

Radiation Attack: Medical & Psychosocial Management

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INSTRUCTIONS

The questions that appear throughout this case are intended as a self-assessment tool. For each question, select or provide the answer that you think is most appropriate and compare your answers to the key at the back of this booklet. The correct answer and a discussion of the answer choices are included in the answer key.

Note: These self-assessment questions are not intended for CME credit. To apply for CME or CEU credit, you must complete the CME Test and the Evaluation Form at the back of this booklet and submit them according to the directions provided.

In addition, a sign is provided in the back of this booklet for posting in your office or clinic. Complete the sign by adding your local health department's phone number.

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INTENDED AUDIENCE

Internal medicine, family medicine, and emergency medicine physicians, and mental health care professionals, including psychiatrists, psychologists, and social workers who will provide evaluation and care in the aftermath of a terrorist attack or other public health disaster

LEARNING OBJECTIVES

Upon completion of this case, participants will be able to:

- Discuss the nature of risks to hospital staff caring for patients following a disaster involving the release of radiological materials.
- Describe behaviors and psychological concerns of hospital staff working in a potentially contaminated environment.
- Describe education and communication to improve hospital staff performance following an event of released radiological materials.
- Describe the presentation and management of patients following an event of released radiological materials.

CASE HISTORY

You are employed part-time as a consultation psychiatrist in a small community hospital. Your duties include providing consultation to physicians and administrators during mass casualty events. You are tasked with identifying the mental health needs of both staff and patients.

On a beautiful, sunny Sunday afternoon the local mall is bustling with activity. It is late summer and families are taking advantage of back-to-school sales. A blue mini-van takes a place among the line of vehicles lined up at the entrance with young teens loading or unloading. Minutes later a moderate explosion rocks the entrance of the mall. Panic follows the initial blast as mall-goers run from the immediate vicinity. An elderly man collapses, clutching his chest. Most of the bystanders gradually drift

back and congregate in small groups. Emergency medical technicians (EMTs) and other first responders are at the scene in a matter of minutes. They begin triaging patients nearest the blast and transporting the injured to the hospital. Several police units are present and immediately begin to cordon off the area surrounding the blast. Officers can be overheard directing the gathering crowd to remain behind the tape. No one reports having seen suspicious individuals or other unusual phenomena. As the timing device and other metallic, plastic, and glass components of the explosive device are meticulously gathered and examined, one particularly sharp, new cadet shares his concern that there may have been a radiological agent released at detonation.

There are no deaths associated with the initial blast, however the elderly man who collapsed later dies from complications of a myocardial infarction. Despite efforts to control the release of preliminary and largely unsubstantiated findings of the investigation to the public, the concern of a possible radiation contamination is leaked. Local news stations carry the story in dramatic news breaks over the radio stations and interrupt regularly scheduled television programs. The reports provide few facts and much speculation, fueling fears about lives lost and risk of contamination to the community as a whole.

Your hospital is one of the first facilities to receive casualties. The hospital emergency plan is immediately put into action. You recall the radiation event training and drill you participated in 6 months earlier. The seminar focused on disaster preparedness and management subsequent to the intentional release of radiation. You realize that your role in this event will be vital due to the general fear and anxiety that is part of a radiation attack.

COMMENT: Though generally feared and capable of causing numerous fatalities, nuclear explosive devices require advanced technology and manufacturing processes typically not available to terrorist organizations. In contrast, radiological material can be more readily used as a vehicle for terror by distribution within a community and will cause very few, if any, fatalities. Dispersion can be within food or water supplies, placement of material in a site where air circulation can lead to dispersal (e.g., within a subway system), or by means of an explosive device known as a Radiation Dispersal Device (RDD), or "dirty bomb." Dirty bombs generally consist of waste by-products that are salvaged from discarded medical equipment or nuclear reactors. These can be dispersed through the use of conventional explosives.¹

With an RDD explosion, immediate deaths and injuries are usually secondary to the blast and thermal effects of the detonation.² The severity of illness from the radiation will largely depend on the presence of accompanying injuries, the type of radiation, and the amount absorbed. Severity of illness will additionally depend on means of entry, with ingestion or inhalation of contaminants causing more tissue damage than surface exposure. Radiation and radiological materials pose exceptionally dreaded threats due to their invisible and odorless nature. Even after moderately high dose exposure, one may experience only moderate physical symptoms during the days following the exposure. Fortunately, modern medical care has dramatically improved the survivability of radiation exposure. If contaminated individuals are identified, decontaminated, and treated appropriately, most of those exposed to even higher levels of contamination will survive. The long term effects include an increased risk of cancer, however the current estimates are very low. According to radiation experts at the University of Rochester in Rochester, NY, the biggest risk of an RDD would be panic and not cancer.³ The traffic accidents and stress-induced heart attacks would result in more deaths than the direct effects of the bomb.

