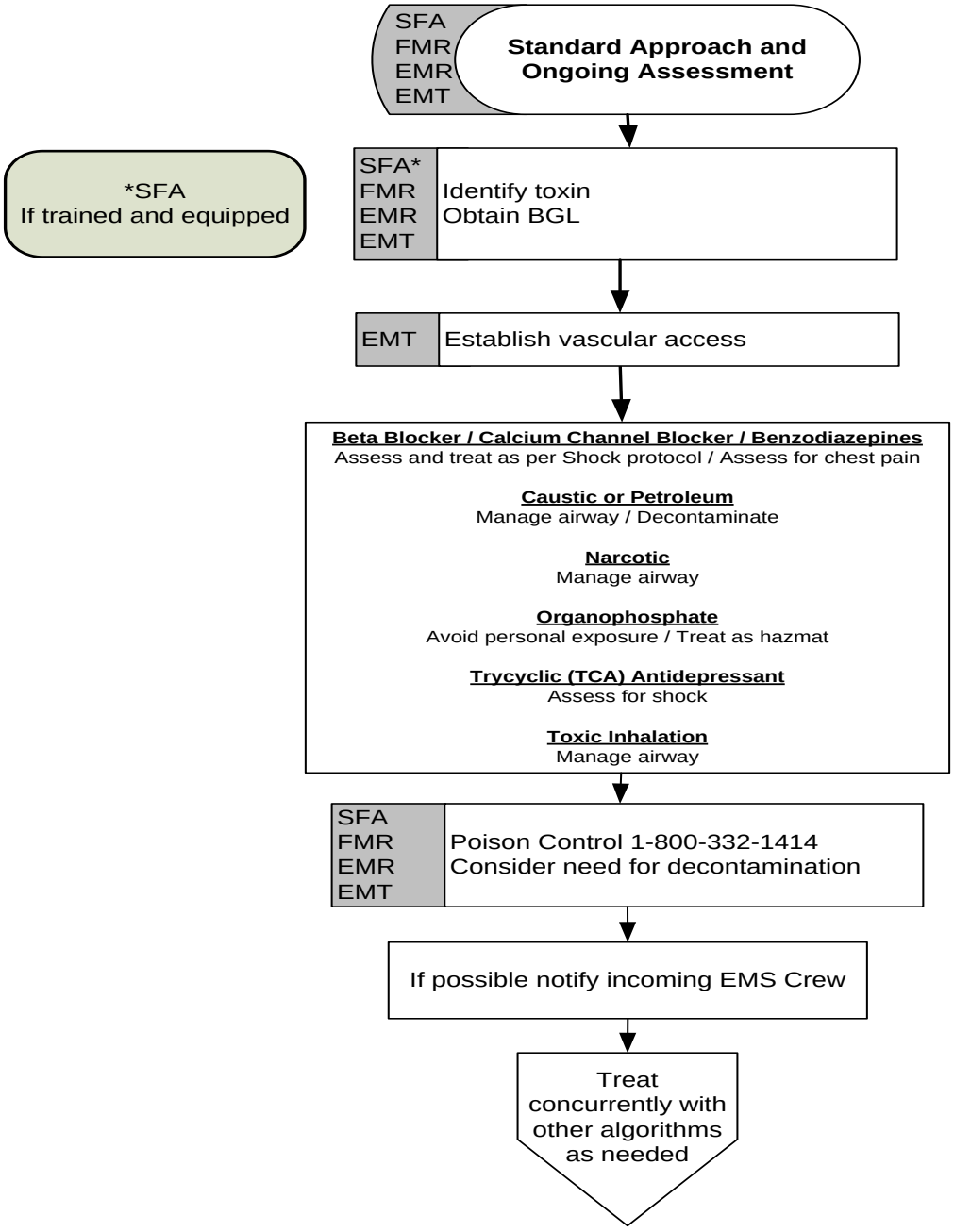
Algorithm 23 Poisoning



Poisoning (Algorithm 23)

The following information is taken from the Alberta Poison and Drug Information Service (PADIS) ©2015

If the victim is breathing and conscious call the Poison Centre for additional directions:
1-800-332-1414

For poisons that are swallowed

Chemicals or household products
Have the container or label of the poison with you
Call the Poison Centre at 1-800-332-1414 and follow their instructions
DO NOT follow the treatment instructions on the container until you have checked with the Poison Centre.
DO NOT give salt water or mustard.
DO NOT put your finger down the throat of a poisoned person, or make them vomit.

Medications
DO NOT give anything by mouth
Have the container or label of the medication with you
Call the Poison Centre at 1-800-332-1414

Plants that are swallowed
Choking is the immediate concern when a child places a plant part in his/her mouth. If the child is gagging or choking, finger-sweep his/her mouth if you can see the object and remove any remaining parts of the plant.
Perform appropriate intervention if choking – refer to Obstructed Airway Protocol
Gently wipe mouth and surrounding area with a wet cloth.
Check for irritation, swelling, discoloration, or difficulty in swallowing.
If the child has no difficulty swallowing, give half a glass of water or milk.
Call the Poison Centre at 1-800-332-1414
DO NOT make the child vomit.
DO NOT wait for symptoms to appear. Symptoms can be delayed.

