

Looking Beyond the Obvious

Objectives

After reading this article, you will be able to:

1. Explain when EMS personnel should consider the possibility of a medical problem
2. Describe common medical conditions that may result in trauma
3. Describe how common medications can affect the patient
4. Describe medical conditions that masquerade as mental health problems
5. Describe medical conditions that mimic other medical and traumatic conditions

Case Study

It's a dry and sunny late afternoon, and you are dispatched to the scene of a one-car accident in the Beacon Hill suburb. You arrive to find a 1988 Chevrolet that has leapt over the curb of the center boulevard hitting a large tree head-on. After surveying the scene for safety, you approach the vehicle and find a young male dressed in a sweaty baseball uniform. He is unresponsive, his head lying back on the headrest. He is wearing a lap seat belt, and the vehicle is not equipped with airbags. There is a catcher's mitt lying on the seat beside him.

Your general impression is that the patient is suffering from trauma. You observe deep lacerations of the forehead and bridge of the nose. There is profuse bleeding from the nose and from a laceration of the upper lip. You suspect a head or neck injury. The victim's airway is unobstructed, his breathing is shallow, his carotid pulse is strong, and his skin is pale and moist. There are no other visible signs of injury.

Your first action is to remove the victim from the vehicle after manual in-line immobilization and application of a short spine board. During this process, you note the odor of ethanol on the young man's breath.

Vital signs are within normal range, and you begin a head-to-toe assessment. There are no signs of other injury except to the face. As you inspect the abdomen, you note multiple dents in the skin, several small lumps, and a recent puncture wound.

You request your partner to obtain a blood glucose level, which is 28 mg/dl, indicating severe hypoglycemia. You begin treatment per protocol.

Introduction

Making a field diagnosis is part of every emergency responder's role. Making an accurate field diagnosis, however, requires skill and a systematic approach to patient assessment. To determine what is really wrong with a patient, EMS personnel must continually reassess the patient throughout the encounter because it's easy to jump to conclusions when relying on first impressions.

The primary assessment is the first impression EMS personnel make that points to immediately required stabilizing treatment. The second assessment involves a head-to-toe physical examination looking for hidden injuries or for anything that doesn't appear normal. This second assessment often provides valuable information that changes the initial field diagnosis and points treatment in another direction.

A complete head-to-toe assessment is often overlooked in favor of a focused assessment, believing that it saves time. This prevents the EMT or paramedic from making an accurate field diagnosis and put a patient in further jeopardy. EMS personnel should develop a system for a head-to-toe assessment on every patient until it becomes second nature.

Many situations occur where the obvious obscures important signs or symptoms that lead to misdiagnosis and delay in providing appropriate treatment. In an effort to hone assessment skills, it's necessary to understand that an initial assessment can miss important signs that are beyond the obvious.

Medical Conditions and Trauma

A number of medical conditions can result in functional impairments that lead to trauma. The effects of these conditions are either acute or chronic. Acute effects are usually sporadic and unpredictable. Chronic effects, however, are relatively predictable and stable. Some medical conditions result in both acute and chronic effects. And sometimes, a chronic medical condition causes unpredicted acute effects.

The following medical conditions are associated with cognitive impairment or significant functional impairments that can result in a person's sustaining injury.

Cardiovascular Diseases

Myocardial Infarction (MI)

Myocardial infarctions are a result of coronary heart disease, the most common type of heart disease. Every year about 935,000 Americans have a heart attack,¹ which can result in unconsciousness and cardiac arrest. An MI can cause a person to fall or suffer injury in a car accident while driving.