Radiation and radiological materials pose exceptionally dreaded threats due to their invisible and odorless nature.

Simply changing a contaminated patient's clothing and washing exposed skin and hair removes 95% of the contamination.

The urgency of radiological decontamination differs from chemical decontamination. Chemical exposure is a medical emergency, because patients can incur further injury from continued exposure. Radiological exposure does not pose an immediate threat and decontamination should never interfere with provision of other life saving medical care. Any residual radiologic particulate matter on patients poses limited risk to others and should be readily removed. Wearing standard disposable surgical attire (i.e., gown, double gloves, shoe covers, and surgical mask) is adequate to prevent contamination.^{4,5} Simply changing a contaminated patient's clothing and washing exposed skin and hair removes 95% of the contamination (the same 0.5% hypochlorite solution used for chemical exposures is also effective in removing radiological contaminants).⁵ Finally, as an extra level of protection, staff members should change their clothing in the middle and end of their shift.

A hospital's response plan should take the following into consideration:

- Establish a communications center for disseminating information to staff and patients
- Distinguish between those needing medical care and those simply exposed to radiation (the latter being capable of receiving treatment/information off-site)
- Implement practices for identifying radiation exposure (i.e. utilize personnel and equipment from the Nuclear Medicine Department for assistance)
- Review the use of personal protective equipment
- Establish a controlled area for contamination
- Prevent the spread of contaminants
- Maintain awareness of all instruments, equipment and personnel that have had contact with contaminated patients
- Provide patients with handouts that describe radiation health risks
- Establish a registry of patients for possible future contact

QUESTION 1

Which of the following describes risk to caregivers of radiologically contaminated patients?

- a. There is no risk to caregivers of radiologically contaminated patients.
- b. Risk of contamination results from poor decontamination practices or failure to wear surgical masks or gloves.
- c. Use of personal protective equipment reduces risk of contamination by 50%.
- d. Working with radiologically contaminated patients exposes one to the risk of specific types of cancer.

Reminder: You can find the Answer Key & Discussion on page 13.

CASE CONTINUES: As the first patients begin to arrive through the doors, none are triaged as needing immediate life-saving care. Several patients present with burns and lacerations from projectiles. A young girl is transported in by the EMTs in a cervical collar. She is noted to have a small amount of blood pooled in the opening of her left ear and diminished hearing, but no other sign of head trauma. Those who are identified as being closest to the initial blast are evaluated for Acute Radiation Syndrome (ARS). The media gains access to this information and begins a campaign of alerting the public to the dangers of ARS.

Anticipating increasing numbers of people with concerns regarding their exposure, the director of the Emergency Department reviews a fact sheet regarding ARS with his physicians and nurses. One of the more experienced nurses reminds her colleagues that it will be important to provide all discharged patients with education on what to look out for after radiologic exposure.

COMMENT: Acute Radiation Syndrome (ARS), also termed radiation toxicity or radiation sickness, is an illness that results when a person is exposed to a very high dose of radiation in a short period of time.⁶ The likelihood that an RDD could release such a large dose is highly unlikely. However, health care providers should remain vigilant for potentially life-threatening conditions even in patients who present with signs/symptoms or mechanisms of injury that appear very benign.

Acute Radiation Syndrome (ARS), also termed radiation toxicity or radiation sickness, is an illness that results when a person is exposed to a very high dose of radiation in a short period of time.⁶

Actively dividing cells with the least amount of differentiation are the most radiosensitive. The stem cells of various tissues are predominantly destroyed, resulting in three ARS syndromes that progress in four distinct stages: prodromal, latent, manifest illness, and recovery (see Table 1).⁷ The initial stage is the prodromal stage, which is characterized by nonspecific symptoms such as nausea, vomiting, and malaise. The earlier the onset of prodromal symptoms after an acute radiation exposure, the larger the dose absorbed.⁸ Subsequently, the prodromal symptoms disappear as radiation exposed individuals then enter a largely asymptomatic latent stage. Despite the absence of outward signs and symptoms, bone marrow functioning is progressively deteriorating. As the underlying organ damage progresses and eventually reaches a threshold, their symptoms manifest with heightened vulnerability to infection, hemorrhage, severe diarrhea, confusion, seizures, and death. Most of the individuals suffering stem cell loss from the bone marrow, and some of those suffering injury to the gastrointestinal tract, will recover as new cells are generated. However, those suffering compromise of the cardiovascular and/or central nervous system face a more dire prognosis with recovery unlikely.

