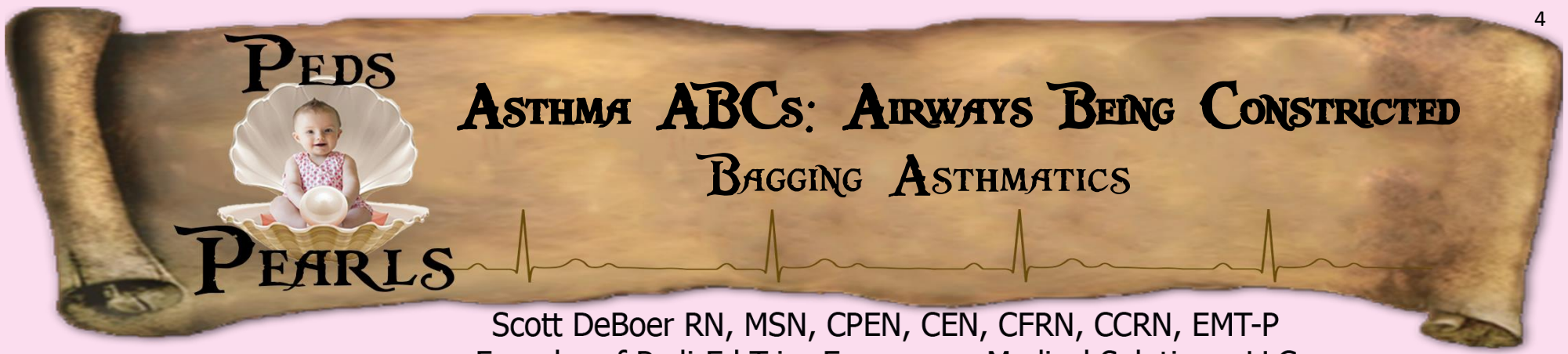


Asthma ABCs: Airways Being Constricted

Bagging Asthmatics

Scott DeBoer RN, MSN, CPEN, CEN, CFRN, CCRN, EMT-P
Founder of Pedi-Ed-Trics Emergency Medical Solutions, LLC
Contributed by: **Marlene Bokholdt MS, RN, CPEN**
with insights from Stu McVicar RRT, FP-C, CCEMT-P

Asthma is all about air movement (or constriction thereof). We need to consider both the anatomy and the physiology of the respiratory system, the structures, and the functions. When we talk about asthma and constricted airways, we can identify three big components:

