

F01: Altered Levels of Consciousness

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Introduction

The altered level of consciousness is a common prehospital emergency. Paramedics are frequently faced with patients with changes to their baseline consciousness, ranging from unconsciousness to hyperarousal. The underlying causes for this are varied and numerous. Some of these conditions are relatively benign, while others are rapidly lethal. Differentiating between these, in the prehospital environment, can be extremely difficult. In assessing and caring for these patients, paramedics should focus on broad goals, such as maintaining a patent airway and supporting oxygenation and ventilation and circulation, while at the same time searching for and treating potentially reversible causes.

Essentials

- Regardless of the underlying cause, patients with altered levels of consciousness are at high risk of functional airway obstruction and hypoxia. Management of oxygenation and ventilation must take priority over a search for potentially reversible causes.
- Syncope should be considered a diagnosis of exclusion: paramedics must look for reversible or life-threatening causes of unconsciousness and rule these out prior to considering syncope as the cause of the altered level of consciousness.
- The search for reversible causes should be conducted systematically. A number of mnemonics exist to guide paramedics in their investigations. Regardless of which tool is used, paramedics should consider, at a minimum:
 - Alcohol and intoxicants
 - Epilepsy, endocrine (hypoglycaemia), electrolytes
 - Insulin
 - Overdoses, accidental or intentional
 - Underdosing of medication or uremia
 - Trauma
 - Infection
 - Psychosis
 - Sepsis, shock, stroke
 - Hypotension
 - Hypoxia
 - Hypo- or hyperthermia
- If a potentially reversible cause is found, refer to the appropriate CPG for management details

Additional Treatment Information

- All patients with an altered level of consciousness require comprehensive monitoring, including blood glucose measurements, temperature, and a 12-lead ECG
- Complete a physical exam with specific attention to lateralizing neurological symptoms
- Patients who have regained consciousness must have a FAST-VAN assessment performed

Referral Information

Patients who experience syncope are often inclined to refuse service. The diagnostic tests required to safely include or exclude potential causes of syncope or transient loss of consciousness are not available in the prehospital environment. Paramedics are expected to follow the appropriate guidelines with respect to these refusals.

General Information

- Syncope is a clinical syndrome in which a transient loss of consciousness is caused by a period of diminished cerebral blood flow. By definition, the duration of the event is usually brief, and with a spontaneous to normal baseline consciousness. Recovery from syncope is usually rapid and complete, with episodes rarely lasting more than a minute or two. Syncope can also be a sign of a potentially serious and life threatening condition. Some patients experience syncope without warning. They lack pre-syncope signs or symptoms, and experience a sudden collapse followed immediately by a return to normal mental status. Paramedics should consider these patients to have suffered from a cardiac dysrhythmia until proven otherwise, regardless of vital signs or ECG findings.
- Immediately life-threatening causes of syncope or unconsciousness include:
 - Cardiac dysrhythmias with or without associated ischemia
 - [→ C01: Acute Coronary Syndrome](#)
 - [→ C02: Bradycardia](#)
 - [→ C03: Narrow Complex Tachycardia](#)
 - [→ C04: Wide Complex Tachycardia](#)
- Structural heart disease (outflow obstruction or cardiomyopathy)
- Hypovolemia from occult hemorrhage
 - [→ D01: Shock](#)
 - [→ D02: Bleeding](#)
- Hypotensive distributive shock
- Pericardial tamponade
- Pulmonary embolism resulting in obstructive shock
 - [→ C06: Pulmonary Embolism](#)
- Hypoglycemia
 - [→ E01: Hypoglycemia and Hyperglycemia](#)
- Heat exhaustion and stroke
 - [→ I02: Hyperthermia](#)
- Cerebrovascular accidents, including transient ischemic attacks and subarachnoid hemorrhage
 - [→ F03: Stroke](#)
- Toxicity from anticonvulsants, beta blockers, calcium channel blockers, benzodiazepines, or narcotic analgesics
 - [→ J01: Approach to Toxic Exposures](#)
 - [→ J07: Beta Blockers](#)
 - [→ J09: Calcium Channel Blockers](#)
 - [→ J12: Opioids](#)
- Some patients experience syncope without warning. They are devoid of any pre-syncope signs or symptoms and experience a sudden collapse followed immediately by a return to normal mental status. This type of syncope should be considered to be from a cardiac dysrhythmia until proven otherwise, even if the vital signs are normal when you arrive on the call.
- Loss of postural tone is inevitable with loss of consciousness, resulting in a collapse that can cause traumatic injuries. Longer periods of real or apparent loss of consciousness suggest either an alternative cause, or a concurrent injury that prolongs the syncopal event.
- Patients can have symptoms associated with syncope without loss of consciousness. This is referred to as pre-syncope, and should be investigated and managed in the same manner as syncope.
- Vasovagal syncope is a common and benign cause of syncope. It occurs due to an inappropriate response by the autonomic nervous system, typically to triggers such as changes in posture, pain, the sight of blood, or extreme emotional distress. Prodromal symptoms are common, and can include a feeling of lightheadedness or dizziness, weakness, nausea, blurred vision, and a general sensation of unwellness or unease. Patients may be pale and diaphoretic. Vasovagal syncope is a diagnosis of exclusion, and should be considered only after all potentially serious, life-threatening causes have been ruled out.