Table 1. Stages of Acute Radiation Syndrome*

Syndrome & Dose [†]	Prodromal Stage	Latent Stage	Manifest Illness Stage	Recovery
Hematopoietic (Bone marrow) >0.7 Gy [‡] (>70rads) (mild symptoms may occur as low as 0.3 Gy)	Onset occurs within 1 hour to days after exposure. Symptoms include anorexia, nausea and vomiting. The stage may last minutes to days.	Stem cells in bone marrow are dying although patient may appear and feel well. This stage lasts 1-6 weeks.	Symptoms are anorexia, fever and malaise. A drop in all blood cell counts occurs for several weeks. The primary cause of death is infection and hemorrhage. Survival decreases with increasing doses. Most deaths occur within a few months after exposure.	In most cases, bone marrow cells will begin to repopulate the marrow. Most individuals will recover within a few weeks up to two years following exposure. The LD 50 [§] is about 3 Gy.
Gastrointestinal >10 Gy (>1000 rads) (some symptoms may occur as low as 6 Gy)	Symptoms are anorexia, severe nausea, vomiting, cramps and diarrhea. Onset occurs within a few hours after exposure and will last about 2 days.	Stem cells in bone marrow and cells lining GI tract are dying, although the patient may appear and feel well. This stage lasts less than a week.	Symptoms are malaise, anorexia, severe diarrhea, fever, dehydration and electrolyte imbalance. Death may occur within 2 weeks of exposure.	Sometimes survivable. The LD100 [¶] is about 10 Gy.
Cardiovascular/Central Nervous System >50 Gy (>5000 rads) (some symptoms may occur as low as 20 Gy)	Symptoms include extreme nervousness and confusion, severe nausea, vomiting and watery diarrhea, loss of consciousness and burning sensations of the skin. Onset occurs within minutes of exposure and lasts for minutes to hours.	Patient may return to partial functionality. This stage may last for hours but often is less.	Symptoms include a return of watery diarrhea, convulsions and coma. Death occurs within 3 days of exposure.	Recovery is not expected.

*Data from Centers for Disease Control and Prevention.⁶

[†]The absorbed doses are "gamma equivalent" values.

[‡]The Gray (Gy) is a unit of absorbed dose and reflects an amount of energy deposited into a mass of tissue (1 Gy= 100 rads).

[§] The LD 50 is the dose necessary to kill 50% of the exposed population.

[¶] The LD 100 is the dose necessary to kill 100% of the exposed population.

QUESTION 2

Which of the following describes the presentation of Acute Radiation Syndrome in the prodromal stage?

- a. Nausea and vomiting
 - b. Severe diarrhea and electrolyte imbalances
 - c. Extreme nervousness and confusion
 - d. Largely asymptomatic
-

COMMENT: ARS results from a brief exposure of most or all of the body to very large doses of gamma radiation that penetrates through the skin and soft tissue, as experienced by many of the survivors of the Hiroshima/Nagasaki atomic bombs. It is usually accompanied with the skin damage associated with Cutaneous Radiation Injury (CRI). However, CRI may occur without the full syndromes of ARS, when the radiation is less penetrating (see Table 2). Beta radiation and low energy x-rays penetrate the tissue less than gamma radiation. Incidental exposures to the radiation sources of radiotherapy equipment may precipitate CRI. Within hours of exposure, patients may present complaining of an itchy reddened rash with a patchy distribution. They may be unable to identify known exposures to heat or caustic chemicals.⁹

The rash and associated symptoms typically disappear in the first 48 hours, leaving the individuals symptom-free for anywhere from a few days to several weeks. This latent phase is followed by recurrence of an erythematous rash, which is further accompanied by blistering and ulceration. Most individuals will be able to heal as the skin regenerates. However, those exposed to doses permeating the deeper basal layer may experience recurrent rashes and permanent damage to include hair loss, damaged sebaceous and sweat glands, skin thinning, alterations in pigmentation, necrosis, and cancer.⁶

When treating patients suspected of CRI, clinicians need to be cognizant of:⁹

- The severity of the cutaneous injury is dependent on both the dose and the depth the radiation is able to penetrate into the tissue.
- Caustic chemicals and heat injuries to the skin result in immediate lesions. In contrast, radiation-damaged skin will not be evident until hours to days later and the lesions typically come and go in a cyclical fashion.
- To adequately treat CRI, providers must prevent secondary infection and provide effective pain management.

