***** 2011 REMAC Protocol revisions take effect July 1 – see below *****

Continuing Medical Education - News & Information

May 2011 - Volume 17, Issue 5 **Multi-Agency Edition**

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Inside this issue:
(bold = new content)

Journal CME Newsletter

Published monthly

FDNY - Office of Medical Affairs

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From the Editor

***** 2011 REMAC Protocol revisions take effect July 1 *****

Although normally scheduled for April 1, this year's NYC REMAC protocol update has been changed for July 1 implementation in the field and on certification exams.

Until July 1, only the 2010 protocols are in effect.

Always see **nycremsco.org** for the current approved protocols.

REMEMBER: the protocols on the street are the protocols on the exam!

Mandatory REMAC Credentialing Fee

A $25 fee has been instituted by NYC REMAC for all new or recertifying paramedic credentials. On successfully completing a REMAC exam, candidates will receive a temporary letter verifying certification. They will soon after be mailed a memo directly from NYC REMSCO requiring a completed application, proof of NY State paramedic certification, and credentialing fee by money order only. On receipt, a permanent NYC REMAC certification card will be issued.

Please direct inquires on this process to NYC REMSCO at 212-870-2301

REMAC Exam Study Tips

REMAC candidates have difficulty with:
* Epinephrine use for peds patients
* 12-lead EKG interpretation
* ventilation rates for peds & neonates

REMAC Written exams are approximately:

15% Protocol GOP	40% Adult Med. Emerg.
10% BLS	10% Adult Trauma
10% Adult Arrest	15% Pediatrics

Certification & CME Information

- *Of the 36 hours of Physician Directed Call Review CME required for REMAC Refresher recertification, at least 18 hours must be ACR/PCR Review (which may include QA/QI Review). The remaining 18 hours may include ED Teaching Rounds and OLMC Rotation.*
- **Failure to maintain a valid NYS EMT-P card will invalidate your REMAC certification.**
- **By the day of their refresher exam all candidates must present a letter from their Medical Director verifying fulfillment of CME requirements. Failure to do so will prevent recertification.**
- **FDNY paramedics, see your ALS coordinator or Division Medical Director for CME letters.**
- **CME letters must indicate the proper number of hours, per REMAC Advisory # 2000-03:**
  - 36 hours - Physician Directed Call Review
    - *ACR Review, QA/I Session* (**minimum 18 hours of ACR/QA review**)
    - *Emergency Department Teaching Rounds, OLMC Rotation*
  - 36 hours - Alternative Source CME - **Maximum of 12 hours per venue**
    - *Online CME*
    - *Lectures / Symposiums / Conferences*
    - *Journal CME*
    - *Clinical rotations*
    - *Associated Certifications:*
      BCLS / ACLS / PALS / NALS / PHTLS

REMAC Refresher Written examinations are held monthly, and may be attended up to 6 months before your expiration date. See the exam calendar at the end of this Journal. To register, call the Registration Hotline @ 718-999-7074 by the last day of the month prior to your exam.

REMAC Quarterly Written and Oral examinations are held every January, April, July & October. Registration is limited to the first 50 applicants. See the exam calendar at the end of this journal.

REMAC CME and Protocol information is available, and suggestions or questions about the newsletter are welcome. Call 718-999-2671 or email swansoc@fdny.nyc.gov

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REMSCO: www.NYCREMSCO.org
NYS/DOH: www.Health.State.NY.US

Online CME: www.EMS-CE.com www.MedicEd.com www.EMCert.com www.WebCME.com www.EMINET.com

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Barbara, Paul	**80306**	**Jameson, Angus**	**80309**
Ben-Eli, David	**80298**	**Kaufman, Bradley**	**80289**
Cox, Lincoln	**80305**	**Munjal, Kevin**	**80308**
Freese, John	**80293**	**Schenker, Josef**	**80296**
Giordano, Lorraine	**80243**	**Schneitzer, Leila**	**80241**
Gonzalez, Dario	**80256**	**Schoenwetter, David**	**80304**
Hansard, Paul	**80226**	**Silverman, Lewis**	**80249**
Hegde, Hradaya	**80262**	**Soloff, Lewis**	**80302**
Hew, Phillip	**80267**	**Van Voorhees, Jessica**	**80310**
Huie, Frederick	**80300**		

**** See page 1 of this journal for an important notice on REMAC Protocol update*****

May 2011 Journal CME Article

BLAST INJURIES: PREPARING FOR THE INEVITABLE

Most explosions are accidental and occur in homes (primarily due to gas leaks or fires) or as a result of significant occupational hazards that exist in many industries. Intentional explosions, in contrast, are responsible for relatively few injuries and deaths[1] (e.g. 150 in the United States in 2004). Prior to1995 few civilian emergency medical providers in the United States had either significant experience or interest in the effects of explosive devices. This abruptly changed in 1995 with the destruction of the Alfred P. Murrah Federal Building by a truck bomb in Oklahoma City. That single blast resulted in more than 750 casualties and 167 fatalities.