Interventions

First Responder

- Position the patient. If symptoms suggest hypotension, lay flat provided this does not increase symptoms.
- If no suggestion of hypotension, place patient in position of comfort
- Maintain airway as required
 - → [B01: Airway Management](#)
- Provide supplemental oxygen as required
 - → [A07: Oxygen and Medication Administration](#)

Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain SpO₂ ≥ 94%
 - → [A07: Oxygen and Medication Administration](#)
- Correct hypoglycemia if present
 - → [E01: Hypoglycemia and Hyperglycemia](#)

Primary Care Paramedic – All FR and EMR interventions, plus:

- Assess for source of syncope
- Monitor for signs of improvement if patient initially hypo-perfusing
- Obtain vascular access and correct hypoperfusion
 - → [D03: Vascular Access](#)
- Correct hypoglycemia
 - [Glucaagon](#)
 - [Dextrose](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Provide advanced airway management if required
- Correct rhythm disturbances

Evidence Based Practice

[Syncope](#)

References

1. Benditt D. Syncope in adults: Clinical manifestations and diagnostic evaluation. In UpToDate. 2019. [\[Link\]](#)
2. Benditt D. Syncope in adults: Epidemiology, pathogenesis and etiologies. In UpToDate. 2019. [\[Link\]](#)

F02: Seizures

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Introduction

A seizure is the result of abnormal and sudden electrical activity in the brain, and can be caused by a wide range of conditions. Seizures can be a symptom of an underlying acute medical or neurological condition, or they can lack a clear etiology (as in the case of epilepsy). The main goals of seizure management are to stop the seizure, protect the patient from secondary injury such as aspiration or trauma, evaluate for and treat potentially reversible causes, and provide safe, expeditious transport to hospital.

Essentials

- Seizures can be traumatizing for bystanders and family. First-time seizures are particularly disturbing.
- Benzodiazepines are the first line therapy for active seizures
- Consider important causes of seizures:
 - Hypoglycemia
 - Hypoxia
 - Traumatic head injury
 - Drug overdose, intoxication, or withdrawal
 - Exposure to toxic substances
 - Electrolyte disturbances
 - Cerebrovascular accidents
 - Infections and fevers, including infectious of the central nervous system
- Care more specifically for the patient than the patient's seizures
- For women who are, or who may be pregnant, consider the role of eclampsia:
 - → [L03: Eclampsia](#)
- For children, see CPG M04 or M12
 - → [M04: Pediatrics: Neurological](#)
 - → [M12: Neonatal: Neurological](#)

Additional Treatment Information

- Protection of the airway, and maintenance of effective oxygenation and ventilation is of critical importance. Profound hypoxia can develop in patients with prolonged seizure activity.
- As a general rule, paramedics should consider controlling seizures in patients who continue to seize after their arrival on-scene: taking travel time into consideration, these patients are often seizing for upwards of ten minutes by the time an ambulance crew makes contact.
- Patients with known seizure disorders are often prescribed benzodiazepines to be administered by family or caregivers. Paramedics must be aware of this possibility and adjust their dosing strategies accordingly.
- Do not provide "prophylactic" benzodiazepines to patients who are not currently seizing.
- The duration of the postictal phase is often variable. Patients may exhibit a wide range of behaviors, none of which are intentional, and none of which should prompt intervention from law enforcement. Wherever possible, paramedics should provide patients with a quiet, non-stimulating space to recover from their seizure, while protecting them from further harm.