Table 2. Stages of Cutaneous Radiation Injury (CRI) ^{7,9}

Stage	Time Period	Description
Prodromal Stage	Within hours of exposure	This stage is characterized by early erythema (first wave of erythema), heat sensations, and pruritus that define the exposed area. The duration of this stage is from 1 to 2 days.
Latent Stage	1-2 days post-exposure	No injury is evident. Depending on the body part, the larger the dose, the shorter this period will last. The skin of the face, chest, and neck will have a shorter latent stage than will the skin of the palms of the hands or the soles of the feet.
Manifest Illness Stage	Days to weeks post-exposure	The basal layer is repopulated through proliferation of surviving clonogenic cells. This stage begins with main erythema (second wave), a sense of heat, and slight edema, which are often accompanied by increased pigmentation. The symptoms that follow vary from dry desquamation or ulceration to necrosis, depending on the severity of the CRI.
Third Wave of Erythema	10-16 weeks post-exposure	The exposed person experiences late erythema, injury to blood vessels, edema, and increasing pain. A distinct bluish color of the skin can be observed. Epilation may subside, but new ulcers, dermal necrosis, and dermal atrophy (and thinning of the dermis layer) is possible.
Late Effects	Months to years post-exposure	Symptoms can vary from slight dermal atrophy (or thinning of dermis layer) to constant ulcer recurrence, dermal necrosis, and deformity. Possible effects include occlusion of small blood vessels with subsequent disturbances in the blood supply (telangiectasia); destruction of the lymphatic network; regional lymphostasis; and increasing invasive fibrosis, keratosis, vasculitis, and subcutaneous sclerosis of the connective tissue. Pigmentary changes and pain are often present. Skin cancer is possible in subsequent years.

COMMENT: The scenario depicts how the use of an RDD can create chaos and confusion in an otherwise quiet suburban community. Hospitals need to be prepared to manage large numbers of alarmed and potentially contaminated individuals. Non-physically injured patients should be directed to a designated area outside of the hospital, while a specified area within the Emergency Department should receive injured patients from the initial blast. Ideally this area would be a burn unit within close proximity to an entrance from the outside. Equip this treatment area with the same materials used for any conditions requiring universal precautions. Primary goals will be the prevention and aggressive treatment of infections, as well as adequate pain management.⁹

When radiologically contaminated patients with physical injuries present for medical care, treatment must first be directed at stabilizing the patient and treating their physical injuries. The combined insult to the body from both radiation and traumatic injuries is significantly more severe than either alone.² ABCs (airway, breathing and circulation) should be secured and physiologic monitoring (e.g., blood pressure, blood gases, electrolyte and urine output as appropriate) initiated. Baseline serum studies should include tissue and blood typing and a CBC with differential (a 50% drop in lymphocytes within 24hrs or an absolute neutrophil count [ANC] of < 100/ μ l will be indicative of a significant exposure).⁷ All wounds should be cleaned and extensively debrided prior to the onset of immunosuppression to reduce the risk of later severe infection. Close the wounds primarily, rather than the traditional approach of allowing combat wounds to heal by secondary intention. All destabilizing conditions requiring surgical interventions should be addressed within the first 48 hours of injury.⁹ Medication may be used to sedate a patient who is particularly agitated, yet clinicians should be aware that this will alter mental status examinations.

CBCs should be repeated in 24 hours if the clinical presentation is consistent with Cutaneous Radiation Injury (CRI). Acute Radiation Syndrome must remain high in clinicians' differential if the patient presents with nausea, vomiting, and bleeding (i.e., epistaxis, gingival bleeding, and petechiae), epilation, or abnormally low WBC's. If ARS is suspected, the CBC must be aggressively monitored with repeat tests every 2-3 hours in the first 8 hours, then every 4-6 hours for the next 2 days. Experts in radiation, hematology, and radiotherapy should be consulted about dosimetry, prognosis, and treatment.⁶

There are three current FDA approved diluting and blocking treatments for internal contamination through ingestion, inhalation, or wound entry.¹⁰ Potassium iodide (KI) is a blocking agent useful in its protection of the thyroid gland. Ion-exchange resins such as Prussian blue are useful agents to increase fecal excretion of Cesium-137. And the calcium and zinc salts of DTPA have proven utility for removing plutonium, americium, and curium.