1995 Alfred P. Murrah Federal Building

Terrorists worldwide are increasingly using bombs, especially improvised explosive devices (IEDs), against civilian targets. Compared to a chemical, biological, or nuclear attack, a first responder is far more likely to encounter a scenario secondary to a bomb blast. This is because these devices provide terrorists a dramatic, low-risk, yet high-yield tool for making a public statement. A lone terrorist or a small group with limited skills and resources can prepare and deliver an explosive device with great impact. The components required to assemble such a device are readily available, few skills are needed to make one, and a variety of options for delivery of the device to a target (e.g. postal service, pipes and tubes, suitcases and purses, toys, cellular phones, and computers) make this method of attack possible for such unsophisticated groups.

The dispersal of forensic evidence makes it difficult to identify the bomb maker and increasingly, information resources such as the Internet and television shows such as C.S.I. make the chemical knowledge easily accessible to construct these devices. An explosion often causes havoc, with multiple victims, and gets the international exposure a group desires for their cause.

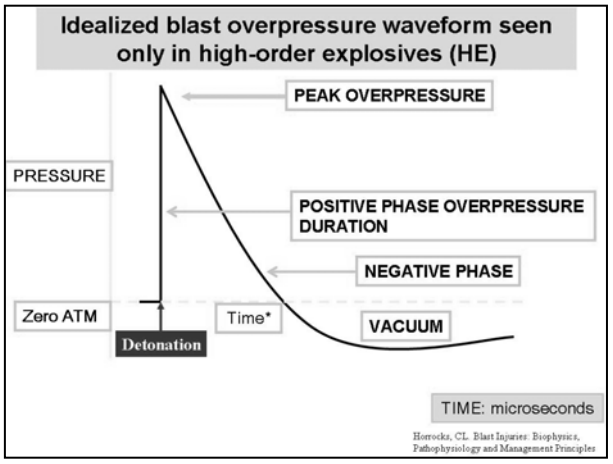
Over the last several decades, terrorist bombings were usually isolated to a few "trouble spots" such as Northern Ireland (1970's) and Paris (1980's) but now incidents are occurring all around the world from the U.S. to the Middle East and Asia. But more recently, terror tactics have included the increasing use of suicidal/homicidal bombers who deliberately accompany the explosive device (often wearing it) to ensure its maximum effect.[2] Devices strapped to humans in this way represent a cheap version of a "smart bomb" or guided missile. These bombers have walked or driven into buses, subways, cafes, and government buildings. Examples include the homicidal bombing of the London transit system in 2005 and Russia's Moscow subway system and Domodedovo Airport in 2010 and 2011, respectively. Each of these incidents resulted in over 100 casualties and 30 fatalities. Excluding the events of September 11, 2001, the use of suicide devices in the U.S. has yet to occur, but given the political climate this scenario is very likely.

The following article will briefly review the details of explosive devices and instead focus primarily on the mechanisms of injury, recognition of early signs of blast injuries, and the natural course of the medical problems caused by explosive devices. This information is critical to those of us tasked with responding to such events.

CATEGORIES OF EXPLOSIVES

An explosion occurs when a specific solid or liquid substance is rapidly (chemically) converted into larger volumes of gas under pressure with resulting energy release. This energy is released in three forms: heat, light, and sound. Although it can be intense, the light release is of short duration and usually of little consequence. The sound, while startling, is associated with the movement of the shock front and shock wave from the epicenter of the explosion. The most violent form of energy, which is responsible for the destructive power of explosives, is heat. The heat is the seed of all energy transfers and translates into the destructive expansion of the superheated gases created by explosives[3].

To understand the real destructive power of a blast, we must recall that gases expand when heated. Think of the tires on your car—if you measure the pressure when they are cold, it is less than when they are hot. As the gaseous product of an explosion rapidly expands it compresses the surrounding air to form the shock wave, also known as the blast wave, and pushes it outward.



The phase of the explosion in which the pressure front is higher than surrounding atmospheric pressure is called a positive wave pulse (over-pressurization). This blast wave moves from the epicenter of the detonation and travels at or above the speed of sound. The speed and magnitude of the blast wave is proportional to the energy being released. A large blast of high order explosives will create a potentially deadly blast wave. Other blast products: gases, particles, fragments of the container and from the surrounding environment (including victims) also travel outward but more slowly.

The result of this positive pulse wave moving out from a point in all directions is the creation of a vacuum at the initial detonation point where the ambient pressure is less than the atmospheric pressure. This creates a suction effect and the air displaced by the positive wave pulse returns to fill the space of the explosion. This phase is known as the negative wave pulse, which last up to 10 times as long as the positive wave pulse.

