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REFRESHER

BEYOND THE BITE

By Corey Sargent, EMS Education Specialist

As EMS providers, we associate insect allergies with the bites and stings of bees, ants, wasps, and mosquitoes (injectant allergens). We know that a reaction to a bee sting in an allergic person can be lethal if treatment isn't immediate. More than two million people in the U.S. have an allergy to insect stings. In fact, more than 100 deaths every year are fatal reactions attributed to arthropod venom. (Betha, 1998) These cases make the news, but the vast majority of victims suffer only minor itching, burning, and swelling.

Contacting body parts, body fluids, or waste products (contactant allergens) can cause some common allergic reactions. Inhaling dust particles composed of pulverized carcasses, shed skins, and excrement (inhalant allergens) can also cause a reaction. Allergies caused by contacting or inhaling insect material from home or the

workplace can have significant health consequences. Symptoms may range from dermatitis and eczema to rhinitis, congestion, and bronchial constriction. With severe cases of sensitivity, the victim may experience respiratory distress, asthmatic reactions, and anaphylactic shock.

We commonly think of insects being an outdoor allergen. Flies, moths, ants, and crickets are all contributors to the airborne allergens during those few non-winter months. Surprisingly, the counts of these insect products are often present in comparable amounts to other allergens such as mold. However, as Minnesotans we spend an unusually large amount of time indoors. Arthropod allergens must not be a big problem for us, right? Wrong! In indoor air arthropod allergens arise from housedust mites, cockroaches, carpet beetles, spiders, fleas, and silverfish. Levels of these indoor allergens will fluctuate depending on air movements and electrostatic

INSIDE

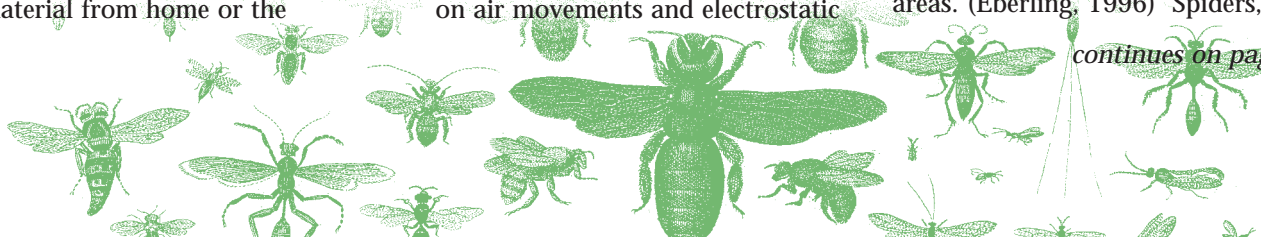
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forces within the room.

The dust mite is a microscopic arachnid that lives where humans live. It prefers warm, moist environments as well as mattresses and carpets. The dust mite lives on shed human skin by breaking it down with an enzyme it produces and eating what is left after the process. Dust mites have become an increasing problem recently because newer houses are generally more airtight. Silverfish and cockroaches live in warm, damp environments. Their excrement, skin, and vomit are responsible for allergies.

In the U.S., 10-12% of the population are allergic to cockroaches and they have been implicated in an increase in asthma cases among children in urban areas. (Eberling, 1996) Spiders,

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Farewell Message

It's still hard for me to believe even though I know it's true – after 20 years, and nearly 14 of them in EMS Education, I'm leaving HCMC. I'll be returning to a clinical setting to manage the Intensive Care Unit at Unity Hospital. It's an exciting time for me – the chance to try a new career, learn new things, develop new skills – and I'm looking

forward with anticipation (and a little anxiety) to the challenges and opportunities that lie ahead.

It's also an occasion for me to reflect on the outstanding years I've had at HCMC. I am grateful for the many experiences I've been afforded which have helped to prepare me for this new position. These past 14 years in EMS Education have been especially great. It has been a privilege to be a part of such an outstanding EMS system and to have worked with so many

terrific people. As I've been cleaning my office and sorting through old files in preparation for my departure, I've been reminded of so many experiences and people. What a lot of memories (and paper) accumulate in 14 years.

So it's time for me to say goodbye and to thank you for your part in making these years so rewarding, successful, and fun!

Best wishes to all!

Judy Everson, EMS Education Manager

Who's doing CPR?

By Paul Finney, R.N., EMS
Education Specialist

Over the past year, I have been coordinating the Automated External Defibrillator (AED) Program at Hennepin County EMS Education. It's given me the opportunity to meet with several EMS providers. One of the comments I hear most often is, "When we arrived, no one was doing anything. Everyone was just standing around."

The frequency of these comments surprised me. Previous to working at EMS Education, I had worked both in HCMC's ED and CCU. When someone would cardiac arrest in these settings, our time to respond was literally measured in seconds. I thought it would be interesting to see who is initiating CPR on patients in the field.

Admittedly, these results are far from scientific, but I thought you might find them interesting.

Following is the process we use to perform quality assurance for the AED Program.