Once potentially life-threatening conditions are addressed, the focus should be on the removal of external contaminants and continued supportive interventions. Patients should be approached as if they have been contaminated with raw sewage. Because the erythematous skin lesions of CRI tend to come and go, careful documentation should be kept of any affected areas with sketches, body chart, or color photographs along with notations of the time and date. Antihistamines and topical antipruritic preparations should be considered for those reporting pruritus. Topical anti-inflammatories may additionally help localized lesions, but oral preparations may be used for more diffuse/extensive injuries.⁹

Vomiting can be controlled with 5-HT₃ receptor antagonists. Hematopoietic complications may arise after the initial 48 hours, and at that point surgical interventions should be considered only with great caution. Bone marrow suppression requires sophisticated interventions, such as cytokines to stimulate hematopoiesis. One such cytokine is filgrastim (Neupogen), which is a granulocyte colony stimulating factor and thus supports growth of WBCs. Stem cell and platelet transfusions may additionally be indicated, as well as anticoagulation for widespread and deep injury. As treatment progresses, pain and anxiety should be continuously monitored and treated.¹¹

The earlier the onset of ARS prodromal symptoms after an acute radiation exposure, the larger the dose absorbed.

CASE CONTINUES: In the days following the explosion, the Emergency Department continues to be overrun by both phone consultations and walk-in patients insisting they have been exposed to radiation or are experiencing symptoms of ARS. Many patients report physical symptoms that are not explained by exposure but attributed to an autonomic response to stress and anxiety. Fortunately, as part of the response plan, the hospital established an Emergency Services Extended Care Center (ESECC). The ESECC is an area set aside to provide psychosocial support for patients determined to be at low risk for medical complications but who are in need of ongoing care. The ESECC will be able to address ongoing concerns, quell anxiety and give the patients a voice so that they are able to feel as though their concerns are not being dismissed. This is also prudent in that some patients may go on to develop physical complications after all and can easily be escorted back to the Emergency Department for definitive care.

Despite the best of planning, complications arise. Several staff members have either called in sick or did not report to work as scheduled. A large proportion of these individuals were noted to work in housekeeping or in positions with significant interactions with the public and general staff. Of those who reported to work, many voiced concerns about their risk for contamination and the safety of their families.

COMMENT: The psychological impact of a release of radiation within the community will likely lead to widespread concern and anxiety. In 1987 there was an incident of community contamination with Cesium-137 released from a medical device in Goinia, Brazil.¹² Unaware of the danger of the substance, several individuals rubbed the glowing material on their bodies and accidentally inhaled or ingested some of it. The material was spread from person to person and house to house. Several individuals became ill a few days later. Fifty-four became seriously ill and 4 died. Of the 78,000 individuals screened, 244 individuals were found to be contaminated with radiation. Yet more than 5,000 individuals displayed signs consistent with early ARS, even though they were never exposed to or contaminated by the radiological material. This example clearly depicts how limited information about toxic exposures can fuel fear, anxiety and somatic concerns, and the sheer numbers of individuals seeking medical attention can overwhelm the medical system.

Terrorists can cause frightening events by creating devices to distribute radiation. An even greater impact can be attained by creating devices that will concurrently cause physical injuries. Release of radioactive materials, using a dirty bomb, can result in more extensive physical injuries caused by projectiles, blast effects, and burns. While some individuals may develop or have an exacerbation of a psychiatric condition, such as Posttraumatic Stress Disorder, most will have generalized anxiety, along with valid concerns over health and well-being.

Generally, the stress and anxiety provoked by exposure to a terrorist event will manifest in one of three ways: individuals who are generally distressed, those who manifest behavioral changes, and those who develop psychiatric illness (see Table 3). For most, the psychiatric symptoms gradually resolve. Those with a greater risk of developing a psychiatric illness are individuals who:

- were near the explosion or witnessed the extent of devastation
- have preexisting mental illness
- suffered significant losses as a consequence of the event
- witnessed death or serious injury to others¹³
- were themselves injured¹³