Cardiac Arrhythmias

- An arrhythmia or dysrhythmia is a problem with the rate or rhythm of the heartbeat. During an arrhythmia, the heart beats too fast, too slow, or irregularly. Most arrhythmias are harmless, but some are serious and even life-threatening. During an arrhythmia, the heart may not be able to pump enough blood to the body, which affects the brain, the heart, and other organs.²

Atrial fibrillation (AF) is the most common type of serious arrhythmia involving a very fast and irregular contraction of the atria. AF alone isn't life-threatening, but it can be dangerous if it causes the ventricles to beat rapidly. In addition, AF leads to pooling of blood in the atria, which can cause blood clots to form. If a clot breaks away and travels to the brain, it can cause a stroke.²

Ventricular arrhythmias are very dangerous. They require immediate medical attention. Ventricular tachycardia (VT) and ventricular fibrillation (VF) can cause cardiac arrest and death within minutes.² Implantable cardioverter-defibrillators indicate that the patient has recurrent ventricular arrhythmias. The battery packs of these devices are in the subcutaneous tissues of the abdominal wall or the chest wall.

Bradycardia is an abnormally slow heart rate caused by the heart's natural pacemaker developing an abnormal rate or rhythm. This occurs when the normal electrical conduction pathway has been interrupted, or when another part of the heart takes over as a pacemaker. Complete heart block is the absence of electrical conduction to the ventricles. This medical emergency can lead to loss of consciousness or sudden cardiac arrest.³ The presence of an implanted pacemaker on examination is a definite indication that the patient suffers from a rhythm disturbance. A pacemaker failure is a true emergency requiring immediate recognition and rapid transport.

Arrhythmias can cause the following problems, all of which can lead to falls or other accidents.³

- Dizziness
- Lightheadedness
- Weakness
- Fatigue
- Low blood pressure (hypotension)
- Fainting (syncope)

Hypotension

Hypotension is caused by a number of factors, including antihypertensive medications, pregnancy, diabetes, and endocrine disorders such as hypothyroidism or adrenal gland disorders. The main concern for the individual who experiences hypotensive episodes is to identify the underlying cause. Sudden and temporary loss of consciousness is the major risk associated with hypotension. Hypotension is often the cause for falling.⁴

Transient Ischemic Attack (TIA)

A TIA is a sudden episode in which there is a brief interruption in blood flow to a part of the brain. TIAs usually last less than 30 minutes and present with symptoms similar to those of a stroke, including:

- Loss of balance
- Vertigo
- Double vision
- Weakness
- Blindness
- Loss of consciousness⁴

A TIA is a strong indication that a person could experience a stroke in the future.

Cerebrovascular Accident/Stroke

The American Heart Association reported in its 2012 statistical update that 30 of every 100,000 persons die each year from stroke.⁵ Strokes are the leading cause of chronic neurological disability. Strokes can result in visual-field defects, impaired consciousness, and impaired motor control. They have the potential to cause trauma either from sudden incapacitation during the event or from the subsequent debilitation following the stroke.⁶

Neurological Diseases

Seizures/Convulsions

A seizure is an uncontrolled abnormal discharge of electrical activity in the brain causing clinical signs and symptoms that interfere with normal functioning. It's a symptom of underlying pathology. Many conditions induce a seizure:

- Injury
- Central nervous system infections
- High fever
- Intracranial tumors
- Reduced flow of oxygen to the brain (cerebral hypoxia)
- Alcohol or drug withdrawal
- Metabolic disorders

Persons who have experienced 2 or more seizures are considered to have epilepsy.⁷ The CDC estimates that about 1 million people in the United States have epilepsy, and nearly 140,000 Americans develop the condition each year.⁸ Seizures can result in the abrupt loss of consciousness or loss of bodily control, placing the person at risk for accident, injury, rapid incapacitation, and sudden death.⁶

Sleep Disorders

Narcolepsy and obstructive sleep apnea are two common medical conditions responsible for many accidents that result in trauma. These disorders cause excessive daytime sleepiness and cognitive impairment. Narcolepsy can also cause cataplexy (brief episodes of sudden bilateral loss of voluntary muscle tone), often associated with intense emotion.^{9,10}

Dementia

Persons with dementia experience progressive deterioration in intellectual functioning, memory, and the ability to solve problems or learn new skills. Dementia impacts safety and increases the risk for injuries. In a study of individuals with dementia, 30% sustained injuries in 29 separate incidents. All but 3 injuries were caused by falls. And 38% of injuries resulted in nursing home placement.¹¹

Respiratory Disorders

Asthma and Chronic Obstructive Pulmonary Disease (COPD)

Asthma and COPD cause reduced oxygen flow to the brain with subsequent decrease in mental alertness that impairs attention, judgment, and decision making. The presence of these impairments places the individual at risk for trauma from an accident such as a fall from loss of balance.⁶ Children often have just a cough as a sign of an asthma attack. If the attack is serious enough, the child may not be able to breathe deeply enough to produce wheezes. It's important to remove clothing to observe chest movements.