The blast wave rapidly loses its pressure and velocity with distance and time. The speed, duration, and pressure of the shock wave are affected by the following:

- The type and amount of explosive: the larger the explosion, the faster the shock waves and the longer they will last.
- Surrounding medium: an underwater blast wave travels at greater velocity then in open air because, unlike gas, water is incompressible thereby making it possible to receive injuries three times the distance that would normally be required to cause such injuries had the same explosion happened in open air.
- Distance: the farther from the explosion, the slower the shock wave's velocity and the longer its duration.
- Open versus closed environment: a blast wave that would cause only modest injury in the open can be lethal if the victim is in a confined space or near a reflecting surface such as a solid wall or building. When blast wave is reflected

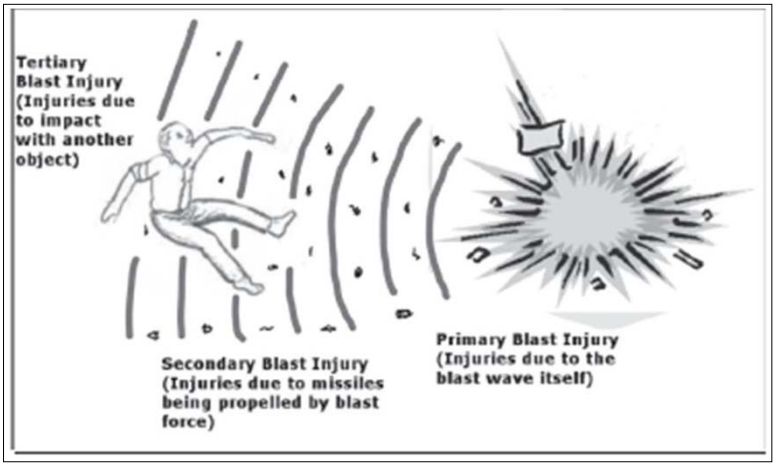
off a solid object its strength may be magnified 2-9 times. In a confined space explosion, in addition to the magnification of the blast waves, there is also the generation of toxic gases and smoke.

High-order explosives are chemical materials that have an extremely high reaction rate. They are designed to detonate and release their energy very quickly and are capable of producing a shock wave or an overpressure phenomenon that could result in a primary blast injury (see below). Common examples include nitroglycerine, dynamite, TNT (trinitroluene), ammonium nitrate-fuel oil (ANFO) mixture, and composition C-4. Low-order explosives, on the other hand, are designed to burn and release energy (solid to a gaseous state) rather slowly. These explosives are often called propellants because they are used to propel a projectile through a barrel or a weapon. They do not produce an over-pressurization shock wave as high-order explosives. Examples include gunpowder, black powder, and petroleum-based incendiary bombs such as napalm. Due to a slower velocity, low-order explosives are not capable of producing an over-pressure wave resulting in a blast wave. And while lower-order explosives do not produce primary blast injuries, both low-order and high-order explosive cause secondary, tertiary, and quaternary injuries.

PATHOPHYSIOLOGY

Explosions have the potential to inflict many different kinds of injuries on multiple victims. Injuries due to explosions are classified as primary, secondary, tertiary, and quaternary blast injuries.

Primary Blast Injuries



Primary blast injuries are caused only by high-order explosives and are due to the direct effects of the blast wave on the body and tissue. There are three general mechanisms of injury: Spalling, implosion, and shearing.

Spalling occurs when the shock wave moves through tissues of different densities resulting in a disruption between the two tissues (e.g. blood vessels within a solid organ such as the liver). As the overpressure blast wave hits the interface between the tissues, it encounters resistance and releases energy into the tissues (think of a wave breaking as it rolls over a sandbar). This release of energy causes physical damage to the tissues.

Implosion occurs when the shock wave contacts areas of entrapped gas such as the middle ear, lungs, and intestines. The pressure wave causes the gases to rapidly contract (implode) and then rapidly expand during the negative pressure phase. This leads to rapid movement and disruption of the tissue. Essentially the gas filled tissues (lungs, ears, intestines) pop. Perforation of the eardrum or tympanic membrane, and associated fracture of the bones comprising the middle ear, will result in hearing loss as the mechanism is no longer able to transmit sound to the inner ear. While it used to be felt that the absence of tympanic membrane rupture was a reliable indicator that no significant internal injuries were present, this has been proven false and we no longer use this as a screening tool.

Shearing occurs when adjacent tissues of different densities are accelerated by the blast wave at different speeds. This differential in acceleration between tissues causes a disruptive force that results in separation of the tissues. Think of what happens in a high-speed motor vehicle accident when a victim is suddenly stopped, the internal organs decelerate at different rates than the body as a whole. This results in injuries such as concussions, and tearing of tissues such as the aorta.

