Management of Acute Severe Asthma

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Steps in the management of acute severe asthma

1- Assessment of severity & identification of life threatening attack

2- Initiation of therapy

3- Assessment of response to initial therapy

4- Modification of or addition to therapy
Step 1.
Initial assessment of severity

The features of life threatening attack of asthma are

i) Cyanosis, silent chest or feeble respiratory effort

ii) Fatigue or exhaustion

iii) Agitation or reduced level of consciousness
Detailed Clinical Assessment

Detailed assessment is done once an appropriate level of management has been instituted in a sick child.

Detailed assessment is done, based on:

1. History
2. Physical examination and
3. Objective measurement of degree of airway obstruction & hypoxia.
History

* Duration of worsening
* Any specific allergen or irritant which could have triggered the attack
* Frequent emergency visits
* Chronic steroid use or recent withdrawal from systemic steroids
* History of previous admission to ICU or H/O endotracheal intubation
Physical Examination

- Respiratory Rate
- Alertness
- Dyspnoea
- Pulsus paradoxus
- Accessory muscle use
- Colour - cyanosis
- Auscultation
- Oxygen saturation
- PaCo2
- PEFR
Objective Assessment

i) Measurement of airflow obstruction by peak expiratory flow rate (PEFR) or forced expiratory volume in the first second (FEVI)

ii) ABG analysis or pulse oximetry
Generally not indicated in a routine acute exacerbation

* Blood CP - Infection / Anemia
* Serum electrolytes – both B-2 against & steroids cause Hypokalemia
* Serum theophylline levels
* CXR - FB inhalation, pneumothorax, atelectasis, pneumomediastinum, pneumonia
Step 2. 
Initiation of therapy

Principles of therapy

*The goal is to rapidly reverse the acute airflow obstruction & relief of resp. distress

*Hypoxia is treated by proper oxygenation

*Corticosteroids are added early in an acute attack

*Repeated clinical & objective assessment is done to evaluate the response, add other drugs if necessary, detect impending resp. failure at the earliest
Initial Therapy

1- Oxygen

O₂ at the rate of 2-6 L/min should be started. The flow should be enough to maintain O₂ saturation above 92%.
2-Beta-2 Agonists

* Salbutamol nebulizer solution (5mg/ml) 0.5ml + 3ml N/S over a period of 10-15m (repeat 3 minutes in one hour)

* Use Central O2 supply at 6-7 l/m to run the nebulizer, at least initially to avoid hypoxia

* Recent studies suggest continuous nebulization may be more effective dose (0.1-0.5 mg/kg/h)
3- Alternatively, metered olosxx inhaler can be used with a space device to give repeated inhalation of B2- agonists one to two puffs 5-10 minutes can be used for 10-20 times.

* Use of MDI reduced the cost of therapy is easily performed & does not require power supply
4- In severe branchopasm, an initial dose of epinephrine may be used prior to initiating inhalational treatment. Injectable terbutaline may also be used. It has larger duration of action & repeat dose may not be required for 2-6 hours.

* Epinephrine start duration cardiac SE cannot be repeated more than 2-3 timed dose.
5- Anticholinergics
Inhaled anticholinergics and a selective B2 agonist produce significant greater improvement in lung function than B2 agonist alone.

Ipratroium bromide
An optimal dose of 250 hg contained in 1.0 ml of respirator solution, may be mixed with salbutamol solution & both given together at an interval of 20 min with nebulizer at may also be given alternating with the dose of nebulized salbutamol.
6- Corticosteroids

Steroids given for a short duration of 3-7 days improve the resolution & reduce the chances of an early relapse. In the following situation, steroids should be started as soon as pts present in the emergency:

i) Acute severe asthma
ii) Provision H/O life threatening attack or severe attacks not responding to bronchodilators
iii) If the child is oral steroids or high dose inhaled steroids
An oral dose of 1-2 mg/kg of preduisolone may be as effective as an equivalent dose of hydrocortisone given I/v, because the time for onset of action is the same.