Table 3. Psychological Responses to Acute Trauma

Distressed Symptoms	<ul style="list-style-type: none">• Sadness, anger, fear, difficulty sleeping, impaired ability to concentrate, disbelief• Psychological distress may present as nonspecific somatic complaints (Multiple Idiopathic Physical Symptoms - MIPS)
Behavioral Changes	<ul style="list-style-type: none">• Decreasing travel, staying home, refusing to send children to school, increasing substance use and abuse
Psychiatric Illness	<ul style="list-style-type: none">• Acute Stress Disorder• Posttraumatic Stress Disorder• Major Depression• Substance Abuse• Family Conflict• Generalized Anxiety Disorder

CASE CONTINUES: In the weeks following the radiation event at the mall, things slowly return to normal. Some of the healthcare workers who did not report immediately to work after the attack report having feelings of guilt for leaving their colleagues short-staffed. Most of the hospital staff report coping fairly well with the event. The majority have sought support from colleagues, family, and friends. Some have utilized additional resources such as community town hall meetings, which were effective in dispelling rumor and myths, as well as helping people understand exactly what happened.

A handful of individuals need professional assistance. One nurse presents to you, reporting difficulty sleeping and persistent nightmares about the event. He began to call in sick to work frequently or was late reporting for his shift. This lasted several weeks until he recognized he needed additional help. During your initial meeting with him, he discloses that even though it goes against his training, he has been using alcohol to help him sleep. He admits that he has been frequently drunk, and as a result his wife is now staying at her mother's home.

COMMENT: Dispersal of accurate information to help the community make sense of the event, and the provision of both personal and public forums to discuss their experience, is invaluable in the recovery and healing process. Psychological debriefing is one tool mental health providers have used to support individuals in the aftermath of disasters. However, there is conflicting data on the usefulness of this intervention and some evidence suggests it can be harmful.^{14,15,16} The administration of the concepts of Psychological First Aid, on the other hand, have shown to be highly useful.

Elements of Psychological First Aid (PFA) include:^{17,18}

- Assist people in meeting their basic needs, such as emergency medical care
- Listen to those wishing to share their stories
- Provide accurate information about the disaster, and acknowledge when information is unknown
- Encourage and assist with the contacting of loved ones
- Provide practical suggestions for good self care (e.g., encourage rest, avoid alcohol)
- Orient to the available resources in the community
- Encourage people to reach out to natural support networks
- Educate about normal responses to traumatic events

Acknowledging concerns and providing accurate information is critical. People will be distressed and want to know their concerns are being heard. Regardless of whether their vomiting is psychogenic or secondary to radiation exposure, it is real to them and frightening. Many will have very limited knowledge about the dangers and risks associated with exposure to radiation, and this further fuels

the confusion and chaos characteristic in the aftermath of a disaster. Similar to the training many of our community members receive in basic life support, training in the principles of PFA can be invaluable in times of crises as well. This preparation will allow more time for health care providers to use their specialty training in the pivotal role of dispelling untruths and providing accurate information on the associated health risks and indicated protective measures.

CASE CONTINUES: The nurse who presents for medical care is a 34 year-old Caucasian who works on the dayshift in the Emergency Department. He reports that if he could get some help falling asleep at night he could get back on track. He relays his belief that trouble sleeping is a “normal” reaction to the recent events and, “I’m not crazy, doc”! You attempt to reassure him that what he is experiencing is not unusual. You go on to relay your goal that the two of you work together to get a better understanding of what is going on and decide on a plan of action together. You then focus on ascertaining a full appreciation of his symptoms in order to best determine if a psychiatric illness is present.

Complaints of insomnia and recurrent nightmares following a traumatic event prompt you to consider the diagnoses of Acute Stress Disorder (ASD) and Posttraumatic Stress Disorder (PTSD). The syndromes differ in duration of symptoms. The duration of symptoms of ASD is between 2 days and 4 weeks after the trauma. The symptoms of PTSD are present more than 4 weeks after the trauma.

COMMENT: Although depression and milder forms of anxiety are more common in the aftermath of a disaster or terrorist event, PTSD must be considered, and its diagnosis can be a challenge for healthcare providers. Consider the following suggestions and consult a mental health professional, as needed. Ask the individual to describe what traumatic events they have been exposed to, and whether they **reexperience** these in anyway. Useful questions are:

- Do these experiences continue to haunt you in any way?
- Since your trauma, do you continue to have vivid dreams about this experience?
- Do you ever feel like you are reliving the experience all over again, as if you are transported back in time to the original event?

Asking people if they are having “flashbacks” can be misleading as definitions vary from person to person.