Secondary Blast Injuries

Secondary blast injuries are likely to affect individuals at a greater distance from the site of the blast as the shrapnel and other objects turned into projectiles by the release of energy from the explosion travel farther than the blast wave. It is the most common category of injury in terrorist bombings and low-order explosives. Almost any type of object may become a projectile if it is in the direct vicinity of the blast. Objects commonly encountered include pieces of the explosive device itself, objects packed around the device intentionally (such as nuts, bolts, nails, and ball bearings), glass and other construction materials, and body fragments of the person who detonated the device as well as those victims at the epicenter of the blast. These flying objects may impact any part of the body causing a wide spectrum of injuries.

Metal objects packed with explosive device

Victim leg with multiple penetrating wounds 2^0 to ball bearings from an IED.

Smooth and round objects such as ball bearings fly in a predictable manner just like bullets. Nails and screws will always fly headfirst. Irregularly shaped objects may tumble through the air and through body tissues creating immense wounds. It is critical to remember that what appears to be a superficial and small wound may, in the setting of a blast, be the only sign of massive internal trauma due to this tumbling and the very high velocity of projectiles. Caution must be used when trying to distinguish superficial wounds from true penetrating trauma in this setting.

Tertiary Blast Injuries

Tertiary injuries include deceleration injuries due to people being thrown into fixed objects, or blunt impact injuries due to objects being thrown into people. This category also includes falling debris such as glass and penetrating trauma due to impalement. In many parts of our city this represents a huge potential for injury with high-rise construction and the glass exteriors of many buildings. These types of injuries are much more familiar to EMS providers as they may occur under normal circumstances without an explosion.

Quaternary Injuries

Include buns from fire or radiation, poisoning from carbon monoxide or other toxic products of the explosion, and inhalation of dust or chemicals from the explosion. This category also includes exacerbation of chronic medical conditions caused by the event.

Mechanisms of Blast Injury

Category	Impact	Mechanism of Injury	Types of Injuries
Primary	Unique to HE, direct blast effects (over--and under-pressurization) with body surfaces and tissues.	•Produced by contact of blast-shockwave with body •Spalling, implosion, and shearing effects on tissue •Gas-filled organs (lungs, ears, intestines) at particular risk	•Tympnaic membrane rupture •Eye injuries •Blast lung •Blast abdomen •Concussion
Secondary	Projectiles propelled by explosion	Ballistic wounds produced by: •Primary fragments (pieces of exploding device) •Secondary fragments (environmental fragments, e.g. glass)	•Penetrating injuries •Traumatic amputations •Lacerations
Tertiary	Propulsion of body onto hard surface or object, or propulsion of objects onto individuals	•Whole body translocation •Crush injuries caused by structural damage and building collapse	•Blunt injuries (including fracture and traumatic amputations) •Crush syndrome •Compartment syndrom3e •Concussion
Quaternary	All explosion-related injuries, illnesses, or diseases not due to primary, secondary, or tertiary mechanisms. Includes exacerbation or complications of existing conditions.	Any body part may be affected.	Burns (flash, partial, and full thickness) Crush injuries Closed and open brain injury Asthma, COPD, or other breathing problems from dust, smoke, or toxic fumes Exacerbation of chronic medical conditions: angina, hypertension, etc.

INITIAL EVALUATION

Responder safety, as always, remains a paramount concern. There are many hazards when operating at the scene of an explosion. Blast sites may need to be swept for secondary devices (before beginning operations) and victims may be armed or booby trapped. Ongoing fire, environmental exposures (air-pollutants), radiation or chemical weapons, and unsafe or collapsed structures, all present significant hazards to responders. There is also a magnification of the usual hazards of EMS operations due to the disaster state caused by significant stress on the system or even the overwhelming of resources. Normal concerns such as universal precautions may seem less important when faced with multitudes of patients, limited resources, an unsafe scene, and the possibility of secondary devices. This will be an inherently dangerous operation, but responders must take personal responsibility to protect themselves and minimize such dangers.

When faced with a number of patients that overwhelm available resources, all healthcare providers must institute a triage system. It may be very difficult to quickly change from our usual mindset of doing everything possible to save every patient, to one where we choose to not care for some critical patients in order to save a higher number of less critical patients who have a greater chance of survival. Our region is about to implement a modification of a system called START Triage, and it is those priorities and patient categories that will determine the initial evaluation and treatment of patients, keeping in mind that the purpose of triage is to allow for the distribution of resources to accomplish the greatest good for the greatest number of patients / victims. In essence we are talking about saving as many as we can.

The use of a formal system allows responders to not become paralyzed by the sheer volume of patients and provides a framework for this rapid sorting. The FDNY has recently modified the START Triage system to add an ORANGE category. This new category is designed to capture those patients who do not meet RED criteria for immediate

removal from the scene, but are likely to become unstable in the near future. This prevents overwhelming of resources and allows for the rapid removal of the true red category patients from the scene.