Referral Information

Patients with well-established seizure disorders, who experience a single, self-limited seizure, may refuse transport

to hospital in consultation with CliniCall.

Interventions

First Responder

- Protect the patient from physical harm
- Provide supplemental oxygen as required
 - → [A07: Oxygen and Medication Administration](#)
- Attempt to place pharyngeal airway if required to maintain patency (do not force mouth open)

Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain $\text{SpO}_2 \geq 94\%$
 - → [A07: Oxygen and Medication Administration](#)
- Consider use of nasopharyngeal airway.
 - → [PR07: Nasopharyngeal Airway](#)
- Consider and search for reversible causes
- Obtain capillary blood sample

Primary Care Paramedic – All FR and EMR interventions, plus:

- Treat hypoglycemia
 - → [E01: Hypoglycemia and Hyperglycemia](#)
- Consider supraglottic airway device in patients who are no longer seizing but remain profound obtunded and require airway management
 - → [PR08: Supraglottic Airways](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- When indicated, control seizures
 - [MIDAZOLam](#) intramuscularly. May repeat once if seizures continue and if IV access is unsuccessful.
 - Obtain vascular access
 - → [D03: Vascular Access](#)
 - If seizures continue: [MIDAZOLam](#) intravenously. May repeat every 2-5 minutes as required.
- Modify doses for smaller / elderly individuals
- Contact CliniCall for additional dosing instructions
- Consider intubation or advanced airway management for seizures refractory to treatment or continued profound unconsciousness
 - → [B01: Airway Management](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Attempt to arrest seizures with anticonvulsants. Consider:
 - Benzodiazepines ([MIDAZOLam](#))
 - Propofol
 - [PhenyTOIN](#)
- In unstable patients refractory to conventional treatments, consider the use of neuromuscular blockade and intubation to maintain physiologic norms.
 - [EPCS consultation is required prior to paralysis.](#)
 - Consider evaluating serum electrolytes in searching for underlying (and potentially treatable) causes.
- Secure airway if required.
 - → [PR18: Anesthesia Induction](#)
 - → [PR29: Mechanical Ventilation](#)



Evidence Based Practice

[Seizures](#)

F03: Stroke

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Introduction

An acute stroke is a sudden non-traumatic ischemic or hemorrhagic insult to the brain. Transient ischemic attacks (TIAs) are events that present similarly to an acute ischemic stroke, but resolve completely and spontaneously within minutes to hours. Despite the resolution of symptoms, TIAs are important warning signs that indicate a patient is at high risk for ischemic stroke. The main goals of care include rapid and accurate recognition of stroke symptoms, establishing the time of symptom onset (or the "last seen normal" time, as applicable), and timely transportation to an appropriate stroke center.

Essentials

- To minimize mortality and disability, effective stroke management involves multiple providers and a system of care. Early recognition, appropriate hospital selection, and communication are essential.
- Apply the FAST-VAN exam as part of patient assessment.
 - → [Tool: FAST VAN calculator](#)
- Patients with suspected acute stroke and TIAs should be preferentially transported to stroke care centers, or to an emergency department with CT imaging capabilities.
- "Hot stroke" patients are defined as those with positive FAST screening score, and an onset of symptoms within the last six hours or who woke up with symptoms.
- "Hot stroke" patients whose VAN exam is positive may have a large vessel occlusion that benefits from endovascular thrombectomy (EVT). Regional guidelines may direct these patients to a particular center with EVT capabilities.
- Approximately 15% of all strokes are the result of an intracranial haemorrhage (ICH). These patients are more likely to deteriorate rapidly despite aggressive prehospital care.

Additional Treatment Information

- A negative FAST-VAN exam does not exclude a stroke
- Paramedics should be suspect a hemorrhagic stroke in patients who present with stroke symptoms and:
 - Glasgow Coma Scale <10
 - A history of severe headache
 - Nausea and vomiting
 - Bradycardia and hypertension
 - Unequal pupils
 - Abnormal respiration patterns

Referral Information

Resolved TIAs require transportation to an appropriate stroke center or emergency department for further evaluation.