When one of the agencies we work with has a run in which they utilize an AED, a face sheet is sent to me. That form includes data about the run (date, time, crew, etc.). One of the sections asks the question, "CPR initiated by?" The person filling



out the form chooses the correct response from the following list: citizen, police, fire, other health professional (R.N., M.D., etc).

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BITE... *continued from page 1*

fleas, and beetles prefer the dryer environments but depend on us and our food stores as their food source. Bites, carcasses, and shed skin are the common allergens from these sources. Millipedes secrete a liquid that smells like iodine. If crushed, this secretion can cause skin rashes. If inhaled, respiratory irritation may develop.

We must also talk about ingestant allergens. Who hasn't opened a box of cereal or grain product to find that the bugs have gotten there first? We don't normally eat foods that we can see are grossly contaminated, but it is likely that we ingest small doses of insect material in food we consider to be edible. The FDA, in fact, even has acceptable levels of insect parts per million in consumable foods. Virtually any food item could be allergenic to those with sensitivity to insects.

Exposure to these allergens is not limited to our personal lives. Occupational exposures are numerous. Food industry workers can be exposed to all forms of arthropods. The incidence of asthma is unusually high among workers who handle products containing Lepidoptera (moth and

butterfly) parts. Workers exposed to the beetle and weevil (Coleoptera) pests of stored grains and milled products report skin itching, hives, rhinitis, and even asthma. (Phillips & Burkholder, 1995)

Without question, we know that insects (i.e. flies) carry "filth" diseases such as typhoid fever, cholera, and other pathogenic organisms from casual contact. We also know that other diseases such as malaria, anthrax, and Lyme disease are transmitted mechanically (i.e., mosquitoes, ticks). We also know that contact with insects is inevitable.

Where does this leave us? We can't live within a bubble; we will be exposed to the allergens. The question really is how do we minimize our exposure? It is important for the allergy sufferer to recognize and avoid insect allergens before the onset of extreme sensitivity. Those at high risk from either home or work need to take environmentally protective measures and recognize those foods that might place them at risk. For allergy sufferers, a little knowledge and common sense can go a long way.

Insects seem so small, how could they cause such a problem? Perhaps we need look only to other arthropods for better understanding. Shellfish (shrimp, lobster, crayfish) are arthropods well known for their ability to induce mild to severe allergic reactions to those who are susceptible. As EMS providers we need to be open to the possibility of an allergic reaction from a seemingly unknown source.

References:

Bethea, L. 1998. Don't Let Allergies "Bug" You This Summer, www.allergiesasthma.com

Eberling, W. 1996, Urban Entomology, Chapter 9, Part 1, Pests Attacking Man and His Pets, pp. 3-8

Phillips, J. & Burkholder, W. 1995. Allergies Related to Food Insect Production and Consumption, Volume 8, Issue #2, USDA-ARS Stored-Product Insects Research Laboratory, Department of Entomology, University of Wisconsin-Madison



Tea for Two or One?

Understanding and Managing Emergencies in the Pregnant Woman

By Rachel Knudson-Ballard, EMS Education Specialist

Fortunately for most women, pregnancy is a healthy time that proceeds without many problems. However, pregnant women are at risk for and have diseases just like the non-pregnant patient. Pregnant women also experience trauma from both blunt and penetrating forces, like all other non-pregnant people. However, there are many physiological changes, mostly respiratory and cardiovascular, that will influence your care when presented with an emergency involving a pregnant woman.

There are many cardiovascular changes that occur with pregnancy. Total blood volume increases by almost 50%. Most of this increase is in the plasma volume, which slowly increases by one-third during pregnancy. The red cells increase by a much smaller amount. This accounts for the “anemia of pregnancy” – a dilutional anemia. Maternal blood loss of up to 30% can be compensated for with few, if any, changes in vital signs. This is due to uterine vasoconstriction and shunting of uterine blood flow to mom at the expense of the fetus. Thus, when a woman shows signs and symptoms of shock, she has undergone significant blood loss and the fetus has already been greatly compromised.

The heart’s stroke volume, rate, and size also increase, especially in the latter stages of pregnancy. Blood pressure and vascular resistance actually decrease by about 5-15 mmHg as compared to the non-pregnant state. As the uterus matures, especially in the last trimester of pregnancy, mom’s body position can greatly alter her hemodynamic status. Simply lying supine on a backboard can compress the inferior vena cava and the aorta enough to decrease blood pressure by 25-30%.

As the uterus enlarges to

accommodate the growing fetus, it nearly becomes a lower intrathoracic organ, causing the diaphragm to move upward. The tidal volume increases and the respiratory rate may increase slightly resulting in a respiratory alkalosis. As a result, there is little compensatory reserve if she is ill or injured. For instance, if a pregnant woman sustains a pneumothorax from trauma or has an asthma attack, her ability to tolerate it may be diminished as compared to the pre-pregnant state. “Hypoxia, hypercarbia (CO₂ retention) and hypocarbia all occur more rapidly, especially with assisted ventilation.”²

This is important information to consider when caring for the pregnant patient who also has asthma. Astute attention is required when ventilating and oxygenating pregnant asthmatics. “Asthma affects one of every 100 pregnant



women, making it the most common respiratory disorder and potentially the most serious disease complicating pregnancy.”¹ Fortunately, most pregnancies in asthmatic women are uneventful.