Orange, simply defined, is a category of patients for whom your knowledge, training, and experience suggest that the severity of their injuries or illness are more severe than the groups into which standard START triage may place them. Most likely the orange sector will include patients who have an exacerbation of a pre-existing medical condition such as asthma who may be able to be transported to non-trauma centers, but it may also include patients for whom you knowledge allows you to recognize that, despite their yellow or green categorization, their condition is more severe than their vitals and mental status may suggest. Frequent (e.g. every15 minutes) re-evaluation of patients in this ORANGE category is important to identify those who may require later but appropriate triage to red.

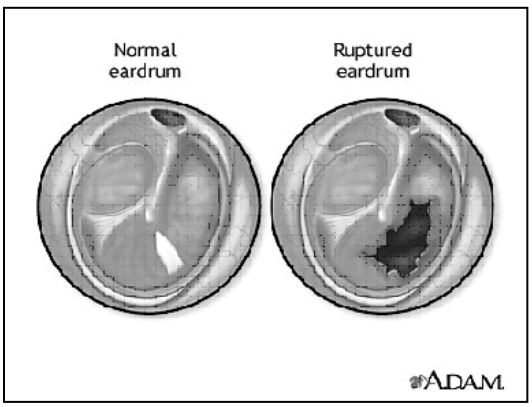
At large incidents such as a blast in a large crowd, resources will be overwhelmed—at least initially. Because of this, only life and limb saving interventions should be undertaken in the initial phase of response (e.g. hemorrhage control, needle decompression). The exception to this is that those patients who are in cardiac or respiratory arrest, or in whom arrest is imminent, should not be treated until adequate resources are available. There will likely not be resources to support ongoing life-sustaining interventions (e.g. CPR, BVM) during the initial phase of such a response. As a rule, definitive care is not performed during triage.

While specific transportation decisions are left to the officers in charge of the scene, the same philosophy of the greatest good for the greatest number remains the basis for these decisions. It is the medical condition of the patient that guides not only their transport priority, but also the destination choice (e.g. trauma vs. general).

IDENTIFICATION AND MANAGEMENT OF SPECIFIC INJURIES

Traumatic Brian Injury (TBI)

Primary blast waves may cause concussion, mild traumatic brain injury, and more severe intracranial injuries. These injuries are sustained without a direct blow to the head from a projectile or impact with a stationary object. Often the severity of the brain injury is directly related to the proximity of the patient to the blast. This has become a particularly troublesome type of injury among military personnel with the huge increase in attack from roadside IEDs. A soldier in an armored vehicle may not be struck by any projectiles but will still be impacted by the blast wave causing significant internal injury. Patients with TBI or concussion may initially complain of only a headache. More severe injuries, particularly those with intracranial edema or bleeding, will present with the classic signs of increasing ICP including disorientation, irritability, confusion, and coma. More subtle injuries may have no immediate symptoms and may manifest as apparent behavioral or psychiatric disorders later on.



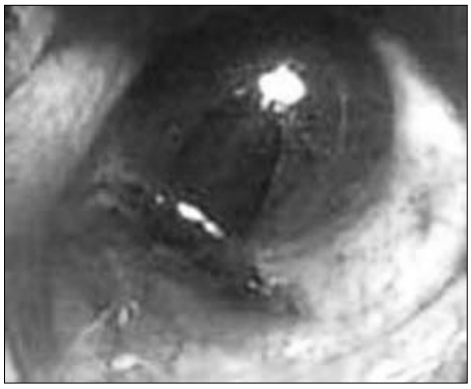
Tympanic Membrane Rupture

As discussed above, ear trauma represents a very common blast injury. The over- pressure wave violently moves the tympanic membrane and may cause rupture as well as disruption of the bones of the middle ear. The magnitude of ear injuries is related not only to the blast nature, but also to the

orientation of the ear to the blast as the tissues of the external ear funnel pressure into the canal. Patients may have bleeding from the ears and/or may not be able to hear. They may also have tinnitus (or ringing in the ears). Some patients may experience a temporary deafness related to injury of the inner ear mechanisms. Inner ear injury may also cause vertigo (a sensation of spinning). Such primary blast injuries of the auditory system cause significant morbidity, but are easily overlooked. There is no specific prehospital treatment for such injuries.