Interventions

First Responder

- Position the patient: place in position of comfort if possible; otherwise, position as necessary for care
- Manage airway as required
 - → [B01: Airway Management](#)

- Provide supplemental oxygen as required
 - → [A07: Oxygen and Medication Administration](#)

Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain SpO₂ ≥ 94%
 - → [A07: Oxygen and Medication Administration](#)
- Obtain and document capillary blood glucose measurement. Treat hypoglycemia with oral glucose as patient's condition permits.
 - → [E01: Hypoglycemia and Hyperglycemia](#)
- Obtain and document onset of symptoms, or "last seen normal" time
- Minimize on-scene time
- Notify receiving facility while en route

Primary Care Paramedic – All FR and EMR interventions, plus:

- Obtain vascular access:
 - → [D03: Vascular Access and Fluid Administration](#)
 - Select a site above the level of the wrist
- Enrol in FRONTIER trial, if indicated

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Anesthesia:
 - Phase 1
 - Secure airway if required. Use an appropriate induction strategy and intubation procedure based on patient and environment specificity.
 - **EPOS orders are required for paralytic use.** Post-call consultation permitted for RSI in emergency situations.
 - Phase 2
 - Deep sedation is required. Target RASS -5 without complete or burst suppression.
 - Propofol is the preferred agent for phase 2 anesthesia.
 - Use narcotic analgesia as required.
 - Use EEG-guided anesthesia if appropriate.
 - Maintain neuromuscular blockade as required.
 - **EPOS orders are required for paralytic use.** Post-call consultation permitted for RSI in emergency situations.
- Manage hemodynamic instability:
 - Target MAP greater than 65 mmHg and systolic blood pressure greater 90 mmHg.
 - Crystalloid and/or vasopressor administration may be required.
 - Consider short term [phenylephrine](#) administration.
 - For long term support, consider [norepinephrine](#).
 - For suspected intracranial hemorrhage or subarachnoid hemorrhage in the unconscious patient, maintain blood pressure below 160 mmHg:
 - Consider [labetalol](#).
 - Consider [hydralazine](#).
- Optimize cerebral venous out-flow:
 - Raise head of bed to 30°.
 - Promote venous drainage (e.g., cervical collars, ETT ties loose, trans-pulmonary PEEP of 0 cmH₂O, trans-pulmonary plateau pressure less than 25 cmH₂O).
 - Maintain neck neutrality.
 - If no esophageal balloon in place, set PEEP 5-12 cmH₂O.
 - Decompress stomach if required.
- Mechanical ventilation strategies:
 - BVM with PEEP valve: maintain adequate oxygenation while preserving adequate cerebral venous drainage.
 - Ensure oxygenation goals are being met. (SpO₂ > 97%, PaO₂ 100-150 mmHg.)

- Ensure ventilation goals are being met. (EtCO₂ 35-40 mmHg, PaCO₂ 35-40 mmHg.)
- Minimize Pplats while maintaining ventilation goals.
- Control seizure activity:
 - Consider etiology and patient presentation when selecting appropriate agent:
 - MIDAZOLam
 - Propofol
 - Consider the side effect of hypotension: pressors may be required to maintain hemodynamic goals.
 - Consider the utility of [phenytoin](#) for seizing and seizure prophylaxis. Treat based on the etiology, patient presentation, requirement for neuromuscular blockade, and transport context.
- Monitor for signs of raised ICP and cerebral herniation:
 - Neurological exam findings:
 - Unilateral pupillary dilation considered to be related to a rise in intracranial pressure.
 - Decorticate or decerebrate posturing.
 - Seizure activity.
 - ONSD of < 6 mm.
 - Consider osmotic therapy
 - Hypertonic saline. EPOS orders are required for the use of hypertonic saline.
 - [Mannitol](#).
- Maintain capillary blood glucose between 6-10 mmol/L.
- Arterial or venous blood gas analysis:
 - Adjust mechanical ventilation to ensure adequate oxygenation, appropriate ventilation, and safe ground ventilating parameters.
- Consider anti-emetic administration:
 - [Dimenhydrinate](#)
 - [Metoclopramide](#)
 - [Ondansetron](#)
- Other considerations:
 - Avoid steroid use.

Neurological emergencies or urgencies are considered to be time sensitive, and may require immediate intervention. Minimizing scene times may have significant effects on patient outcomes.

Evidence Based Practice

[Stroke](#)

References

1. Alberta Health Services. AHS Medical Control Protocols. 2020. [\[Link\]](#)
2. Ambulance Victoria. Clinical Practice Guidelines: Ambulance and MICA Paramedics. 2018. [\[Link\]](#)

F04: Headache

Joe Acker

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Introduction

Headache is a generalized term given to any pain in the region of the head above eye level. Pain from headaches can be acute or chronic, generalized or localized, and can range from mild to severe. The pain may occur on one or both sides of the head, be isolated to a single location, or extend as a band across the skull. Paramedic assessment of a patient with a headache should include a detailed history followed by a thorough general and neurological examination. The underlying cause of the pain cannot be diagnosed in the prehospital setting, and transport to hospital is usually required.