Metabolic Disorders

Diabetes Mellitus

The American Diabetes Association reports that 8.3% of the population in the United States has diabetes. It's present in 26.8% of all people 65 years or older. And about 1 in every 400 children and adolescents has diabetes.⁶ Diabetes is placed in two categories. Type 1 appears before the age of 30; type 2 occurs in those over age 40.

The main problem associated with diabetes that leads to accident and trauma is a hypoglycemic reaction.⁶ This is most likely to occur in individuals treated with insulin, but it also occurs in those treated with oral agents. Severe hypoglycemia can result in either seizure or coma, both of which require the intervention of another person. These conditions require the administration of intravenous glucose, intramuscular glucagon, or hospitalization.⁶

Hypothyroidism

Underactive thyroid (hypothyroidism) is a common disorder resulting from deficiency of the thyroid hormone that regulates the rate of metabolism and heat production. It affects all body systems and occurs insidiously over months or years. Signs and symptoms of this condition are often subtle, but the person can experience fatigue, sleepiness, and cognitive impairment, which are of greatest concern for incurring trauma.¹³

Myxedema coma, a medical emergency, is a severe form of hypothyroidism that results in:

- An altered mental status
- Low body temperature (hypothermia)
- Slowed heart rate (bradycardia)
- Increased carbon dioxide in the blood (hypercapnia)
- Decreased sodium in the blood (hyponatremia)

This condition most commonly occurs in persons with undiagnosed or untreated hypothyroidism who are subjected to an external stress such as low temperature or infection.¹⁴

Alcoholism

Alcohol dependence is a disorder characterized by chronic, excessive consumption of alcohol that results in injury to health and social functioning. Alcohol raises the risk for near drowning, falls, car crashes, and pedestrian injuries. An estimated 21% of all injuries are attributable to alcohol use by the injured person.¹⁵ Alcohol interferes with the brain's communication pathways and affects a person's abilities to think clearly and coordinate movement.¹⁶

Medication Effects

No medicine, whether prescription or over-the-counter, is without risk. Among their desired therapeutic actions, drugs typically have other so-called side effects, many of which are undesirable. Side effects can occur with every drug, even when taken properly. Side effects are described as serious, common, and less common. Serious side effects could be life-threatening or otherwise have a significant impact on well-being and safety. All medications can cause an allergic response known as anaphylaxis, which can be fatal. The following are drug classifications that have the potential to lead to accident and injury.¹⁷

Drugs That Affect the Cardiovascular System

Cardiac Glycosides

Digoxin (Lanoxin) is commonly used in the treatment of congestive heart failure. This drug increases the force and strength of the heart's contractions and makes the heart pump more efficiently. Adverse effects include:

- Toxicity resulting in drowsiness (somnolence)
- Dizziness
- Weakness
- Syncope
- Blurred or yellowed vision
- Confusion^{18,19}

Antiarrhythmic Agents

Antiarrhythmic agents are used in the treatment of atrial fibrillation, supraventricular tachycardia (SVT), atrial premature complexes (PACs), or ventricular premature complexes (PVCs). These drugs work by either suppressing the abnormal firing of the heart's pacemaker tissue or depressing the transmission of impulses in tissues that either conduct too rapidly or participate in reentry of the conduction. Examples of antiarrhythmic agents are beta-blockers such as metoprolol (Lopressor) that reduce the heart's workload and heart rate, and calcium channel blockers such as verapamil (Calan) that reduce the heart rate. Some of the more serious adverse effects of these drugs include:

- Drowsiness
- Lightheadedness
- Confusion
- Bradycardia
- Sleep disturbances
- Fatigue
- Hypotension

It's important to recognize that the difference between a therapeutic dose and a life-threatening dose is very small.^{18,20}

Antihypertensive/Antianginal Agents

In addition to beta-blockers and calcium channel blockers, nitroglycerin-like compounds are used to treat angina. These medications decrease the workload of the heart by decreasing cardiac output, decreasing peripheral vascular resistance, or both. This reduces the oxygen requirements of the heart muscle and relieves symptoms. The adverse effects of these drugs include severe headaches, hypotension, lightheadedness, and syncope.^{18,21}

Antihypertensive agents work in three ways. They reduce the volume of blood in the system; dilate blood vessels, which results in decreased resistance to blood flow; and affect the cardiac muscle cells by slowing the heart and reducing the force. Examples of these types of drugs are diuretics such as hydrochlorothiazide and furosemide (Lasix), beta-blockers, calcium channel blockers, and ace inhibitors such as captopril (Capoten). Adverse effects from these

drugs include:

- Bradycardia
- Confusion
- Hallucinations
- Dizziness
- Fatigue
- Syncope
- Lightheadedness
- Insomnia
- Depression^{18,22}

Drugs That Affect the Blood

Antiplatelet and Anticoagulant Drugs

These medications inhibit blood from clotting or prevent existing clots from getting larger in the heart, veins, or arteries. Common anticoagulant drugs include warfarin (Coumadin) and heparin. Antiplatelet drugs include aspirin, aspirin-containing medications, and clopidogrel (Plavix). All anticlotting therapies carry the risk of bleeding, which can lead to dangerous situations, including stroke. Internal bleeding is a major risk following an accident of any kind for patients taking antiplatelet and anticoagulant drugs.^{18,23}

Licit and Illicit Drugs That Affect the Nervous System

Stimulants

Caffeine, nicotine, amphetamines, and cocaine mimic the stimulation of the sympathetic nervous system and cause a feeling of euphoria. These stimulants increase blood pressure and heart rate and constrict blood vessels, which can lead to cardiovascular failure or lethal seizures.¹⁸

Sedative/Hypnotic Drugs

Ethanol and barbiturates (Phenobarbital) are sedatives. Ethanol produces a sedative effect and a sense of well-being at low doses. At higher doses, however, depression of brain centers involved in pain sensation, coordination, and balance can occur, as well as loss of consciousness. Barbiturates are prescribed to aid sleep and to prevent seizures. They mimic some of the actions of ethanol. Barbiturates and alcohol act additively—the combination produces a depression greater than either one taken alone. This combination is often the cause of suicide, both accidental and planned.^{18,31}

Opiates

Morphine, codeine, heroin, fentanyl, methadone, and oxycodone depress nerve transmission, relieve pain, and suppress cough. Methadone is also used in maintenance treatment for addiction. The most serious side effects of these drugs occur with misuse and overdose.¹⁸ They include:

- Severe respiratory depression
- Confusion or stupor
- Coma
- Circulatory collapse
- Cardiac arrest

Antianxiety Agents

Antianxiety medications are used in the treatment of anxiety, tension, panic attacks, insomnia, and alcohol withdrawal. Common drugs in this category are the benzodiazepines diazepam (Valium) and alprazolam (Xanax). They are highly addictive and frequently abused. They impair the ability to perform hazardous tasks. Other adverse side effects include:

- Drowsiness
- Fatigue
- Muscle weakness
- Lack of muscle control (ataxia)
- Memory impairment
- Confusion
- Vertigo
- Blurred vision

- Dizziness and syncope^{18,24}

Prolonged sedation can occur in the elderly with increased risk of falls.³¹ All antianxiety drugs have been implicated in both causing depression and making it worse in susceptible individuals.

