

**District III EMS
Quality & Improvement
Case of the Month – November, 2005
*To Bag, or Not To Bag***

*If you have any questions or comments, please feel free to contact me at
Daniel.Wolfson@vtmednet.org*

Chief Complaint: Asthma Attack

Pre-hospital course:

An ALS crew arrives to find a 35 yo CAO3 female c/o sudden onset of asthma attack. The crew was informed that the patient has a history of asthma and uses albuterol but could not locate her inhaler. The patient was breathing at a rate of 40, with a pulse of 100 and an oxygen saturation of 95% on room air. She had wheezing present in all lung fields and poor air movement in the lower lung fields. She was able to whisper full sentences.

The patient was placed on 100% oxygen by NRB mask and her oxygen saturation increased to 98%. The radio room was contacted for albuterol orders but was unable to locate a physician (this problem was reviewed with the radio room and physician staff). During transport the patient continued to hyperventilate with an oxygen saturation of 98%. It was felt that her air movement was poor and respirations too rapid, so the patient was provided assisted ventilation with a bag mask valve and coached when to take a breath.



Emergency Department Course:

The patient arrived in the Emergency Department being bagged by EMS staff at a rapid rate. All oxygen was removed and the patient was noted to be spontaneously hyperventilating with a respiratory rate of 42 and oxygen saturation of 100% on room air. The patient was given an albuterol updraft and verbal reassurance and her breathing improved. She was discharged with an albuterol inhaler.

Quality Improvement:

The teaching point in this case is how to manage the hyperventilating patient.

We have had several instances in the past few months where the EMS crew has attempted to slow a hyperventilating patient's breathing by use of the bag mask valve or by re-breathing into a paper bag. While such treatment may be beneficial to the patient who is suffering from Hyperventilation Syndrome (HVS: a condition of rapid respirations of unclear etiology that may mimic an acute asthma exacerbation or myocardial infarction in its presentation with dyspnea, wheezing, and chest pain and has a significant overlap with panic disorder), it can be disastrous for the patient that has another etiology for their hyperventilation. Deaths have occurred in patients with acute myocardial infarction, pneumothorax, or pulmonary embolism misdiagnosed as HVS and treated with paper bag re-breathing.

The preferred treatment is to transport the hyperventilating patient to the ED with supplemental oxygen as needed. Do not try to slow their breathing. Once more serious causes of the hyperventilation have been ruled out in the ED, the patients breathing can be slowed by a combination of reassurance and anxiolytic medications. Let's examine the physiology behind this in order to understand why.



A patient may be hyperventilating for an organic reason such as metabolic acidosis, pulmonary edema, acute asthma exacerbation, acute MI, pneumothorax, or pulmonary embolism. If this is the case, slowing the patient's breathing is contraindicated. Think about the physiology. If a patient's breathing is slowed by use of the BVM or by re-breathing into a paper bag, their CO₂ level will increase and O₂ level will decrease. While this may be helpful for the hyperventilating patient suffering from HVS, it can cause fatal hypoxia or acidosis in the patient with one of the organic conditions just mentioned like metabolic acidosis or pulmonary edema. These patients need just the opposite treatment, an increase in oxygen to improve hypoxia and a decrease in CO₂ to decrease acidosis.

Take Home Message:

Do not attempt to slow the breathing of the hyperventilating patient. Assisted BVM ventilations should only be administered when a patient's breathing is absent or inadequate. Transport the patient to the ED for a full evaluation. Only after other life-threatening etiologies of the patient's hyperventilation are excluded should attempts be made to slow the respiratory rate.

Note: Photos of the patients depicted in this case review are from a publicly posted google site and are not of the actual patients involved in the case, but depict a similar presentation.