

***First line:***

**Salbutamol**, inhalation, 200 micro gram/puff to be taken, as needed but not more than 3-4/day (For ***S/E****,* ***C/I*** *and* ***Dosage forms***, see on page 107)

***OR***

**Theophedrine 100mg, two to tid**
(***S/E, C/I*** and ***Dosage forms*:** see above)

***PLUS***

**Beclomethasone** oral inhalation 1000mcg /daily for two weeks

***S/E***: GI disturbances, hyperglycemiaheadache, and psychiatric reactions

***C/I:*** hypertension, infection, diabetes, and osteoporesis

***Dosage forms:*** oral inhalation (aerosol), 50 mcg/dose, and 100 mcg/dose

***Plus*** *if required*

**Prednislone,** p.o. 5-10 mg on alternate days. Doses of 20-40 mg daily for seven days may be needed for short-term exacerbations in patients not responding to the above. ***S/E****,* ***C/I*** *and* ***Dosage forms:*** see on page 108)

**3. PERSISTENT MODERATE ASTHMA:**

**First line**

**Salbutamol, inhalation** as needed not more than 3-4 times a day.
**(*For S/E****,* ***C/I*** *and* ***Dosage forms,*** see page 107)

***PLUS***

**Beclomethasone** 2000mcg, p.o. daily for two weeks and reduce to 1000 mcg if symptoms improves.
(For ***S/E****,* ***C/I*** *and* ***Dosage forms****,* see above page109)

**4. SEVERE PERSISTENT ASTHMA:**

***First line:***

**Salbutamol,** inhalation not more than 3-4 times a day
(For ***S/E****,* ***C/I*** *and* ***Dosage forms,*** see page 108)

***PLUS***

**Beclomethasone,** 2000 mcg, p.o. daily and
(For ***S/E****,* ***C/I*** *and* ***Dosage forms****,* see on page 109)

***OR***

**Prednisolone,** 0.5 mg, p.o. a day. (For ***S/E****,* ***C/I*** *and* ***Dosage forms****,* see page 108)

**GENERAL COMMENT ON TREATMENT OF ASTHMA:**

**Increasing intensity**: When asthma is not brought under control with current treatment even though treatment has been taken correctly; medication dose is doubled with each step.

**Decreasing intensity**: When the objective of treatment have been reached and maintained over some weeks; medication dose is halved at each step; the minimum treatment needed must be determined.

**TREATMENT OF ACUTE ASTHMA ATTACKS IN PEDIATRICS:**

### Bronchial Asthma

Asthma is a disease characterized by reversible airway obstruction, airway inflammation and increased airway responsiveness to a variety of stimuli (hyper-reactive airway). The onset of childhood asthma is before the age of 5 years in more than half of the patients. Approximately one half of children "out grow" their asthma by adolescence, but recurrence is common in adulthood. There is no single diagnostic test for asthma in young children, although a number of challenge tests may be helpful in older children and adults.

**Diagnosis** is mainly clinical. Chronic and recurrent episodes of coughing and wheezing, specially if aggravated or triggered by exercise, viral infection or inhaled allergens are highly suggestive of asthma.

**Treatment:**

Asthma therapy includes basic concepts of avoiding allergens improving vasodilatation, and reducing mediator-induced inflammation.

**Acute asthma**

**Epinephrine,** 0.01-0.02ml/kg sc, and repeat the dose every 20 minutes for three doses.

***S/E*:** transient headache, palpitation, anxiety, and dysarrythemia.

***Dosage forms:*** injection, 0.1% in 1ml ampoule

***AND/OR***

**Salbutamol**: 0.1-0.2mg/kg(1-2 puffs) 3-4 times a day or 0.075-0.1mg/kg p.o. 3 times a day. (For ***S/E, C/I, D/I*** *and* ***Dosage forms,:*** see page 107)

**Note:**

**Corticosteriods** as aerosols or tablets are also recommended in severe asthma**.**

**Status Asthmaticus**

If a patient continues to have significant respiratory distress despite administration of symathomimetics drugs with or without theophylline, the diagnosis of status asthmaticus should be considered.

Status Asthmaticus is a clinical diagnosis defined by increasingly severe asthma that is not responsive to drugs that are usually effective

**Treatment**

**Drug treatment:** Children with status asthmaticus require hospitalization and aggressive therapy with bronchodilators, corticosteroids and oxygen.

**Predensolone**, 1-2 mg /kg every six hours
(For ***S/E, C/I, D/I*** *and* ***Dosage forms***, see page 108)

**N.B.**

- The potential for growth retardation should be considered
- Dose and duration should be as limited as possible