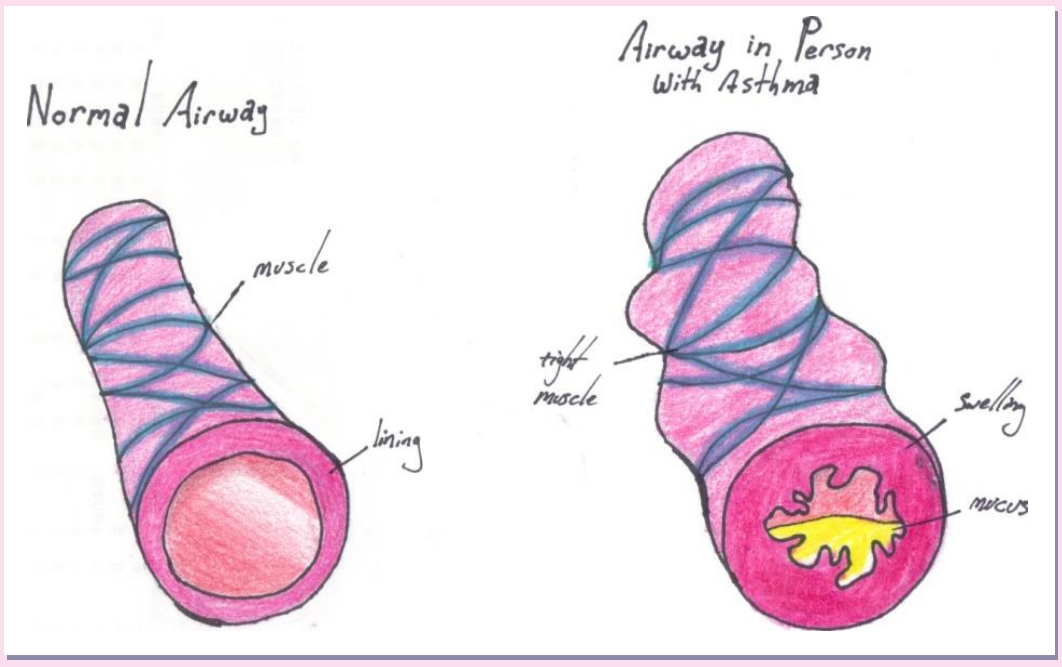
1) Airway inflammation

2) Smooth muscle contraction

3) Secretions filling the lower airways

To better understand asthma, let's look at how those changes in the anatomy affect the physiology. We usually think about asthmatic patients having trouble with taking a deep breath. But there is another really big problem with asthma and that is the inability to exhale fully. So, what's going on inside the chest that makes asthma so bad?

Despite what you may have heard or thought, asthmatics do not generally have normal chest X-rays. Granted, they rarely have infiltrates or signs of pneumonia (unless something else is going on), but the chest X-ray of a patient with an exacerbation of asthma will tend to show lungs that are hyperinflated and therefore, hyperexpanded. That means the dark parts look darker and the arch at the diaphragm is flattened. Additionally, the great vessels are sometimes compressed (squished) resulting in decreased vascular markings.



If this expanding and compressing gets bad enough, the heart is also squished and may appear long and narrow. As we all know, to stay alive, two things have to happen; Air has to go in and out and blood has to go round and round. With severe asthma, both of these may be compromised.

As you can imagine, both a flat diaphragm that is unable to help you exhale and a "squished" heart are both bad things! Remember that the problem with asthma is not only getting air in, but also <u>getting air out</u>!

If you are manually "bagging" your patient, chances are that you will need to **SLOW DOWN THE BAGGING** to minimize hyperinflation! Make the exhalation phase far longer than inhalation. Make it even longer if you see signs of decreased cardiac output such as pale, cool skin, weakened pulses, tachycardia, or even worse, dropping blood pressure.

If your intubated asthmatic is mechanically ventilated, you can force air in, but it may seem like it never fully comes out. If you take your patients off of the vent for a moment and watch them as they exhale, you may think that it is taking way too long before they take their next breath. So, you may need to adjust the ventilation rate to allow <u>far more time</u> for exhalation.

Imagine that you are assuming care of a 4-year-old asthmatic child. With all of the excitement going on, you notice that your patient is intubated and being bagged at a rate of 50 times per minute. With this seriously fast bagging rate, it should be no surprise to find all of the signs of decreased cardiac output as previously described. This child is not only on the edge of the cliff, but about to fall off! You gently take over ventilation and with SLOW bagging (i.e., a rate of 8) her condition SLOWLY starts to improve.

As you have just shown your colleagues, the asthma issue is compounded with the cardiac output issue. It is crucial to allow time for filling the heart. Your patient's recovery is very much about the cardiopulmonary interactions in this case! Bagging too fast increases the intrathoracic pressure and often affects venous return to the heart.

The best way to determine the optimal ventilator rate is to LISTEN!!! Give a breath and listen until the patient reaches the end of exhalation or at least close to the end of exhalation. Then and only then should you (or the ventilator) give another breath. Sometimes, in really bad asthmatics, you will actually have to push on their chest to get air out.

Moral of the story

Overbagging the pediatric asthmatic patient is bad. A very long exhalation phase is good. Air goes in and out… Blood goes round and round… Any variation of this is a bad thing!



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Info@PediEd.com 1-888-280-PEDS (7337) PediEd.com

