The First Line of Defense

Effects and Benefits of an Epinephrine Auto-Injector

Pratham Singh - November 21, 2013
Introduction

After reading *The New York Times*’ article (Sittenfeld, 2013) on Ammaria Johnson and her tragic passing, I became fixated on finding out why the school let such an awful event take place. Ammaria Johnson was an outgoing first grader attending Hopkins elementary school. She was severely allergic to peanuts to the extent that consuming a single nut would cause her airways to constrict. Unfortunately, one day on the playground, she ate a nut and began reacting to it within minutes. The school staff was not permitted to administer any child with some other student’s epinephrine shot, so they called for medical attention. By the time the ambulance had transported Ammaria to the hospital, the anaphylactic shock had caused cardiac arrest and took her life. After learning about this, I was very much unsettled. I chose to research on the most effective option for someone in Ammaria’s position. My findings stated that an epinephrine auto injector can stabilize anaphylaxis within minutes. By writing this paper, I hope to explain how absolutely essential having an accessible EpiPen is for someone who suffers from anaphylaxis. At the same time, I want to express how important it is for an ordinary citizen to understand anaphylaxis and what an EpiPen does, as well as how to administer it. The more people that can correctly use an EpiPen in case of an emergency, the more lives can be saved. This research article is directed towards finding how any EpiPen can save someone’s life during anaphylactic shock. It will primarily focus on the medical affects of an EpiPen after it is used on someone suffering from anaphylaxis. Also included will be instructions on using an epinephrine auto-injector, the effects of epinephrine in one’s body, and the availability of EpiPens for the public. To begin, we need to define anaphylactic shock in terms of how it influences the body.
Anaphylactic Shock

What is Anaphylactic Shock?

WebMD describes Anaphylactic Shock as a potentially fatal condition, if not treated immediately (2013). It is a severe allergic reaction which is caused by the body’s own immune system. When our immune system creates the antibody “immunoglobulin E” it begins to perceive harmless substances such as food to be a pathogen. Medicine Plus reports that, “Anaphylaxis can occur in response to any allergen. Most common causes include: drug allergies, food allergies, and insect bites” (Schwartz LB, 2011). This causes hives, swelling and a radical drop in blood pressure. If one does not get immediate medical attention, these symptoms can progress into increased heart rate, shock, unconsciousness and, in some cases, death.

Who is Affected by This Condition?

Many consider anaphylaxis to be the Black Plague of the 21st century. According to the studies conducted by the Center for Disease Control in 2013, food allergies among children has risen by 50% between 1997 and 2011. Researchers are not quite sure why this increase is present. The Food Allergy Research & Education website provides statistics which state, “food allergies result in more than 300,000 ambulatory-care visits a year among children under the age of 18” (FARE Website, 2013). The researchers at FARE also claim that young adults with food allergies are the ones at most risk for,
“fatal food-induced anaphylaxis.” (FARE Website, 2013) As indicated by the facts, we can see how this relentless disease is growing rampant in today’s society. Unfortunately, there is yet to be a cure found for this condition. The only long-term treatment is avoiding the certain food allergen that triggers the immune system. The best option during anaphylactic shock, however, is using an EpiPen.

Epinephrine Auto-Injector

How Can a Pen Save a Life?

During Anaphylaxis, the body begins to lower its blood pressure, break into hives, and swell. Uneasy breathing, difficulty swallowing, and losing consciousness can also occur. The EpiPen is the most immediate treatment for anaphylactic shock. It delivers a dose of epinephrine into the bloodstream which promptly constricts blood vessels causing blood pressure to rise back to normal levels. The blood flow allows for swelling to decrease and keeps all the body’s organs from failing. The effects of this medicine are effective only for a short time. Now that the adrenaline is administered, seeking medical attention is the next vital step.

How to Use an EpiPen

First off, it is essential that every person carrying an EpiPen is capable of correctly administering it to themselves and others. The EpiPen® (epinephrine) 0.3 website (2013) offers a detailed step-by-step instruction sheet on operating an EpiPen. Here is what it states:
**Step 1 - Prepare:** Flip open the yellow cap of the EpiPen and slide the auto injector out of the carrier tube. Grasp the EpiPen in a fist with the orange tip facing downward. With the other hand, releases the blue safety pin by pulling straight up. Do not twist or bend it.