The gastrointestinal system also undergoes changes. Heartburn is a common occurrence in pregnant women due to hormonal changes that cause relaxation of the esophageal sphincter. The growing

uterus pushes on the stomach causing higher gastric pressures. As a result, they are much more prone to aspiration when unconscious.

Death related to pregnancy itself is quite rare, estimated to occur in 1 in every 30,000 deliveries.² More common causes of cardiovascular collapse in pregnant women occur at delivery and include drugs from overdose or abuse, amniotic fluid embolism, and eclampsia. Other perinatal causes due to maternal physiological changes include hemorrhage; aortic dissection; pulmonary embolus; and congestive cardiomyopathy.¹

How can we manage some of these problems?

Whatever the nature of the emergency, consideration of the unborn child is of utmost importance. The goal is to provide maximum treatment for mom in order to provide the fetus with the most optimal chance of survival. After all, you ARE treating two patients.

Perhaps the best treatment is prevention. Many of the cardiovascular problems pregnant women experience are due to the pressure of the pregnant uterus pressing against the inferior vena cava. Manually pushing the uterus to the left, or positioning the patient on her left side will prevent hypotension. If the patient is already hypotensive, the left lateral position will decrease the severity of the hypotension. If the patient is on a backboard, tilting the board about 30° will help prevent hypotensive episodes. Expect and treat shock before signs and symptoms appear — the fetus will be affected long before symptoms are present in mom.

If there are any potential breathing problems, think about oxygen early — even if she doesn’t appear to be distressed. To minimize the risk of aspiration in the unconscious woman, the Sellick’s maneuver

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Tea for Two... *continued from page 3*

(cricoid pressure) may be desired when assisting ventilations by BVM or oxygen powered resuscitators. Consider manual exhalation techniques and slow ventilation rates when breathing for a pregnant asthma patient in respiratory failure or arrest. This will help to minimize CO₂ retention and promote CO₂ elimination while also maximizing oxygenation. (Hennepin County protocol for PPV in asthma arrest patients is a rate of 1 ventilation every 6 or 7 seconds).

When faced with a pregnant patient in cardiac arrest, remember the simple BLS techniques you can employ **before** initiating chest compressions:

- BVM/PPV with the Sellick's maneuver
- Manually displace the uterus to the left OR
- Place a wedge or several pillows under the right hip

Drugs and defibrillation are utilized in the same manner as in non-pregnant patients. If the woman does not respond to resuscitation efforts within a few minutes post-arrest, the need for an emergency c-section must be considered for optimal fetal survival.

Emergencies involving pregnant women present unique challenges because of the physiological and anatomical changes that take place throughout pregnancy. Knowledge of these changes and implementation of some minor modifications in your care of these



women will go far in optimizing the outcomes for both mom and infant.

References:

¹Gary Hals, MD, PhD, and Todd Crump, MD; The Pregnant Patient: Guidelines for Management of Common Life-Threatening Medical Disorders in the Emergency Department, *Emergency Medicine Reports*, March 13, 2000.

²Richard O. Cummins, MD, MPH, MSc, et al, ACLS for Experienced Providers, Instructor Manual, American Heart Association, ©1999

Additional Resources

Trauma Nursing Core Course, Provider Manual, Emergency Nurses Association, © 1995

Basic Trauma Life Support for Paramedics and Advanced EMS Providers, edited by John Emory Campbell, Alabama Chapter, ACEP, 3rd edition, © 1995.

Support Instructor's Manual for 1997-99 states, "The most important link in the chain of survival in the community is the layperson." Even with all the supporting research and media coverage of the importance of CPR, we as EMS personnel still need to do our part to support the layperson in seeking proper training in CPR, and then encourage him or her to perform the skill when needed. This will increase our odds of responding to a viable patient when the time comes.

CPR? . . . *continued from page 2*

In 1999, I received a total of 167 AED run face sheets. Twenty-three of the reports did not document CPR data so I have excluded those from the totals. Based on the remaining 144 reports:

- Police/fire started CPR in 89 of the reports (61.8%).
- Health care providers initiated CPR in 25 of the cases (17.4%).
- The disturbing part to me was that there were only 30 cases in which citizens/laypersons had initiated CPR (20.8%).

The first sentence in the American Heart Association Basic Life

The Beat Goes On ...

"The Beat Goes On" program was instituted to recognize EMS professionals who used the Automated External Defibrillator in the field with successful results. Those recognized receive a specially designed pin and certificate acknowledging their achievements. Congratulations to these recent 'Beat Goes On' honorees:

Lake Benton First Responders

Kris Christensen
Jennifer Dahl
Wayde Kenneke
Pam Kimes
Bev Martinson
Chris Miller
Tom Miller

Minneapolis Fire Department

Ron Jogodka
Mike Montgomery
Greg Phillips
Max San Roman, Jr.
Shane Thorn
Todd White

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