Ocular Trauma

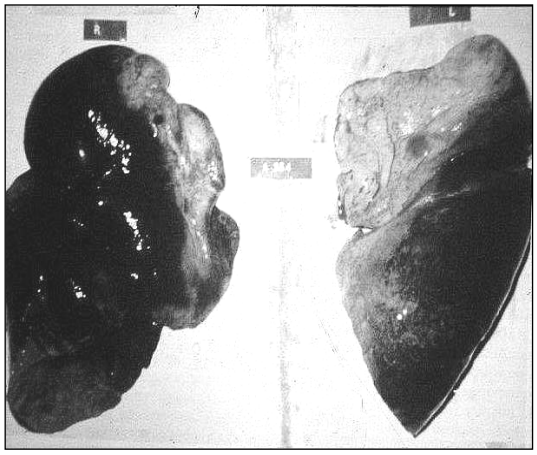
Up to 10% of all blast survivors will have significant eye injuries. These injuries most often involve perforations from high velocity projectiles but may also include thermal burns and chemical irritation or burns. Symptoms may include pain, irritation, foreign body sensation, decreased vision, or double vision. Physical findings include decreased visual acuity, periorbital swelling or contusions, redness, subconjunctival hemorrhage (blood overlying the sclera), and globe perforation or impalement. Eyes that are not perforated or suspected of being perforated should be irrigated if there is chemical irritation and protected. Impaled objects, perforated globes, and globes that have been enucleated (displaced out of the socket) should be protected and stabilized. Covering the non-injured eye may help prevent consensual eye movement.



Blast Lung or Pulmonary Barotrauma

Blast lung is the most common fatal primary blast injury among initial survivors. It occurs due to the positive and subsequent negative air pressure wave compressing and then expanding the gasses within the lung. This often results in a pneumothorax and/or hemothorax. Signs of severe blast lung will usually present at the time of the initial evaluation but can present up to 48 hours after the explosion. The clinical triad of apnea, bradycardia, and hypotension characterize severe blast lung.

Blast lung should be suspected for any patients with cough, dyspnea, hemoptysis (spitting up blood) and/or chest pain. Initial management for these patients is supplemental oxygen, and if resources allow, positive pressure ventilation. Recognize the likelihood of coexisting pneumothorax and the fact that positive pressure ventilation will worsen pneumothorax and speed the development of tension pneumothorax. Victims in this situation may very well need needle decompression.



Penetrating Chest Trauma

Secondary and tertiary blast injuries may include penetrating chest trauma. It is important to remain vigilant for respiratory compromise secondary to pneumothorax in these patients. Occlusive dressings should be applied and immediate needle decompression is indicated if there are physical signs of tension pneumothorax. These include dyspnea, tachypnea, JVD, tracheal deviation, decreased or absent lung sounds, subcutaneous emphysema, tachycardia, and hypotension. This is an immediate life threatening condition that may be temporarily reversed through decisive action.

Blast Abdomen

Gas-containing sections of the GI tract are most vulnerable to primary blast effect. The overpressure wave may cause immediate or delayed bowel perforation resulting in sepsis. Additionally, victims may suffer internal hemorrhage, solid organ lacerations, and testicular rupture. Blast abdominal injury should be considered in anyone exposed to a high order explosion. Initial treatment includes fluid resuscitation as indicated for signs of decompensated shock.

Signs of Blast Abdomen

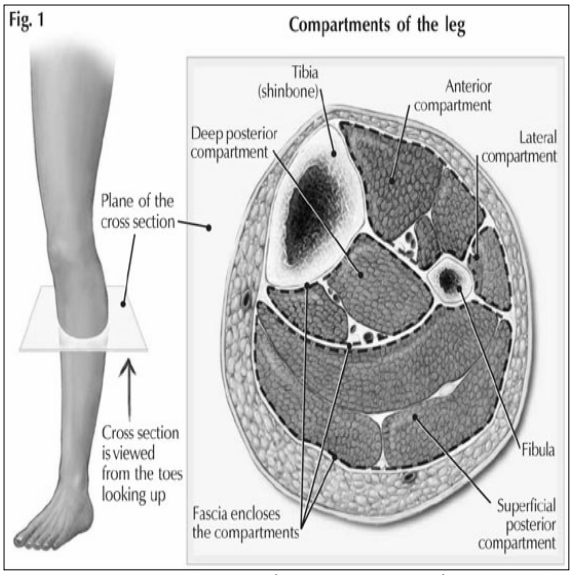
-Abdominal pain
-Nausea
-Vomiting
-Vomiting blood
-Testicular pain
-Unexplained Hypovolemia
-Distention/rigidity of abdomen

Penetrating Abdominal Trauma

Secondary and tertiary blast injuries may include penetrating or blunt abdominal trauma. Blunt trauma may be difficult to distinguish from blast abdomen and has similar signs. Treatment is similar and consists of fluid resuscitation for persistent hypotension and signs of decompensated shock. Impaled objects should never be removed, but may be shortened if necessary to facilitate transport.

