UNIT TERMINAL OBJECTIVE

5-8 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with a toxic exposure.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

5-8.1 Describe the incidence, morbidity and mortality of toxic emergencies. (C-1)
5-8.2 Identify the risk factors most predisposing to toxic emergencies. (C-1)
5-8.3 Discuss the anatomy and physiology of the organs and structures related to toxic emergencies. (C-1)
5-8.4 Describe the routes of entry of toxic substances into the body. (C-1)
5-8.5 Discuss the role of the Poison Control Center in the United States. (C-1)
5-8.6 List the toxic substances that are specific to your region. (C-1)
5-8.7 Discuss the pathophysiology of the entry of toxic substances into the body. (C-1)
5-8.8 Discuss the assessment findings associated with various toxidromes. (C-1)
5-8.9 Identify the need for rapid intervention and transport of the patient with a toxic substance emergency. (C-1)
5-8.10 Discuss the management of toxic substances. (C-1)
5-8.11 Define poisoning by ingestion. (C-1)
5-8.12 List the most common poisonings by ingestion. (C-1)
5-8.13 Describe the pathophysiology of poisoning by ingestion. (C-1)
5-8.14 Recognize the signs and symptoms related to the most common poisonings by ingestion. (C-1)
5-8.15 Correlate the abnormal findings in assessment with the clinical significance in the patient with the most common poisonings by ingestion. (C-1)
5-8.16 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by ingestion. (C-3)
5-8.17 Discuss the factors affecting the decision to induce vomiting in a patient with ingested poison. (C-1)
5-8.18 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with the most common poisonings by ingestion. (C-3)
5-8.19 Define poisoning by inhalation. (C-1)
5-8.20 List the most common poisonings by inhalation. (C-1)
5-8.21 Describe the pathophysiology of poisoning by inhalation. (C-1)
5-8.22 Recognize the signs and symptoms related to the most common poisonings by inhalation. (C-1)
5-8.23 Correlate the abnormal findings in assessment with the clinical significance in patients with the most common poisonings by inhalation. (C-1)
5-8.24 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by inhalation. (C-3)
5-8.25 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with the most common poisonings by inhalation. (C-3)
5-8.26 Define poisoning by injection. (C-1)
5-8.27 List the most common poisonings by injection. (C-1)
5-8.28 Describe the pathophysiology of poisoning by injection. (C-1)
5-8.29 Recognize the signs and symptoms related to the most common poisonings by injection. (C-1)
5-8.30 Correlate the abnormal findings in assessment with the clinical significance in the patient with the most common poisonings by injection. (C-3)
5-8.31 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by injection. (C-3)

5-8.32 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with the most common poisonings by injection. (C-3)
5-8.33 Define poisoning by surface absorption. (C-1)
5-8.34 List the most common poisonings by surface absorption. (C-1)
5-8.35 Describe the pathophysiology of poisoning by surface absorption. (C-1)
5-8.36 Recognize the signs and symptoms related to the most common poisonings by surface absorption. (C-1)
5-8.37 Correlate the abnormal findings in assessment with the clinical significance in patients with the most common poisonings by surface absorption. (C-3)
5-8.38 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by surface absorption. (C-3)
5-8.39 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for patients with the most common poisonings by surface absorption. (C-3)
5-8.40 Define poisoning by overdose. (C-1)
5-8.41 List the most common poisonings by overdose. (C-1)
5-8.42 Describe the pathophysiology of poisoning by overdose. (C-1)
5-8.43 Recognize the signs and symptoms related to the most common poisonings by overdose. (C-1)
5-8.44 Correlate the abnormal findings in assessment with the clinical significance in patients with the most common poisonings by overdose. (C-3)
5-8.45 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by overdose. (C-3)
5-8.46 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for patients with the most common poisonings by overdose. (C-3)
5-8.47 Define drug abuse. (C-1)
5-8.48 Discuss the incidence of drug abuse in the United States. (C-1)
5-8.49 Define the following terms: (C-1)
    a. Substance or drug abuse
    b. Substance or drug dependence
    c. Tolerance
    d. Withdrawal
    e. Addiction
5-8.50 List the most commonly abused drugs (both by chemical name and street names). (C-1)
5-8.51 Describe the pathophysiology of commonly used drugs. (C-1)
5-8.52 Recognize the signs and symptoms related to the most commonly abused drugs. (C-1)
5-8.53 Correlate the abnormal findings in assessment with the clinical significance in patients using the most commonly abused drugs. (C-3)
5-8.54 Differentiate among the various treatments and pharmacological interventions in the management of the most commonly abused drugs. (C-3)
5-8.55 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for patients using the most commonly abused drugs. (C-3)
5-8.56 List the clinical uses, street names, pharmacology, assessment finding and management for patient who have taken the following drugs or been exposed to the following substances: (C-1)
    1. Cocaine
    2. Marijuana and cannabis compounds
    3. Amphetamines and amphetamine-like drugs
    4. Barbiturates
    5. Sedative-hypnotics
    6. Cyanide