* Role of inhaled steroid in acute severe asthma

A recent meta-analysis of controlled trial with inhaled steroids suggested that there is no clear evidence till now that inhaled steroids are better than systemic steroids.

Dexamethasone, Budesonide & Flutigsonexx
Step 3 - Assessment of response to initial therapy

The patient should be assessed after initial therapy of 2-3 dose of bronchodilator along with oxygen over a period of one hour.
Good response

No wheeze, no breathlessness
H/R & R/R ↓
Auscultation of chest – no ronchi PEFR or FEVI will improve to more than 70% of the predicted or personal best
Observe for 2-4 hours- stable discharge on bronchodilators for 5-7 days
Partial response

* Still wheeze & breathlessness present
* Auscultation – ronchi
* H/R & R/R above neonatal
* Pulsus paradoxus of 10-15 mm of Hg
* O2 saturation 91-95%
* PEFR between 40-70%
Poor response

* No Subjective or objective improvement
* Severe respiratory distress & wheezing
* Pulsus paradoxas > 15mm of Hg
* Use of accessancy muscles & extensive ronchi
* O2 saturation < 90 %
* PEFR < 40 %
Step 4 - Modification of therapy for pts with partial & poor response to initial therapy

* Oxygen & B-2 against inhalation should be continued
* Inhalation as frequently as every 20 m, or even continues can be given without side effects for the next 24 hours & child reassessed
* If ipratropium is not used at the onset, it is added at the end of first hour
* MDI with a spacer can also be used frequently as an effective alternate device

* **Continue corticostexxxds**
  - 1-2 mg /kg/d in d/d prednisalone
  - or
  - 2.5-5.0 mg/kg/ dose of hydrocortisone
  - every 6 hourly

* **In Fluids & Correction of Acidosis**
  Dehydration may produce more viscous mucus, leading to bronchiolar phlegm, correction of dehydration, therefore is allupxx indicated.
  SIADA has been reported in same cases of bronchial asthma
Hypokalcemia has been reported with frequent beta adrenergic & corticostesaid therapy. It should be corrected when present. Metabolic audosis that occurs during an acute attack may decreased the responsirenen of bronchi to bronchodilators. It has been recommended that PH is less than 5m Bg, ultravenous correction with soda bicalsxxx is indicated, initially using half the calculated dose & then repeating the ABG.
Monitoring

If the child is very sick and is deteriorating, he may require continuous monitoring. PEFR or FEVI & ABG should be assessed for an objective evaluation.
Addition of other drugs

Role of aminophylline
- It has a very low therapeutic index & S/E can be murmurs & serious
- Xminophylline acts by bronchodilators
  - Stimulation of respiratory drive, reduction in respiratory muscle fatiguability & enhancement of arocilianyx clearance.
The dose of therapylliness reduced in fever by 50% & by 25-30% when concomitantly used with drugs like crythroimxx, aminoquinloness cimetidine& related drug. Dose may have to be increased in children getting drug live rifampicm phenytoimxx & pherobabition.
I/V Terbuta line

Therapy is started with an initial bolus of 10 mg /kg over 30 mint followed by an nifuriarxx at the rate of 0.1 mg/kg/mint which may be increased by 0.1mg/kg/mml every 30 minutes upto a maximum of 4mg/kg/mmxx or until there is a fall in PaCo2 with clinical improvement.

Dose of terbutalim should be reduces by half, if therapy there is used con covvintently.

S/E – Tachycardia arrythemia, HIN, myoxxal hypeghycemia, hypokalcemia

xxx xx xx
Magnesium sulphate

Acts by counteracting calcium medicated smooth muscle contraction through its mechanism on calcium homeostasis in inhibition of acetylcholine release and direct action on smooth muscle contraction and sedation.

Dose: 30-70mg/kg in 20-30 min. Available in a 50% solution.

Serum levels greater than 4mg/dl are necessary for bronchodilation.

Onset of action occurs within a few minutes of I/V infusion and lasts for 2 hours.