Essentials

- Acetaminophen is an effective first-line analgesic for managing headaches in the prehospital environment
- Nitrous oxide is considered safe and may be effective for managing headache
- Treat nausea and vomiting as required
- Paramedics are not to administer acetylsalicylic acid for headache
- Opioids are of limited benefit in the treatment of migraine. MORPHine may not be effective and may be associated with delayed recovery. FentaNYL should only be used to treat severe headache where other measures have failed, and where transport to the treating facility is prolonged.

Additional Treatment Information

- Severe dehydration may cause headaches. IV fluid replacement may be beneficial in these cases.
- Analgesia may not be effective in patients who suffer from previously diagnosed cluster headaches. High flow oxygen may be beneficial in these cases.

Referral Information

Headache management depends upon in-hospital diagnosis; this cannot take place in the prehospital environment. Paramedics must provide interim symptom relief until a definitive diagnosis can be made and appropriate management plan developed. Patients who suffer from migraine or chronic headaches may have a pre-defined treatment plan, and will seek care only when that plan has failed, or the presentation of the headache is new or unusual.

General Information

- The common types of headache include:
 - Vascular
 - Migraines and cluster headaches
 - Can last from minutes to days
 - Characterized by intense/throbbing pain, photosensitivity, nausea, vomiting, and sweating
 - Sudden onset/most severe ever headache (thunderclap) may indicate sub-arachnoid hemorrhage
 - Tension
 - Often starts in the morning as mild and worsens throughout the day
 - Characterized by a dull, achy pain
 - Organic
 - Less common
 - Caused by tumours, infection, or other diseases of the brain
 - Headaches can be a minor inconvenience or may be debilitating. Occasionally a serious medical emergency may present with headache as a symptom. These include:

- Subarachnoid hemorrhage
 - Sudden onset, severe, instantaneously peaking headache (a “thunderclap” headache)
- Hemorrhagic strokes
 - Onset of a sudden and severe headache
- Other vascular etiologies:
 - Giant cell arteritis, carotid or vertebral artery dissection, venous thrombosis
- Meningitis
 - Continuous throbbing headache (usually in occiput) with sudden onset of fever, nausea, vomiting, confusion, and stiff neck
 - Frequently associated with a rash which may be maculopapular petechial or urticarial
 - A decreased headache secondary to the administration of metoclopramide is not diagnostic in nature. Do not make further treatment or transport decisions based solely on a response to the medication
 - Paramedics should use droplet precautions if meningitis is suspected
- Acute angle-closure glaucoma
 - Headache with severe pain to ipsilateral eye with associated visual changes, or visual loss
- Carbon monoxide toxicity

Interventions

First Responder

- Place patient in position of comfort: the patient may be more comfortable if the environment can be made dark/dim and quiet
- Manage airway as required
 - → [B01: Airway Management](#)
- Supplemental oxygen as required
 - → [A07: Oxygen and Drug Administration](#)
- Obtain a blood glucose level and temperature

Emergency Medical Responder – All FR interventions, plus:

- Consider analgesia:
 - → [E08: Pain Management](#)

Primary Care Paramedic – All FR and EMR interventions, plus:

- Obtain vascular access
 - → [D03: Vascular Access](#)
 - Consider volume replacement for dehydration
- Consider analgesia for symptom relief:
 - [Nitrous oxide](#)
 - [Acetaminophen](#)
- Consider antiemetic for symptom relief:
 - [Dimenhydrinate](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Consider analgesia for severe pain:
 - [Fentanyl](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Other Medications (Ondansetron, Metoclopramide)
- Investigations to address and treat underlying etiology

Evidence Based Practice

[Headache and Migraine](#)

References

1. Alberta Health Services. AHS Medical Control Protocols. 2020. [\[Link\]](#)
2. Ambulance Victoria. Clinical Practice Guidelines: Ambulance and MICA Paramedics. 2018. [\[Link\]](#)
3. Queensland Ambulance Service. Clinical practice guidelines: Neurological/headache. 2017. [\[Link\]](#)