7. Narcotics/ opiates
8. Cardiac medications
9. Caustics
10. Common household substances
11. Drugs abused for sexual purposes/ sexual gratification
12. Carbon monoxide
13. Alcohols
14. Hydrocarbons
15. Psychiatric medications
16. Newer anti-depressants and serotonin syndromes
17. Lithium
18. MAO inhibitors
19. Non-prescription pain medications
    (1) Nonsteroidal anitinflammatory agents
    (2) Salicylates
    (3) Acetaminophen
20. Theophylline
21. Metals
22. Plants and mushrooms

5-8.57 Discuss common causative agents, pharmacology, assessment findings and management for a patient with food poisoning. (C-1)

5-8.58 Discuss common offending organisms, pharmacology, assessment findings and management for a patient with a bite or sting. (C-1)

5-8.59 Integrate pathophysiological principles of the patient with a toxic substance exposure. (C-1)

5-8.60 Differentiate between toxic substance emergencies based on assessment findings. (C-3)

5-8.61 Correlate abnormal findings in the assessment with the clinical significance in the patient exposed to a toxic substance. (C-3)

5-8.62 Develop a patient management plan based on field impression in the patient exposed to a toxic substance. (C-3)

AFFECTIVE OBJECTIVES

None identified for this unit.

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

I. General toxicology, assessment and management
  A. Types of toxicological emergencies
    1. Unintentional poisoning
      a. Dosage errors
      b. Idiosyncratic reactions
      c. Childhood poisoning
      d. Environmental exposure
      e. Occupational exposures
      f. Neglect and Abuse
    2. Drug/ alcohol abuse
    3. Intentional poisoning/ overdose
      a. Chemical warfare
      b. Assault/ homicide
      c. Suicide attempts
  B. Use of poison control centers
  C. Routes of absorption
    1. Ingestion
    2. Inhalation
    3. Injection
    4. Absorption
  D. Poisoning by ingestion
    1. Examples
    2. Anatomy and physiology review
      a. Absorption
      b. Distribution
    3. Assessment findings
    4. General management considerations
  E. Poisoning by inhalation
    1. Examples
    2. Anatomy and physiology review
      a. Absorption
      b. Distribution
    3. Assessment findings
    4. General management considerations
  F. Poisoning by injection
    1. Examples
      a. IV drug abuse
      b. Venomous bites and stings
    2. Anatomy and physiology review
      a. Absorption
      b. Distribution

3. Assessment findings
4. General management considerations

G. Poisoning by absorption
   1. Examples
   2. Anatomy and physiology review
      a. Absorption
      b. Distribution
   3. Assessment findings
   4. General management considerations

H. Drugs abuse
   1. Epidemiology
      a. Incidence
      b. Morbidity/ mortality
      c. Risk factors
      d. Prevention
   2. Psychological issues
   3. Psycho-social issues
   4. Pathophysiology of long term drug abuse
      a. End organ damage
         (1) Brain
         (2) Liver
         (3) Heart
      b. Malnutrition
   5. Basic concepts
      a. Habituation/ dependence/ addiction
         (1) Physical
         (2) Psychological
      b. Tolerance
      c. Antagonist
      d. Potentiating
      e. Synergism
      f. Withdrawal syndromes
   6. Assessment finding