S/E: Flushing, malaise, hypotension, aselfexia, respiratory depression & arrhythmia.
Role of Antibiotics

Limited to

i) Patient who are running high grade fever, look sick & toxic

ii) TLC (Pchymaph) rasdxxx

iii) Sprtum is presented with prescsxx of pohyperphusxx & not eosinephils

iv) CXR – gisilidationxx
Role of Antihistamines, Mucolytics, Cough syrup & sedation

- Non sedating, more patient H-1 receptor antagonists appear to achieve more effective, histamine blockade. Recent studies have demonstrated significant reduction in severity of symptoms & bronchodilation with concomitant use of antihistamine.
- In some patients they may make the secretion viscid thus adversely affecting expectoration. Mucolytics & cough syrups are not helpful. Sedation is harmful.
Any child with signs of life threatening attack, should be immediately transferred to ICU. If the child has been receiving therapy & has shown poor response after being observed for a few hrs or develop sign of impending respiratory failure (persistent hypoxemia, exhaustia, change in level of serorium) transfer to ICU.
Management

The focus of case continues to be

* Close observation &
* Delivering of nebulized B2 against combined with steroids & possibly aminophylline
Intubation & controlled ventilation

If the patient does not referred to drug, Intubation & mechanical ventilation is the last option indications are:-

1- Failure of maximal pharucologic therapy

2- Cyanosis & hypoxemia (P2O2< 60 mm of kg)

3 -P2O2 > 50mmHg & rising by more than 5mm Hg/hr

4- Minimal chest movements
5- Minimal air exchange
6- Severe chest retraction
7- Deterioration in mental status, lethargy or agitation
8- Recumbent & diaphoretic patient
9- Pneumothorax or pneumomedistiurs
10- Respiratory or cardiac arrest
A volume cycled ventilator is recommended with 100 respiratory rate 8-12/m and long expiratory time I:E ratio of 1:4 or 1:3 to prevent hyperinflation. Airway observation in itself comes extrinsically PEEP, therapy and expiratory pressure PEEP should be minimal. Tidal volume of 10-12 ml /kg & peak airway pressure < 40-50 cm of water should be maintained.
High inspiratory flow rates should be kept to improve gas exchange. This can be achieved with heavy sedation or use of muscle relaxants. Throughout ventilation, bela-2 agonists are nebulized into the inspiratory circuit of ventilator. In the ventilated patients, therapeutic bronchoscopy with lavage after administration of saline. Sodabicorhxx and a cotylcrpterteria has been used in very ill patients with persistent mucus hugging, to present atelactasis to commial pneumonia.
Role of Droperidol

It is a safe sedation with bronchodilator properties. It may be used in asthmatic on assisted ventilation. It antagonizes bronchoconstriction mediated by alphaadrenergic receptors in peripheral airway. Recommended dose in 0.22 mg/kg & its main side effect with hypotenuse
Role of Ketannire

It relaxes smooth muscle directly increases chest wall compliance and also decreases bronchospasm in ventilated asthematic children.

Loading dose 0.5-1.0 mg/kg followed by one infusion of 1.0-2.5 mg/kg/hr in ventilated patients.

S/E. Amythmias, increases secretions & lonyngospasm.
Helium oxygen mixture has been used to reduce air viscosity & treat upper airway distention. Inhaled anaesthetic agent Halothon, Isofluane, ether.
Management during recovery phase

The frequency of inhalation should be reduced gradually, and oral drug should be instituted in place of parenteral medication.
Prevention of Future Attacks

The following points must be observed to prevent exacerbation of asthma:

1- Written instructions should be provided to parents regarding administration of drug during acute asthma episode.
2- Parents should be taught has to recognize deteriorating control, both clinically & by measurement of PRFR on older children

3- Patient should know when to seek medical help & whose ,& response children regularly long term

4- Therapy should be planned deprobig up the stage &affordability
4- Simple methods of delivery like MDI with spacer & rotacap inhalers should be easily available with the patients.

5- These should be written public giving clear guideline of management for acute asthma in the hospital.

6- Frequency & severity of exacerbation may be reduced by avoidance of allergies & smoothly, Haxx arexx polluted please.
Thank You