

# Status Asthmaticus



By Tim Chang 2020

## Question 1

A 12 year-old boy with history of asthma presents to ER with a 12 hour history of cough and wheezing. The mother administered albuterol every 4 hours prior to bringing the child to the ED.

## Question 1 Continued

After the initial 3 doses of nebulized albuterol-atrovent and oral dexamethasone were administered, the patient was started on continuous nebulized albuterol, IV magnesium sulfate, and supplemental oxygen due to non-improving tachypnea, prolonged expiratory wheezing, and oxygen desaturation to 91%.

## Question 1 Continued

After observation for 30 minutes, you noticed lethargy, slowing of respiratory rate to normal, and oxygen desaturation <90%.

## Question 1 Continued

Which one of the following would be the next best management in the ED?

- A. Heliox
- B. Endotracheal Intubation
- C. Noninvasive Ventilation
- D. Ketamine
- E. Chest Physiotherapy

## Question 1 Answered

Which one of the following would be the next best management in the ED?

- A. Heliox
- B. Endotracheal Intubation
- C. Noninvasive Ventilation
- D. Ketamine
- E. Chest Physiotherapy

## Noninvasive Ventilation

- Includes CPAP/BiPAP
- NIV is well tolerated and improves RR and respiratory scores in status asthmaticus (Carroll et al. 2006)
- Change of ICU disposition to floor when administered in ED (Beers et al. 2007)

## Noninvasive Ventilation

- Can reduce the need of intubation if there is a positive response within 1-2 hours (Allen & Kaminsky 2007, Rehder 2017)
- Indications to Escalate:
  - Children's intolerance
  - Cardiopulmonary arrest
  - No improvement after 2 hours

## Heliox

Rationale: lower gas density; decrease flow resistance; increasing ventilation (TV x RR)

Original Recommendation: NAEPP 2007 suggested beta-agonist with heliox for life-threatening exacerbations due to improved drug delivery and greater symptomatic improvement (Kim et al. 2005, Hess et al. 1999)

## Heliox

- No significant difference in pulmonary function compared to oxygen (Rodrigo et al. 2006 Cochrane Library)
- Mixture of 70% helium is ideal; not beneficial for patients requiring higher FiO<sub>2</sub> than 30% (Reuben & Harris 2004 BMJ)
- No change in LOS when using beta agonist with Heliox (Bigham 2010)

## Endotracheal Intubation

- Considered last resort in cardiopulmonary arrest, severe hypoxia, or rapid mental deterioration
- Complications increasing M&M (UTD):
  - Dynamic hyperinflation air trapping- hypotension, hypoxia, pneumothorax
  - Increased bronchospasm from foreign body
  - Infection
- 2-4% mortality rate vs. 0.03% for non-intubated

## Ketamine

- Observed bronchodilation; unconfirmed mechanism
- No benefit compared to standard treatment/placebo (Allen & Macias 2005, Jat & Chawla 2012)
- Improved oxygenation and decreased oxygen requirements for intubated patients- 1st line for analgesia before intubation (Goyal & Agrawal 2013)

## Chest Physiotherapy

- No improvement to airflow when compared to standard treatment for children (Asher et al. 1990)
- No controlled studies demonstrating effectiveness; may produce bronchospasm (Hoffman et al. 1987)

## Teaching Point Summary

During impending respiratory failure after all standardized treatments have been exhausted, there are evidence for the use of IV terbutaline and NIV prior to intubation and transfer to ICU.

# Resources

- Up-to-date
- Respiratory Care Journal
- British Medical Journal
- Critical Care from Biomedical Central