I. Alcoholism
   1. Epidemiology
      a. Incidence
      b. Morbidity/ mortality
      c. Risk factors
      d. Prevention
   2. Psychological issues
   3. Psycho-social issues
   4. Pathophysiology of long term alcohol abuse

a. End organ damage
(1) Brain
(2) Liver
(3) Heart
(4) Bone
(5) Pancreas
b. Malnutrition
c. Withdrawal syndrome
5. Assessment findings

J. Toxic syndromes
1. Definition/ advantages
a. Grouping of toxiologically similar agents
b. Useful for remembering the assessment and management of toxicological emergencies
c. Does not consider how or why the toxin has been introduced to the body
d. Be sure to include the general management based or route of entry in addition to specific treatments
2. Cholinergics
a. Common causative agents - pesticides (organophosphates, carbamates) and nerve agents (sarin, Soman)

b. Assessment findings
(1) Headache
(2) Dizziness
(3) Weakness
(4) Nausea
(5) SLUDGE (salivation, lacrimation, urination, defecation, GI Upset, Emesis)
(6) Bardycardia, wheezing, bronchoconstriction, myosis, coma, convulsions
(7) Diaphoresis, seizures
c. Management
(1) Decontamination
(2) Airway and ventilation
(a) Aggressive airway management
(3) Circulation
(4) Pharmacological
(a) Atropine

(b) Pralidoxime chloride (2-PAM)
(c) Diazepam
(d) Activated charcoal
(5) Non-pharmacological
(6) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(7) Psychological/ communication strategies

3. Anticholinergic
   a. Common causative agents
   b. Assessment findings
   c. Management
      (1) Airway and ventilation
      (2) Circulation
      (3) Pharmacological
      (4) Non-pharmacological
      (5) Transport considerations
         (a) Appropriate mode
         (b) Appropriate facility
      (6) Psychological/communication strategies
4. Hallucinogens
   a. Common causative agents - lysergic acid diethylamide (LSD), phenyclicidine (PCP), peyote, mushrooms, jimson weed, mescaline
   b. Assessment findings
      (1) Chest pain
   c. Management
      (1) Airway and ventilation
      (2) Circulation
      (3) Pharmacological
      (4) Non-pharmacological
      (5) Transport considerations
         (a) Appropriate mode
         (b) Appropriate facility
      (6) Psychological/ communication strategies
5. Narcotics/ opiates
   a. Common causative agents - heroin, morphine, codeine, meperidine, propoxyphene, fentanyl
   b. Assessment findings
      (1) Euphoria
      (2) Hypotension
      (3) Respiratory depression/ arrest
      (4) Nausea

(5) Pinpoint pupils
(6) Seizures
(7) Coma
c. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(a) Naloxone- opiate specific antidotal therapy
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

6. Sympathomimetics
a. Common causative agents
b. Assessment findings
c. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

II. Specific toxicology, assessment and management
A. Cocaine
1. Clinical uses
2. Common causative agents
3. Common street names
4. Pharmacodynamics
5. Pharmacokinetics
6. Assessment findings
7. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility

f. Psychological/ communication strategies

B. Marijuana and cannabis compounds
1. Clinical uses
2. Common causative agents
3. Common street names
4. Pharmacodynamics
5. Pharmacokinetics
6. Assessment findings
7. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

C. Amphetamines and amphetamine-like drugs
1. Clinical uses
2. Common causative agents
3. Common street names
4. Pharmacodynamics
5. Pharmacokinetics
6. Assessment findings
7. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/communication strategies