Antipsychotic Agents

These medications are given for treatment of psychotic mental disorders and include the older typical antipsychotic drugs such as haloperidol (Haldol) and the newer atypical drugs such as risperidone (Risperdal). Although antipsychotic medications have minimal morbidity and mortality in adults, ingestion of a single dose by a toddler could be lethal.^{18,25}

Antipsychotic drugs can cause:

- Seizures
- Cardiac arrhythmias
- Severe hypotension
- Sedation
- Respiratory depression
- Hypothermia
- Inhibition of spontaneity that both feel and look like depression

Antidepressants

Antidepressants include selective serotonin reuptake inhibitors (SSRIs), tricyclics, and monoamine oxidase (MAO) inhibitors. Drugs given for the treatment of depression can cause sleeplessness or drowsiness in the first few weeks following the start of treatment. Antidepressants are also prescribed for treatment of anxiety. Drug-food interactions can occur in those using MAO inhibitors, which can lead to a reaction causing hypertensive emergencies that can be fatal. Severe toxicity is manifested by hyperthermia, seizures, respiratory depression, and CNS depression. Hypotension, cardiovascular collapse, and death could ensue. In 2010, victims of MAO inhibitor poisoning included 12 as young as 5 years of age. It's important to remember that children can be exposed to medication a parent or other adult in the home is taking.^{18,26}

Anticonvulsants

Anticonvulsant medications such as phenytoin (Dilantin) and barbiturates are used to treat seizure disorders, most notably epilepsy. These medications can cause:

- Drowsiness
- Decreased coordination
- Fatigue
- Slurred speech
- Dizziness
- Confusion
- CNS depression
- Hypotension
- Cardiovascular collapse^{18,27}

Abrupt cessation of these medications can precipitate status epilepticus (continuing attacks of epilepsy without gaining consciousness).³¹

Drugs That Affect the Respiratory System

Bronchodilators

Theophylline and aminophylline are common drugs used in the treatment of (COPD) and asthma. These drugs relax smooth muscle and stimulate cardiac muscle and the central nervous system. Adverse effects from these medications include:

- Tachycardia
- Arrhythmias
- CNS excitement
- Insomnia
- Seizures resistant to anticonvulsants
- Acute myocardial infarction^{18,28,31}

Antihistamines

Antihistamines are used in the treatment of allergic symptoms. First-generation antihistamines such as diphenhydramine (Benadryl) can cause drowsiness and dizziness. Toxicity can result in severe agitation and seizures. Second-generation antihistamines such as cetirizine (Zyrtec) can also cause drowsiness, and toxicity can cause life-threatening ventricular tachycardia.^{18,29}

Drugs That Affect the Endocrine System

Antidiabetics

The most common drugs affecting the endocrine system are insulin and oral antidiabetic drugs. Insulin is used to treat diabetes type 1, but is also used for type 2 when uncontrolled by diet, exercise, or weight reduction. Oral antidiabetic drugs such as glyburide (DiaBeta) are used only in the treatment of type 2 diabetes. These drugs stimulate the beta cells to produce more insulin and increase cellular sensitivity to insulin. Other oral medications such as metformin (Glucophage) decrease glucose production in the liver. Adverse side effects include:

- Hypoglycemia
- Hyperglycemia
- Dizziness
- Drowsiness
- Blurred vision
- Extreme fatigue
- Interactions with other drugs

Rosiglitazone (Avandia) has been linked to an increased risk of myocardial infarction.^{18,30}

Common Natural/Herbal Products

Often the use of alternative medicinal products is overlooked by EMS personnel. It's important to recognize that these drugs can cause harm and contribute to accidents and injury. They should be considered along with all other medications being taken when obtaining a history and determining the cause of a patient's signs and symptoms.