For poisons that are spilled on the skin
Ensure appropriate safety precautions and PPE
Remove all soiled clothing.
Avoid getting poison on yourself.
Rinse the skin under running water for 15 minutes, then wash gently with soap and water and rinse again.

For poisons that are breathed in
Ensure appropriate safety precautions and PPE
Consider breathing protection for the responder, i.e. self-contained breathing apparatus (SCBA) or a supplied air respirator (SAR)
Remember to consider the possibility of a poisonous gas if a person has collapsed in an enclosed space.
Move the victim into fresh air if you can do so without putting yourself in danger.
Open all doors and windows.
DO NOT breathe the fumes.
Call the Poison Centre at 1-800-332-1414
If the person is not breathing, start artificial respiration.

For poisons that are splashed in the eye
Rinse the eye with lukewarm water for 15 minutes, by pouring lukewarm water from a large glass 2 to 3 inches above the eye, or by standing in the shower. Avoid contaminating unaffected eye.
Have the person blink as often as possible while rinsing the eyes.
Call the Poison Centre at 1-800-332-1414
DO NOT force the eyelids open.

For poisons that are injected (puncture or injection)
Apply gentle direct pressure if bleeding
Clean the wound with soap and water
Soak in warm water for 15 minutes
Bandage
Apply ice to reduce pain and swelling
Call the Poison Centre at 1-800-332-1414
Watch for signs of an allergic reaction or anaphylactic shock
Provide airway management if the victim has airway or breathing problems – refer to airway management.

The priority in managing toxic exposures is to protect responders, the patient, and hospital staff from further harm by reducing the contamination as much as possible

Contamination Reduction (Decontamination)

Do not approach the patient until properly trained and equipped personnel are able to perform contamination reduction:

1. Remove all clothing from the contaminated patient
2. Wash the patient with copious amounts of water; be sure to contain contaminated runoff

Identify Toxin / Agent / Product

Use history taking, scene assessment, and patient signs and symptoms to assist in identification of the toxin; look for:
Dangerous goods placards
WHMIS labels
Medication containers
Household chemicals
Other clues that may aid your assessment

Special Circumstances

1. Anticholinergic OD
   Common signs and symptoms include: confusion with mumbling speech, tachycardia, dry flushed skin, dilated pupils, myoclonus, temperature elevated, urinary retention
   - Red as a beet
   - Mad as a hatter
   - Dry as a bone
   - Hot as Hades
   - Blind as a bat

   Common sources: antihistamines, anti-parkinsonism meds, atropine, antipsychotics, scopolamine, antidepressants, antispasmodics, mydriatics, skeletal muscle relaxants and many plants.

Organophosphate Poisoning Notes

Etiology

Organophosphate compounds include insecticides (e.g. malathion, parathion) and nerve agents (e.g. sarin, VX). These compounds have a very high affinity for acetylcholinesterase and irreversibly bind with the enzyme preventing it from metabolizing acetylcholine. Acetylcholine is the neurotransmitter responsible for the transmission of a nerve impulse from one nerve to another or a target organ, gland, or muscle. Normally, acetylcholinesterase almost instantly metabolizes the acetylcholine to stop the stimulation of the target receptor site.

Carbamate compounds include insecticides (e.g. carbofuran, Furadan, carbaryl) and polyurethanes (e.g. bisphenol-A). These compounds act similarly to organophosphates in that they bind to acetylcholinesterase; however, an important difference is that the bond formed between carbamates and acetylcholinesterase is reversible.

When the acetylcholinesterase is bound to one of the above compounds, the acetylcholine remains active and continues to stimulate the target receptor site causing adverse physiologic effects. This means the organs, glands, and muscles act continuously, eventually leading to respiratory system failure, cardiovascular effects, paralysis of skeletal muscles, and over-stimulation of the brain causing convulsions and death.

Signs and symptoms of organophosphate / carbamate poisoning develop rapidly (less than 1 minute to 60 minutes) after exposure and in order of appearance and severity include:

- Constricted pupils (miosis) and dim vision
- Running nose, excessive salivation
- Feeling of tightness in the chest
- Muscular weakness
- Intestinal cramps and diarrhea – indicates a severe organophosphate exposure
- Difficulty breathing
- Convulsions

A useful mnemonic to remember these signs and symptoms is **SLUDGEM**:

- S Salivation
- L Lacrimation
- U Urination
- D Defecation
- G GI upset
- E Emesis

- M Miosis

Other chemicals such as cholinergics and cholinesterase inhibitors (e.g. nicotine, muscarine / poisonous mushrooms, neostigmine, cevimeline) have similar effects on the nerve synapses. Treatment for these chemicals is the same as for organophosphates.