Musculoskeletal Trauma

Fractures, dislocations, and ligamentous injuries are all common in blast survivors and are usually the result of secondary or tertiary injury mechanisms. Long bone fractures should be splinted to relieve pain and aid in bleeding control. Amputations are most commonly the result of primary blast injuries rather than secondary or tertiary injury mechanisms. Bleeding should be controlled using the hemostatic dressing when authorized and in the future tourniquets will likely be used for such injuries. Amputated limbs should be transported with the patient when possible, however re-plantation is very unlikely due to the tearing and jagged nature of the separation. Head injuries or other multi-system trauma will often be present as well.



Compartment Syndrome and Crush Syndrome

Extremities that have significant weight applied to them may cut off circulation and are subject to developing compartment syndrome. This is because the blood vessels (along with the muscles) in the extremities run in compartments made of thick connective tissue that cannot stretch. When blunt injury (e.g. a weight applied) causes swelling in the compartment the blood supply may be interrupted not only by the weight, but by swelling and edema within the compartment causing an increase in pressure within the compartment. This may result in muscle cell death

and subsequent disintegration of the cells. This releases intracellular contents into the tissue. If the blood supply to the limb was blocked by a weight, and that weight is lifted after a period of time, the sudden rush of the substances (mainly potassium and myoglobin-a muscle protein) into the rest of the body's circulation can lead to immediate life threatening cardiac arrhythmias as well as later kidney failure, liver failure and death. Rescue medics have specific protocols to address these problems including treatment of the hyperkalemia and protection of kidney function.

CONCLUSION

Initial care of the blast victim is similar to a regular trauma care but differs in a few significant ways. Extensive or ongoing resuscitation care should not be attempted in situations where triage is needed. Members called upon to perform triage must remember that although we want to help every victim, we must adhere to an accurate and organized triage process in order to do the greatest good for the greatest number. Even after triage, assessing and intervening in the ABCs may be all the care we are able to provide at such a scene. Providers must maintain a high level of suspicion for blast wave injuries—even those not outwardly visible—when conducting triage and reassessments prior to and during transport. Having an understanding of the pathophysiology and common injury patterns described above will aid in our preparation for the next bomb blast or accidental explosion in our city.

Written by: **DOUG ISAACS, MD**
FDNY EMS Director of Training

ANGUS JAMESON, MD
FDNY EMS Fellow

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CME JOURNAL 2011_J0 04: BLAST INJURY QUIZ

1. Which basic blast mechanism is most likely to affect a patient's gas filled organs and structures?

a. primary blast mechanism
b. secondary blast mechanism
c. tertiary blast mechanism
d. quaternary blast mechanism

2. The shock wave from a blast causes injuries through a combination of different mechanisms including:

a. compression, scalding and claudication
b. spalling, shearing, and implosion
c. implosion, compression, and scalding
d. shearing, implosion, and claudication

3. Which of the following defines primary blast injury?

a. unique to high-order explosives
b. results from penetrating or blunt trauma
c. typically involves the ear, liver, and kidney
d. often occurs in isolation without evidence of additional injury

4. Which category of blast or explosive injury is a result of trauma caused by being thrown against a fixed object?

a. primary
b. secondary
c. tertiary
d. quaternary

5. Common primary blast injuries include:

a. blast lung, concussion and tympanic membrane rupture
b. penetrating chest trauma, fractures, and traumatic amputations
c. hyperglycemia, crush syndrome and COPD
d. blast lung, penetrating abdominal injury and crush syndrome

6. Which of the following are NOT true regarding blast injuries?

a. Liberal use of intravenous fluids should be used for blast lung injury.
b. Patients may present with combined injuries, especially blast and burn or blast and crush.
c. Blast lung, intestinal perforation, and traumatic brain injury are all examples of primary blast injuries.
d. Secondary blast injuries caused by flying debris generated by an explosion are the most common cause of injury in a blast event.

7. Blast lung injury should be suspected if any of the symptoms are present following a patient's exposure to the detonation of an explosive device except:

a. hemoptysis
b. chest pain
c. palpitations
d. dyspnea

8. Which of the following energies released from an explosive device is responsible for the destructive power of an explosive device?

a. heat
b. sound
c. light
d. vibration

9. Signs of blast abdominal injuries include all of the following except:

a. peritoneal signs
b. tachycardia
c. rectal pain
d. vomiting blood

10. Which of the following could lead to an immediate life-threatening condition secondary from crush syndrome upon reperfusion of a body part after the removal of a heavy object off a patient who has been trapped for a significant period of time?

a. dehydration
b. hyperkalemia
c. hypothermia
d. hyperthermia

Journal CME Credit Answer Sheet

Based on the CME article, place your answers to the quiz on this answer sheet.
Respondents with a minimum grade of **80%** will receive **1 hour** of Online/Journal CME.

Please submit this page **only once**, by one of the following methods:

- FAX to 718-999-0119 or
- MAIL to FDNY OMA, 9 MetroTech Center 4th flr, Brooklyn, NY 11201

Contact the Journal CME Coordinator at 718-999-2790:

- three months before REMAC expiration for a report of your CME hours.
- for all other inquiries.

