# BLAST INJURIES

## Abdominal Blast Injuries

### Background

Abdominal blast injuries are a significant cause of injury and death. The actual incidence of abdominal blast injury is unknown. Incidence and clinical presentation of abdominal blast injury will vary significantly depending upon the patient and the nature of the blast. Underwater blasts carry a significantly greater risk of abdominal injury. Children are more prone to abdominal injuries in blast situations due to their unique anatomy. (For further information please refer to CDC's "Blast Injuries in Children—What Non-Pediatric Clinicians Need to Know" fact sheet.)

### Clinical Presentation

Gas-containing sections of the GI tract are most vulnerable to primary blast effect. This can cause immediate bowel perforation, hemorrhage (ranging from small petechiae to large hematomas), mesenteric shear injuries, solid organ lacerations, and testicular rupture. Blast abdominal injury should be suspected in anyone exposed to an explosion with abdominal pain, nausea, vomiting, hematemesis, rectal pain, tenesmus, testicular pain, unexplained hypovolemia, or any findings suggestive of an acute abdomen. Clinical findings may be absent until the onset of complications:

- Clinical presentation of abdominal blast injury may be overt, or subtle and variable, and may include: abdominal pain, rebound tenderness, guarding, absent bowel sounds, nausea and vomiting, fever, and signs and symptoms of hypovolemia or hemorrhage. Victims of closed space bombings are at risk for more primary blast injuries, including abdominal injury.
- Predominant post-explosion abdominal injuries among survivors involve standard penetrating and blunt trauma (secondary and tertiary blast injury), but include primary blast injuries, including ischemia secondary to arterial gas embolism.
- Abdominal injuries are particularly severe in underwater blasts; the lethal radius of an underwater explosion is about three times that of a similar explosion in air because waves propagate faster and are slower to lose energy with distance due to the relative incompressibility of water
- Children are more prone to abdominal blast injury
  - smaller and more pliable walls offer less protection
  - thin abdominal walls offer less protection
  - proportionately larger organs render children more vulnerable to injuries, especially to liver and spleen
- Most common abdominal blast injuries include:
  - Primary: abdominal hemorrhage and perforation (colon most vulnerable to perforation)
  - Secondary: penetrating and blunt abdominal trauma
  - Tertiary: blunt and penetrating abdominal trauma
  - Quaternary: crush injury to abdomen and abdominal wall

### Diagnostic Evaluation

- Work-up similar to standard blunt and penetrating abdominal trauma
  - Serial abdominal examinations, as presentation may be delayed; serial exams may be difficult in young children
  - Laboratory studies
  - Radiological studies: free air, unexplained ileus, intra-abdominal hematoma/hemorrhage, solid organ contusion/laceration, intra-abdominal abscess

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## Initial Management

- ABCs (airway, breathing, circulation) as for all trauma patients
- Nothing by mouth
- Avoid removal of penetrating objects in emergency room (operative intervention due to risk of hemorrhage)
- Antibiotics and tetanus immunization
- Serial exams and laboratory monitoring
- Radiological studies: plain abdominal films, computed tomography [CT] scan, Focused Abdominal Sonography for Trauma (FAST)

## Disposition

- High degree of suspicion for missed or delayed abdominal injuries, including serial exams, close follow-up, and strict return instructions should signs or symptoms of abdominal injury manifest after discharge
- Appropriate referral to trauma center as needed

*This fact sheet is part of a series of materials developed by the Centers for Disease Control and Prevention (CDC) on blast injuries. For more information, visit CDC on the Web at:* ***www.emergency.cdc.gov/BlastInjuries***

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