Signs and symptoms of poisons that affect the nerve synapses depend on whether they are affecting the muscarinic or nicotinic receptor sites. Muscarinic receptors are predominantly in the parasympathetic nervous system while nicotinic receptors are in the sympathetic system.
A mnemonic to remember the signs and symptoms of muscarinic poisoning is DUMBELS and nicotinic poisoning is MTWHF (Monday-Tuesday-Wednesday-Thursday-Friday).

Muscarinic

- D Diarrhea
- U Urination
- M Miosis
- B Bradycardia, Bronchorrhea, Bronchospasm
- E Emesis
- L Lacrimation
- S Salivation, Secretion, Sweating

A mnemonic to remember the signs and symptoms of nicotinic poisoning is MTWHF (Monday-Tuesday-Wednesday-Thursday-Friday).

Nicotinic

- M Mydriasis
- T Tachycardia
- W Weakness
- H Hypertension, Hyperglycemia
- F Fasciculations

Interventions

Contamination Reduction (Decontamination)

Request assistance from the local fire department and hazardous materials units if available.

Do not approach the patient until properly trained and equipped personnel are able to perform contamination reduction:

a) Remove all clothing from the contaminated victim

b) Wash the victim with copious amounts of water; be sure to contain contaminated runoff

Patient Safety Considerations

The priority in managing organophosphate exposures is to protect responders, the patient, and hospital staff from further harm by reducing the contamination as much as possible.

Toxic Inhalation Notes

Etiology

Toxic inhalations occur when a patient has inhaled smoke or fumes which damage the lungs or poison the body. Chemicals that directly damage the lungs cause a chemical pneumonia. Other chemicals such as carbon monoxide and hydrogen sulphide enter the body via the respiratory system, but affect other organs.

Carbon monoxide (CO)

A colorless, odorless gas produced by the incomplete combustion of a material containing carbon. It has a much higher affinity for hemoglobin than oxygen, resulting in hypoxemia. The smaller the patient's body size, the greater the effect of CO.

Signs and symptoms include:

- Headache
- Nausea
- Flushed skin
- SOB
- Altered level of consciousness
- Dizziness
- Ischemic chest pain

Interventions

- High Flow Oxygen

Administer oxygen to all patients suspected of suffering a toxic inhalation regardless of their SpO_2 reading; CO bonds with hemoglobin forming carboxyhemoglobin which gives a false (high) reading on SpO_2 monitors

Patient Safety Considerations

Fetal hemoglobin has a much greater affinity for CO than adult hemoglobin; pregnant patients may exhibit mild to moderate symptoms, yet the fetus may have devastating outcomes.

CO Monitoring

Monitor SpCO levels (if available) in patients suspected of being exposed to CO; SpCO levels of greater than 5% are considered significant.

Treat the patient based on presentation, not on SpCO level.

Atmospheric monitoring of CO levels (if available) can prepare you for the patient's condition; their actual condition is based on the concentration, duration of exposure, and minute ventilation rate:

CO ppm	Duration of exposure	Signs & Symptoms
200	2 – 3 hours	Mild headache, fatigue, nausea, dizziness
400	1 – 2 hours	Serious headache, other symptoms intensify Life-threatening if exposure greater than 3 hours
800	45 minutes	Dizziness, nausea, convulsions Unconscious within 2 hours, death within 2 – 3 hours
1600	20 minutes	Headache, dizziness, nausea Death within 1 hour
3200	5 – 10 minutes	Headache, dizziness, nausea Death within 1 hour
6400	1 – 2 minutes	Headache, dizziness, nausea Death within 25 – 30 minutes
12800	1 – 3 minutes	Death

Hydrogen sulphide (H2S)

A colorless gas that can smell like rotten eggs; however, at higher concentrations, it impairs the olfactory nerves and has no smell. H2S is produced as a result of the bacterial breakdown of organic matter in the absence of oxygen and also occurs in natural gas (sour gas). H2S blocks cellular respiration by preventing oxygen from binding in the mitochondria.

Signs and symptoms include:

- Ocular / respiratory irritation
- SOB
- Sudden collapse
- Cardiac arrest

Interventions

- High Flow Oxygen

Other considerations for Toxic Gas Inhalation:
Odour Field Guide

Odour	Possible Causative Agents
Bitter almonds	Cyanide
Garlic	Arsenic, organophosphates, phosphorus, thallium
Acetone	Methyl alcohol, isopropyl alcohol, aspirin
Wintergreen	Methyl salicylate
Pears	Choral Hydrate
Fruity	Isopropanol, acetone, nail polish remover
Minty	Mouthwash , rubbing alcohol
Mothballs	Napthalene, p-dichlorobenzene
Peanuts	Vacor rat poisons
Shoe polish	Nitrobenze