Echinacea

Echinacea is classified as an anti-infective and antipyretic. It's used for bacterial and viral infections, for prevention and treatment of colds, and for wound healing. It can affect the CNS causing dizziness, fatigue, headache, and drowsiness.³¹

Ginkgo

Ginkgo is classified as an antiplatelet agent and a central nervous system stimulant. It's used for the relief of symptoms of organic brain dysfunction and for treatment of severe pain in the calf muscles (intermittent claudication) caused by peripheral vascular disease. Adverse effects include:

- Dizziness
- Headache
- Vertigo
- Seizures
- Cardiac arrhythmias
- Life-threatening cerebral bleeding³¹

Ginseng

Ginseng has no therapeutic classification assigned, but it serves as a CNS stimulant that improves physical and mental stamina, and as a general tonic to increase energy. This dried root is said to enhance the glucose-lowering effects of oral hypoglycemics and insulin, and it can interfere with platelet aggregation and coagulation. This drug can also cause hypertension and tachycardia.³¹

Valerian

Classified as an anti-anxiety agent and sedative/hypnotic, this drug is used to treat insomnia and anxiety. It causes drowsiness. When discontinued after long-term use, it can present with benzodiazepine-like withdrawal symptoms. Additive sedative effects can occur when taken with alcohol, antihistamines, or other CNS depressants.³¹

Medical Condition or Mental Health Problem?

The psychiatric appearance of a medical disorder is defined as the presence of mental symptoms deemed to be the direct result of a general medical condition. It's important to understand common psychiatric symptoms and the medical diseases that cause or mimic them. Failure to identify a medical cause for altered behavior or altered mental state can lead to a dangerous outcome. It's important to consider all appropriate medical causes of symptoms when assessing a patient.

According to Harvard psychiatrist Barbara Schildkrout, more than 100 medical disorders can masquerade as psychological conditions. In some cases, a psychological problem is the first sign of a serious medical condition. Recognizing an underlying medical condition is particularly difficult when there is also a psychological explanation for a patient's symptoms.³²

When determining whether mental issues are the result of an underlying medical condition, consider the following factors:

- The person is over 40 with no previous psychiatric history or history of similar symptoms.
- A head injury occurred recently or in the distant past.
- Disorientation or memory impairment is present.
- There has been a sudden change in mood or personality.
- The person experiences fluctuating or impaired levels of consciousness.
- The person misinterprets stimuli (illusions).
- Coexisting chronic medical diseases are present.
- The person exhibits abnormal body movements or speech deficits.
- Visual disturbances, either double vision or partial visual loss, are experienced.
- The individual reports experiencing rapidly changing, vividly colored visual hallucinations or olfactory (smell) hallucinations.
- There is a recent history of travel or exposure to infections.³³

Depressive Disorder

Depression is caused by a number of medical conditions. The most common include the thyroid disorders of hypothyroidism and hyperthyroidism. Structural brain problems such as stroke, brain tumor, or multiple sclerosis can manifest as depression. Degenerative brain diseases such as Alzheimer's dementia, Parkinson's disease, or Huntington's disease, as well as traumatic brain injury, present as depression. Cardiac conditions are often associated with depression. Infectious diseases such as Lyme disease and neurosyphilis can both present with solely psychiatric symptoms, including depression.³²

Bipolar Disorder

A multitude of acute medical conditions manifest with large fluctuations in mood and mental status. Following are some of the common disorders:

- Hyperthyroidism and hypothyroidism
- Hyperglycemia and hypoglycemia
- Cushing's syndrome (a hormonal disorder involving excessive cortisol, a hormone of the adrenal gland)
- Traumatic brain injuries
- Strokes
- Brain tumors
- Postictal states following seizures
- Meningitis
- Syphilis
- HIV/AIDS
- Alcohol and drug withdrawal³²

Anxiety Disorders

Many medical conditions mimic anxiety disorders. These include hyperthyroidism and hypotension. Respiratory problems such as asthma, pulmonary embolism, and anaphylaxis may all present as panic attacks. Panic attack in some cases occurs with a vitamin B12 deficiency. Alcohol withdrawal and cocaine and stimulant ingestion can underlie anxiety symptoms. Irritability can also indicate an underlying brain injury, either recent or delayed reaction. It can also be the result of temporal lobe epilepsy or the early stage of dementia.³²

Psychotic Disorders

Psychotic symptoms such as hallucinations and delusions can be the result of a great number of underlying medical problems. It's always best to suspect delirium in any patient with psychotic symptoms. Delirium is a state of mental confusion marked by disorientation to time and place, usually with illusions and hallucinations. There are many forms of delirium, depending on the cause. Medical conditions that manifest psychotic symptoms include:

- Endocrine diseases such as hyperthyroidism
- Metabolic diseases such as acute intermittent porphyria
- Autoimmune diseases such as systemic lupus erythematosus
- Fever
- Infections
- Narcolepsy

Epilepsy, stroke, brain tumor or cyst, and sexually transmitted diseases such as HIV/AIDS and syphilis (20 to 30 years after initial exposure) can all present as psychosis. Also to be considered are medications, particularly in the elderly, and substance abuse or withdrawal.^{32,33}

Cognitive Impairments

A person who presents with cognitive changes might have incurred a brain injury or might have a brain infection. Cognitive changes include impaired perception, reasoning, judgment, intuition, and memory. Dementia and mercury or lead poisoning may present only with cognitive changes. The sexually transmitted disease syphilis can present as dementia.³²

Medical and Traumatic Mimics

At times, emergency responders encounter individuals who have all the signs and symptoms of a particular medical condition, but in reality, another medical condition is the source of the presentation. Performing a systematic head-to-toe assessment assists in determining the patient's underlying problem.

Alcohol and Drug Intoxication

A number of medical and traumatic conditions mimic drug or alcohol intoxication. It's helpful to observe for indicators such as Medic Alert pendants, bracelets, or wallet cards that indicate a medical condition.

Hypoglycemia

Hypoglycemia is most commonly associated with diabetics, but it can affect other people as well, under certain circumstances. This is probably the most common medical emergency mistaken for intoxication. Signs and symptoms of hypoglycemia include:

- Slurred speech
- Staggering
- Unsteadiness
- Altered mental status
- Cold and clammy skin
- Anxiety
- Seizures
- Confusion
- Combativeness³⁴

Anoxic Hypoxia

Hypoxia is caused by a number of conditions that slow breathing to inadequate levels, displace oxygen-carrying cells in the body, or limit the body's ability to absorb oxygen. These include stroke, shock, emphysema, drug overdoses, heart attacks, and smoke or other hazardous material inhalation. Signs and symptoms include restlessness, confusion, an altered mental status, and cyanosis (bluish coloring of the skin).³⁵

Stroke

A person experiencing a stroke might appear to be intoxicated. Other signs include:

- Partial or complete inability to speak
- Confusion
- Dizziness
- Loss of bladder or bowel control
- Impaired vision

- Vomiting
- Seizures
- Unequal pupils
- Loss of consciousness³⁵

Hypothermia/Hyperthermia

Hypothermia or hyperthermia can cause altered mental status. Hypothermia depresses the CNS and presents similar to intoxication. Signs of hypothermia include:

- Impaired speech
- Drowsiness
- Staggering
- Confusion
- A glassy stare

Signs of hyperthermia include:

- Dizziness
- Rapid and shallow breathing
- Loss of consciousness
- Dilated pupils³⁵

Seizure Disorders

Seizures are related to a variety of conditions. The person experiencing a seizure shows temporary changes in behavior or consciousness and may lose bowel and bladder control and stop breathing for a while. Seizures are convulsive or nonconvulsive. Complex partial or temporal lobe seizures are nonconvulsive, and the resulting behaviors are often mistaken for intoxication. Following a seizure, the person may appear intoxicated and be easily frightened and combative.³⁶

Stroke Mimic

Stroke is a result of injury to the blood vessels in the brain, most commonly caused by atherosclerosis or hypertension. It's the most common cause of permanent disability in adults. EMS personnel often encounter a patient whose presentation resembles or is indistinguishable from a stroke. Because treatment for strokes can have serious adverse effects, it's important to rule out stroke mimics.

Stroke mimic is a term for nonvascular disease processes that produce stroke-like clinical pictures. Mimics include processes occurring within the central nervous system, as well as systemic disease processes.

Seizures and postseizure events are common causes of stroke-like conditions. In these instances, alterations in neuronal function are reversible and duration is usually brief. It's important to note that seizures may also be present as a complication of acute stroke and can develop in a patient with a history of stroke.