To elicit whether **avoidance** behaviors are present, consider the following:

- Do you find yourself avoiding conversations, people or activities that remind you of the event?
- Do you avoid going to shopping centers or large public gatherings?

Symptoms of **numbing** are similar to the neurovegetative symptoms of reduced interests and energy seen with many depressed patients and can be asked in the same fashion. Examples are:

- Since the bomb explosion, has your interest in life gone downhill?
- Has your relationship with your spouse suffered? Has it been harder to be intimate?
- Has your view of the world or your future goals changed?

Arousal symptoms also overlap with those seen in depression (e.g., insomnia, impaired concentration, irritability). Yet hypervigilance and a startle response are more specific for PTSD. Consider the following:

- Do you find you are much more aware of your surroundings, such as keeping a close watch on what is going on around you? Are you careful where you position yourself in a room so your back is to a wall?

Mnemonic for PTSD¹⁹

The PTSD patient Remembers Atrocious Nuclear Attacks

Reexperiencing the trauma via intrusive memories, flashbacks, or nightmares (one of which is required for diagnosis)

Avoidance of stimuli associated with trauma

Numbing of general responsiveness (e.g., avoiding things associated with the trauma, amnesia for the trauma, restricted affect or activities, detachment, and foreshortened future; one required for diagnosis)

Arousal symptoms, such as insomnia, irritability, hypervigilance, startle response, and poor concentration (two required for diagnosis)

- Do you jump more readily when a phone rings or a door slams?
- Are you irritable or quick to anger?

Be aware that these symptoms could also be associated with depression, generalized anxiety disorder, or substance abuse or dependence. All of these disorders are associated with a heightened risk for suicide and/or homicide. Though difficult topics to breach, suicide must be assessed in every diagnostic interview for mental illness, and homicide when the presentation calls for it. The best approach is a direct approach:

- Have you felt suicidal or homicidal?
- Have you had any thoughts of wanting to harm yourself or others?

You will find that patients will rarely be embarrassed or angered. Rather, many will express relief as they will have had at least passing thoughts from time to time of wanting to be dead. Others will endorse having had fantasies of wanting to “strangle someone,” yet readily endorse they would never do such. The next and most important step is to determine if they are acutely in danger of harming themselves or others. This generally means they are “actively suicidal or homicidal,” and may act on their thoughts immediately. To explore this, consider the following questions:

- When was the last time you wanted to be dead? When was the last time you wished your spouse was dead? Current ideation is suggestive of increased risk of suicide or homicide.
- Do you have a plan for how you would do this? What would you use and do you have access to this? There is an increased risk if someone has a more thought out, feasible, and lethal plan.
- What would you hope to accomplish? Assessing the patient’s intent can help determine risk for suicide.
- Does anything stop you from acting on these thoughts? Fear of leaving loved ones and violating religious beliefs are protective factors against suicide and may decrease risk.
- Have you ever tried to harm yourself or kill yourself before? Have you ever been violent with others before? A history of violence predicts future violence, and the greatest risk of death by suicide is a previous attempt.

Many health care providers are hesitant to ask such questions due to uncertainty of what to do if the patient answers “yes”. Immediate mental health consultation is indicated when you determine the patient to be actively suicidal or homicidal. This means they are an acute risk to themselves and/or others, and decisions may need to be made to protect themselves or others.

CASE CONTINUES: You ask the patient whether he has ever been violent or a threat to himself or others. He denies ever being suicidal and describes seeing himself as a “nonviolent person”. He then goes on to describe how he has been increasingly irritable. He reports being so agitated the other night that he raised his voice at his wife after he broke a dish while loading the dishwasher. You target your questions to attempt to get a better sense of the severity of the argument and possible associated violence:

- Did you intend to break the dish? If so, why?
- Did you feel provoked in any way?
- Were threats verbalized? Did either of you verbally or physically harm the other?
- Has anything like this happened before?
- Do you have kids or does anyone else live in your home?

Again, you approach the patient with straightforward questions. It is not uncommon for individuals to get defensive about their or their spouse’s actions. You explain that these are questions you routinely ask people facing similar stressors. You take care not to prematurely ascribe blame, as you are only hearing about the argument through the eyes of one participant.

QUESTION 3

What is the most appropriate psychological intervention for individuals recently exposed to traumatic events?