D. Barbiturates
1. Clinical uses
2. Common causative agents
3. Common street names
4. Pharmacodynamics
5. Pharmacokinetics
6. Assessment findings
7. Management
a. Airway and ventilation
b. Circulation

c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

E. Sedative-hypnotics
1. Clinical use
2. Common causative agents - benzodiazepines (diazepam, chlordiazepoxide, midazolam)
3. Common street names
4. Pharmacodynamics
5. Pharmacokinetics
6. Assessment findings
a. Respiratory depression/ respiratory arrest
b. Hypotension
7. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
(1) Antidote
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

F. Cyanide
1. Sources
2. Common causative agents
a. Used in industry (electroplating, ore extraction, fumigation of structures)
b. Product of combustion of nylon or polyurethane
c. Ingestion of seeds (apricot, cherry, pears)
d. Nitroprusside administration
3. Pharmacodynamics
4. Pharmacokinetics
5. Assessment findings
a. History of cyanide exposure
b. Early findings (anxiety, dyspnea, confusion, hypertension, agitation)
c. Late findings (hypotension, acidosis , seizures, pulmonary edema, dysrhythmias, coma)
6. Management

a. Personal protective equipment
(1) Remove patient from the source of poison
b. Airway and ventilation
c. Circulation
(1) Monitoring for hypotension as a result of therapy
d. Pharmacological
(1) Antidotes
(2) Cyanide antidote kit
e. Non-pharmacological
f. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
g. Psychological/ communication strategies

G. Narcotics/ opiates
1. Clinical uses
2. Common causative agents - heroin, morphine, codeine, meperidine, propoxyphene, fentanyl
3. Phamacodynamics
4. Pharmcokinetics
5. Assessment findings
a. Euphoria
b. Hypotension
c. Respiratory depression/ arrest
d. Nausea
e. Pinpoint pupils
f. Seizures
g. Coma
6. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
(1) Naloxone - opiate specific antidotal therapy
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

H. Cardiac medications
1. Clinical use
2. Common causative agents - antidysrythmics, beta blockers, calcium channel blockers, glycosides

3. Pharmacodynamics
4. Pharmacokinetics
5. Assessment findings
6. Management
    a. Airway and ventilation
    b. Circulation
    c. Pharmacological
    d. Non-pharmacological
    e. Transport considerations
        (1) Appropriate mode
        (2) Appropriate facility
    f. Psychological/ communication strategies

I. Caustics
1. Source
2. Common causative agents - acids and alkali
3. Pharmacodynamics
4. Pharmacokinetics
5. Assessment findings
6. Management
    a. Airway and ventilation
    b. Circulation
    c. Pharmacological
    d. Non-pharmacological
    e. Transport considerations
        (1) Appropriate mode
        (2) Appropriate facility
    f. Psychological/ communication strategies

J. Common household poisonings
1. Sources
2. Common causative agents - bleach, cleaning agents
3. Pharmacodynamics
4. Pharmacokinetics
5. Assessment findings
6. Management
    a. Airway and ventilation
    b. Circulation
    c. Pharmacological
    d. Non-pharmacological
    e. Transport considerations
        (1) Appropriate mode
        (2) Appropriate facility
    f. Psychological/ communication strategies

K. Drugs abused for sexual purposes/ sexual gratification
    1. Sources
    2. Common causative agents
    3. Pharmacodynamics
    4. Pharmacokinetics
    5. Assessment findings
    6. Management
        a. Airway and ventilation
        b. Circulation
        c. Pharmacological
        d. Non-pharmacological
        e. Transport considerations
            (1) Appropriate mode
            (2) Appropriate facility
        f. Psychological/ communication strategies

L. Carbon monoxide
    1. Source
    2. Common causative agents
    3. Pharmacodynamics
    4. Pharmacokinetics
    5. Assessment findings
    6. Management
        a. Airway and ventilation
        b. Circulation
        c. Pharmacological
        d. Non-pharmacological
            (1) Hyperbaric treatment
        e. Transport considerations
            (1) Appropriate mode
            (2) Appropriate facility
        f. Psychological/ communication strategies