**Step 2 - Administer:** Hold the outer tip of the auto injector near the outer thigh. Next, push the injector firmly into the thigh at a 90° angle. Make sure to listen for a ‘click’ sound. Hold the EpiPen steadily on the thigh for approximately 10 seconds to complete the injection process.

**Step 3 - Finalize Injection:** Pull the auto injector out of the thigh and allow the orange tip to extend and cover the needle. Next rub the injection area for another 10 seconds.

After injecting the epinephrine, contact the emergency medical help service right away.

**Caution:** Do not inject EpiPen into buttocks or intravenously. Never put fingers in front of orange tip. Do not attempt to take apart the EpiPen.

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**Effects of Epinephrine**

Epinephrine, most commonly known as adrenaline, is the body’s natural jump starter. In life-threatening situations, adrenaline is released from medulla of the adrenal glands and spread throughout the entire body. This causes vasoconstriction, meaning the body’s blood vessels constrict and cause blood pressure to rise. At this time, the heart accelerates the force of cardiac constrictions which redistributes blood flow to every part of the body and muscles gain a substantial amount of energy to dispose of in
the “fight or flight response”. This is the main reason why epinephrine is immediately administered in case of anaphylaxis. With the body in anaphylactic shock, the blood pressure begins to plummet. This leads to organ system failure if not treated within a certain time frame. The quickest way to administer the epinephrine is through the mid-anterolateral aspect of the thigh. This is a skeletal muscle meaning it will facilitate rapid absorption into circulation. If injected subcutaneously, for example the buttocks, the absorption rate will slow and the epinephrine will be less effective. In addition, Medicine Plus cautions to never give an epinephrine shot intravenously. It can cause an overdose and lead to hypertension and pulmonary edema. Knowing this information is vital to saving the person’s life. For instance, when receiving medical attention after injecting the epinephrine, it is important to know what you have just done. Explaining to the paramedics that adrenaline has already been administered will keep an accidental overdose from occurring.

**EpiPens for the Public**

With many unfortunate incidents, much like Ammaria’s, occurring in society today, our political representatives are generating new laws to ensure everyone’s safety. According to Marie Clare Jalonick, the Justice Department has recently declared that food allergies can be, in some cases, considered a disability under law (Jalonick, Associated Press, 2013). The first major effect of this should be seen in public areas. Just as a public place is expected to accommodate disabled people with ramps for easy access, they will now be required to have accessible epinephrine auto injectors in case of emergencies. A feasible example of this would be having EpiPen containers that resemble fire extinguisher displays. Secondly, this has proven to be a huge step towards having state law incorporate EpiPens into the
school system. In this past year, Virginia passed a law allowing its schools to stock and administer epinephrine. Associated Press reporter Lucan L. Johnson states, “Fifteen other states followed suit, mostly with legislation that allows schools to have the epinephrine” (Johnson, Associated Press, 2013).

With radical modifications like these, most schools in these states will be well equipped to handle severe adverse allergic reactions. However, even with fifteen states altering school policies, not all children attending public school in America were studying in an equipped institution until this week. The White House Blog’s Valerie Jarrett states that on November 13, President Barack Obama, “signed into law the School Access to Emergency Epinephrine Act, which will encourage schools to plan for severe asthma attacks and allergic reactions” (Jarrett, 2013). This law authorizes the Department of Health and Human Services to allocate funding to all states that allow for schools to maintain an emergency supply of EpiPens on campus. This will not only relieve millions of parents who worry about their allergic child being at school, it will also dramatically increase the chance of a student surviving an anaphylactic episode.

**For the Future**

This topic of allergic reactions is becoming one of the most discussed topics in the media simply due to the number of people it is affecting. With millions suffering from food allergies, cautionary measures need to be taken. The steps an individual should to take, to ensure the safety of themselves and people around them, are familiarizing themselves with the symptoms and treatments of this disease, and sharing the knowledge. Knowing the symptoms of allergic reactions and being able to quick-
ly respond to can save a person’s life. Being able to use an EpiPen and calling for medical attention can keep someone from dying. This nation is heading in the right direction by passing laws such as the School Access to Emergency Epinephrine Act. Not only does this allow for schools to take action, it helps bring this subject into the limelight and be seen by the media and public.
References