- a. Encouragement of avoidance of stimuli associated with the trauma
 - b. Psychological Debriefings
 - c. Psychological First Aid
-

CASE CONTINUES: When you ask the nurse specific questions about his use of alcohol, he describes drinking more recently in order to help him relax and fall asleep at night. Many times individuals use alcohol to mitigate feelings of increased arousal (e.g., agitation, anxiety, insomnia). Unfortunately, this can result in a cycle of increased arousal and increased drinking. It is important to elucidate the severity of alcohol misuse. Alcohol misuse occurs in three stages of severity:

1. Problematic drinking
2. Alcohol abuse
3. Alcohol dependence

In order to screen for harmful use or impairment from alcohol, you use the following lines of inquiry:

- You must have felt pretty down after spending numerous long shifts consoling all the frightened and injured patients. Did drinking give you some relief? In what way?
- Was your drinking an issue with your wife? Did she leave you because of it?

Your patient then holds his face in his hands and sobs. He reports his wife having left him after telling him she feared he was becoming just like the alcoholic, abusive father she grew up with. You are concerned about the degree to which he may be impaired while at work. You ask if his work performance has been compromised, have coworkers commented on his irritability, what impact his drinking has had, and whether he has come to work hung over or intoxicated. He denies these symptoms and replies "I just want my life back."

You then go on to give the patient your interpretation of his condition and propose a plan of treatment. You discuss with him why you believe ASD best describes the emotional distress, behavioral changes, and social impairment he has been experiencing. The two of you discuss what will help him in his recovery, such as good sleep hygiene, no alcohol, and an abbreviated course of a sedative with limited risk for addiction. You address his concerns about his wife leaving him. You commend him for seeking help for his irritability and recent misuse of alcohol, and then encourage that he suggest to his wife that they seek couples therapy.

CASE CONCLUSION: The Chief of the Medical Staff has requested a series of meetings to provide updates, elicit questions, and monitor staff morale. When the floor is opened for comments and questions, you provide suggestions for continued self-care of staff and reiterate the leadership's praise of the commendable service the team has provided the community.

ANSWER KEY & DISCUSSION

QUESTION 1

Which of the following describes risk to caregivers of radiologically contaminated patients?

- a. There is no risk to caregivers of radiologically contaminated patients.
- b. Risk of contamination results from poor decontamination practices or failure to wear surgical masks or gloves.
- c. Use of personal protective equipment reduces risk of contamination by 50%.
- d. Working with radiologically contaminated patients exposes one to the risk of specific types of cancer.

ANSWER: The correct answer is b. Patients may have residual external contaminants on their body. It is recommended to approach them as you would someone contaminated with raw sewage. Simply changing the patient's clothing and washing their exposed skin and hair will remove 95% of the contamination.

QUESTION 2

Which of the following describes the presentation of Acute Radiation Syndrome in the prodromal stage?

- a. Nausea and vomiting
- b. Severe diarrhea and electrolyte imbalances
- c. Extreme nervousness and confusion
- d. Largely asymptomatic

ANSWER: The correct answer is a. Clinical presentations of ARS demonstrate evidence of stem cell damage in one or all of four major organ systems. Radiologic damage to any of these organ systems can result in the prodromal symptoms of nausea and vomiting. Therefore, keep a high level of suspicion for ARS when patients present with such nonspecific symptoms and a mechanism of exposure. Severe diarrhea and electrolyte disturbances are consistent with the manifest illness stage of the Gastrointestinal Syndrome. On the other hand, extreme nervousness and confusion are seen as early as the prodromal stage of the Cardiovascular/Central Nervous System Syndromes. For a review of the stages of Acute Radiation Syndrome, refer to Table 1.

QUESTION 3

What is the most appropriate psychological intervention for individuals recently exposed to traumatic events?

- a. Encouragement of avoidance of stimuli associated with the trauma
- b. Psychological Debriefings
- c. Psychological First Aid

ANSWER: The answer is c. Individual counseling is less frequently indicated, and when needed, more likely to be brief. Avoidance of stimuli associated with the traumatic event is a behavioral change that is not uncommon. Most individuals experiencing behavioral changes will resume their usual activities and routines with the passage of time. However, reliance on this avoidance behavior should not be encouraged as it can lead to further distress and disability (i.e., ASD and PTSD). The efficacy of Psychological Debriefings is questionable, and the risk of causing more harm is noteworthy. Whereas the elements of PFA (i.e., assist individuals in getting treatment for their basic needs, provide accurate information, facilitate the contacting of loved ones, provision of practical education on good self care) can be very effective.

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SUGGESTED READING

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