M. Alcohols
    1. Clinical use/ sources
    2. Common causative agents - ethylene glycol, methanol, isopropyl alcohol, ethanol
    3. Pharmacodynamics
    4. Pharmacokinetics
    5. Assessment findings
    6. Management
        a. Airway and ventilation
        b. Circulation
        c. Pharmacological
            (1) Antidote

d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

N. Hydrocarbons
1. Source
2. Common causative agents - gasoline
3. Pharmacodynamics
a. Aspiration pneumonia
b. CNS depression
c. Acute gastritis
4. Pharmacokinetics
5. Assessment findings
6. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

O. Psychiatric medications
1. Tricyclic antidepressants
a. Clinical use
b. Common causative agents - amitriptyline amoxapine, clomipramine, doxepin, imipramine, nortptyline
c. Phamacodynamics
d. Pharmacokinetics
e. Assessment findings
(1) Early findings (dry mouth, confusion, hallucinations)
(2) Late findings (delirium, respiratory depression, hypotension, hyperthermia, seizures, coma)
(3) Cardiotoxicity - dysrhythmias
f. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(a) Antidote

(b) Sodium bicarbonate may reverse the cardiotoxic effects
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

2. Newer anti-depressants and serotonin syndromes
a. Clinical uses
b. Common causative agents
c. Common street names
d. Pharmacodynamics
e. Pharmacokinetics
f. Assessment findings
g. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

3. Lithium
a. Clinical uses
b. Common causative agents
c. Common street names
d. Pharmacodynamics
e. Pharmacokinetics
f. Assessment findings
g. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

4. MAO inhibiters
a. Clinical use
b. Common causative agents
c. Pharmacodynamics

d. Pharmacokinetics
e. Assessment findings
f. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

5. Other

P. Non-prescription pain medications

1. Nonsteroidal anti-inflammatory agents
a. Clinical uses
b. Common causative agents
c. Common street names
d. Pharmacodynamics
e. Pharmacokinetics
f. Assessment findings
g. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies

2. Salicylates
a. Clinical uses
b. Common causative agents
c. Common street names
d. Pharmacodynamics
e. Pharmacokinetics
f. Assessment findings
g. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode

(b) Appropriate facility
(6) Psychological/ communication strategies
3. Acetaminophine
a. Clinical use
b. Common causative agents
c. Pharmacodynamics
d. Pharmacokinetics
e. Assessment findings
f. Management
(1) Airway and ventilation
(2) Circulation
(3) Pharmacological
(4) Non-pharmacological
(5) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(6) Psychological/ communication strategies
Q. Theophylline
1. Clinical use
2. Common causative agents
3. Pharmacodynamics
4. Pharmacokinetics
5. Assessment findings
6. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies
R. Metals
1. Clinical use
2. Common causative agents - iron, lead, mercury
3. Pharmacodynamics
4. Pharmacokinetics
5. Assessment findings
6. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
(1) Antidote

d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

S. Plants and mushrooms
1. Clinical use
2. Common causative agents
3. Common street names
4. Pharmacodynamics
5. Pharmacokinetics
6. Assessment findings
7. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

T. Food poisoning
1. Common causative agents
2. Pharmacodynamics
a. Type I reaction
b. Gastrointestinal allergy
c. Bacterial toxins
(1) Exotoxins
(2) Enterotoxins
d. Neurotoxins
(1) Paralytic shellfish poisoning
3. Pharmacokinetics
4. Assessment findings
5. Management
a. Airway and ventilation
b. Circulation
c. Pharmacological
d. Non-pharmacological
e. Transport considerations
(1) Appropriate mode
(2) Appropriate facility
f. Psychological/ communication strategies

U. Bites and stings

1. Common offending organisms - hymenoptera, spider bites, other arthropods, snake bites, marine animal
2. Pharmacodynamics
3. Pharmacokinetics
4. Assessment findings
5. Management
    a. Airway and ventilation
    b. Circulation
    c. Pharmacological
    d. Non-pharmacological
    e. Transport considerations
        (1) Appropriate mode
        (2) Appropriate facility
    f. Psychological/ communication strategies