Monthly receipts are not issued. You are strongly advised to keep a copy for your records.

Note: if your information is illegible, incorrect or omitted you **will not** receive CME credit.

check one: ☐ EMT ☐ Paramedic ☐ _____
other

_____
Name

_____
NY State / REMAC # or "n/a" (not applicable)

_____
Work Location

_____
Phone number

_____
Email address

Submit answer sheet by the last day of this month.

May 2011 CME Quiz		
1.		**Required for BLS & ALS providers**
2.		
3.		
4.		
5.		
6.		**Required for ALS providers only**
7.		
8.		
9.		
10.		

Citywide CME – May 2011

Sessions are subject to change without notice. Please confirm through the listed contact.

Boro	Facility	Date	Time	Topic	Location	Host	Contact
BK	Kingsbrook	TBA	TBA	TBA: call to inquire →	ED Conference Room	Dr Hew	Manny Delgado 718-363-6644
	LICH	5/5	1200-1500	Call Review **RSVP** →	Avram Conference Room "G"	Dr Vlasica	Aaron Scharf 718-780-1859
		6/7	0900-1200	Call Review **RSVP** →	Avram Conference Room "A"		
	Lutheran	4th Wed	1730-1930	Call Review **RSVP** →	Call for location →	Dr Chitnis	Dale Garcia 718-630-7230 dgarcia@lmcmc.com
MN	NY Presbyterian	TBA	TBA	TBA: call to inquire →	Weill Cornell Campus A-950	Dr Ewy	RSVP: ssamuels@nyp.org Ana Doulis 212-746-0885 x2
	NYU School of Medicine	TBA	TBA	TBA: call to inquire →	Schwartz Lecture Hall 401 E 30 Street	TBA	Jessica Kovac 212-263-3293
QN	FDNY-BOT	Cancelled until further notice		---	---	---	---
	NYH Queens	Thursdays	0800-0900	Call Review/Trauma Rounds	East bldg, courtyard flr	Dr Sample	Mary Ellen Zimmermann RN 718-670-2929
	Mt Sinai Qns	last Tues	1800-2100	Lecture or Call Review	25-10 30 Ave, conf room	Dr Dean	Donna Smith-Jordan 718-267-4390
	Parkway Hosp	3rd Wed	1830-2130	Call Review	Board Room, 1st flr		pabruzzino@capitolhealthmgmt.com
	Queens Hosp	2nd Thurs	1615-1815	Call Review	Emergency Dept		718-883-3070
		4th Thurs					
SI	RUMC	5/5	1400	Call Review/Protocol Update	MLB conf room	Dr Ben-Eli	William Amaniera 718-818-1364

2011 NYC REMAC Examination Schedule

Month	REMAC Refresher Exam (Written only - CME letter required)		REMAC Quarterly Exam - $100 fee (Written & 3 Orals Scenarios)			NYS/DOH Written Exam
	Registration Deadline	Exam Date (on Wednesdays)	Registration Deadline	Written @18:00	Orals @09:00	
January	12/31/10	1/19/11	Thursday 1/6/11	Thursday 1/20/11	Thursday 1/27/11	1/20/11
February	1/31/11	2/23/11				
March	2/28/11	3/23/11				3/24/11
April	3/31/11	4/20/11	Thursday 4/7/11	Thursday 4/21/11	Tuesday 4/26/11	
May	4/30/11	5/25/11				5/20/11
June	5/31/11	6/22/11				6/16/11
July	6/30/11	7/20/11	Thursday 7/7/11	Thursday 7/21/11	Thursday 7/28/11	
August	7/31/11	8/24/11				8/18/11
September	8/31/11	9/21/11				
October	9/30/11	10/26/11	Thursday 10/6/11	Thursday 10/20/11	Tuesday 10/25/11	
November	10/31/11	11/16/11				11/17/11
December	11/30/11	12/21/11				12/15/11

The **REMAC Refresher Written examination** is offered monthly for paramedics who meet CME requirements **and** whose REMAC certifications are either current or expired **less** than 30 days. To enroll, call **718-999-7074** before the register registration deadline above. Candidates may attend an exam no more than 6 months prior to expiration. Refresher exams are held at 07:00 or 18:00 hours at FDNY-EMS Bureau of Training, Fort Totten, Queens.

The **REMAC Quarterly Written & Orals examination** is for initial certification, **or** for inadequate CME, **or** for certifications expired **more** than 30 days. Registrations **must** be postmarked by the deadline above. Email swansoc@fdny.nyc.gov for instructions. You are encouraged to **register at least 30 days** prior to the exam - seating is limited. The exam fee as above is by **money order only**. The Quarterly is held at FDNY-EMS Bureau of Training, Fort Totten, Queens.