A patient with hypoglycemia may present with stroke-like symptoms such as total or partial inability to move on one side of the body (hemiplegia) and the partial or total inability to speak or understand speech (aphasia). The person may be drowsy but remain alert and show none of the more common responses to hypoglycemia, including confusion or diminished level of consciousness. Aphasia may make it difficult to obtain a history of diabetes.³⁷

Strokes can be simulated when mass lesions are present, such as subdural hematoma, cerebral abscess, and CNS tumors. Sudden onset of symptoms has been known to occur in patients with brain tumors. Chronic subdural hematomas have often been reported as a cause of stroke and TIA symptoms.³⁷

Seizures and postictal states often present with stroke-like symptoms. Migraine headache has been found to mimic strokes and actually precipitate a stroke. A form of migraine that causes one-sided paralysis of the body (hemiparesis) that lasts after the headache subsides is known as a hemiplegic migraine and is difficult to diagnose.³⁷

False stroke can be the result of a psychiatric problem such as a conversion disorder manifested by deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. These include:

- Double vision
- Loss of sense of touch
- Blindness
- Deafness
- Paralysis

- Hallucinations³⁷

Head Injury

Traumatic head injuries are often mistaken for several conditions, including intoxication. Head injuries result from motor vehicle collisions, falls, and assaults that include blunt trauma to the head or face. Open head injuries are obvious and usually include visible bleeding or lacerations. Closed head injuries are not as apparent. They include concussions, skull fractures, and bruising or bleeding in the brain.

Similarities between intoxication and traumatic head injuries include:

- Difficulty walking
- Poor balance
- Slurred or slowed speech
- Altered mental status
- Unequal pupils

Misdiagnoses are common with head trauma. Traumatic head injury can present as depression. Seizures can be caused by underlying traumatic head injury leading to a misdiagnosis of a seizure disorder.³⁸ And dementia can mimic as a head injury with these signs:

- Short-term memory loss
- Reduced flexibility of thinking
- Difficulty concentrating
- Inability to plan or prioritize
- Difficulty with multitasking

Case Review

The EMS personnel in this instance needed to be aware of the immediate environment when assessing this accident. The roads are dry, it's a clear day, and the accident occurred on a quiet street in a suburb with a posted speed limit of 25 mph. There is no evidence of obstacles in the road that the driver would have tried to avoid. A one-car accident in this situation raises red flags about what caused it.

The driver appears to have struck his face against the steering wheel. He is young and obviously fit (he has been playing baseball). He is unconscious and has an odor of ethanol on his breath. His skin is moist and pale. He has normal vital signs; however, his respirations are shallow. One could assume that he was drinking, lost control of the car, hit the tree, and sustained a head injury causing unconsciousness.

The responder's head-to-toe assessment reveals evidence in the abdomen of multiple injections, most probably insulin. Requesting a blood sugar at this point was appropriate and revealed the cause of the driver's incapacitation to be severe hypoglycemia, an insulin reaction.

Diabetes type 1 is a disease that begins in those under age 30. It's often not readily considered present in a young person. Even with good control, imbalance can occur. Several things cause low blood sugar leading to an insulin reaction:

- Being more physically active than usual
- Missing a meal
- Changing when or how much is normally eaten
- Taking insulin or medication at a different time than usual
- Drinking alcohol excessively without eating

This accident victim appears to have been physically active. We don't know when or how much he has eaten during the day. Nor do we know when he took his insulin. We do know, however, that he drank an unknown quantity of alcohol before getting into his car.

Conclusion

Making a rapid diagnosis is important when determining how best to treat an emergency patient. However, in the interest of saving time, misdiagnoses are made and significant problems overlooked that could lead to further injury and even death. An accurate field diagnosis by EMS personnel requires that one sees the obvious but doesn't allow it to bias thinking and interfere with a complete head-to-toe assessment. Often, the first diagnosis is correct and the most obvious, and this leads to complacency. However, professional emergency responders always recognize that it's necessary to avoid jumping to conclusions and to keep looking beyond the obvious to avoid missing that important clue to a serious underlying problem.

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