Toxicology

Q1 * Gastric lavage :-

- It consider only if patient has ingested a life-threatening amount of poison & present to hospital within 1 to 2 hr of ingestion
- It involve passage of wide-bore orogastric tube in order to remove content of stomach
- 0.9% saline or water used.

*

- American Academy of Clinical Toxicology & EAPCCT prepare draft & procedure for gastric lavage

* Indication

- Work for patient has taken - life threatening dose ~~with 1 to 2 hr of administration~~ & come to hospital within 1 to 2 hr of administered.
- Some authorities preffered GL upto 6 to 12 hr of administered.
- E.g. Salicylate, tricyclics, barbiturates

*

Contraindication.

→ Relative - Haemorrhagic diathesis
- Alkaline corrosive
- Pregnancy
- Oesophageal surgery
- Coma

→ Absolute - Hypothermia
- Vomiting
- Unprotected airway
- Injection of acid
- Depressed & convulsions

Procedure

→ Explain process to patient & obtain consent. If refused, do not do lavage.

→ Patient positioned in left lateral head down posture which give better lavage result

→ length of tube is measured.
Adult - 35-40 french or 50cm gauge tube
Child - 16-28 french gauge tube or 25cm

-> In india, Ewald tube is used which has soft rubber tube with funnel or round end.

-> Tube passing through nasally cause damage thus oral route preffered.

-> Glycerine or vaseline use to lubricate ends.

-> Use mouth gag so patient will not bite the tube.

-> As tube has inserted check air insufflated while listening over stomach or aspiration pH check.

-> lavage taken or carried out with 200-300 ml of warm saline or plain water. used each time.

-> lavage continued till no further particulate is seen.

* Complication

- laryngeospasm
- Pneumonia
- Sinus bradycardia.
- Perforation of stomach.

Q.3 Method of Enhancement of Elimination of drug

3 type

(I) Multiple dose activated charcoal

(II) Urinary alkalinisation

(III) Extracorporeal elimination

(I) Multiple dose activated charcoal

→ Interruption of entero-hepatic circulation

→ Require biliary excretion to adsorb charcoal

→ & I dialysis

→ Drug from Intravascular to gut mucosa, absorbed via intraluminal activated charcoal.

↓

Only tiny, lipid soluble & low Vd absorbed.

Use :- Carbamazepine
- Dapsone
- Phenobarbitone
- Quinine

* Contraindication
  - Unconciousness
  - without prior airway protection
  - Bowel obstruction

* Technique

50 g activated charcoal
↓
In intubated patient, administered by oro-or naso gastric tube
↓
check Bowel sound before administer
↓
NO sound
↓
Stop administer
↓
Every 6 hr reconsider the reseen.

* Complication
  - Vomiting
  - charcoal aspiration
  - Constipation
  - Bowel obstruction
  - Corneal Abrasion (Scratch)

(II) Urinary alkalinisation.

-) Ionization of acidic medicine inhibit tubular reabsorption cause urine p^H toward alkalization.

* Use :- Phenobarbitone
Salicylate

* Technique.

Hypokalaemia corrected
↓
1-2 mmol/kg NaHCO3
↓
5% dextrose 250ml.
↓
20 mmol of KCl to maintain potasium level.
↓
Every 4hr ~~check~~ serum bicarbonate.
↓
Continue till toxicity removed

* Complication :- Alkalaemia
- Hypo kalaemia
- Hypocalcaemia.

(III) Extracorporeal

→ Start Haemodialysis if
- small molecule
- small V_d
= slow elemination

→ CRRT (continuous renal replacement treatment) has low clearance per unit time.

- use when patient is unstable
- highly protein or toxin
- very long plasma life

→ Haemoperfusion for high protein-bound drug.

* Use :- carbamazepine
- lithium
- Potassium
- lactic acidosis
- Methotrexate.

* Theophyline :- RRT continue till it plasma level < 20mg/L.

* Alcohols

(a) Methanol :- RRT till ~~less than~~ 25mg/dl level.
- Rebound take 36 hr

(b) Ethylene glycol :- RRT less than 20mg/dl
Rebound take 24 hr

* Valporate :- Saturated plasma protein given

* Haemoperfusion in theophyline & Anti epileptic

* Complication :- Air embolism
- Clotting
- bleeding from systemic anticoagulation
- Anemia
- Hypothermia

Q3. Supportive Care.

→ Supportive care keep the patient alive until physiological function restored.

→ In supportive care patient receive physical, practical, emotional & spiritual support.

→ (i) Airway.

→ Monitor and managing airway in treatment of poisoning

→ Proper ventilation should provide

→ SPO_2 ventilation should provide
e.g. Atropine, cocaine, Salicylate.

→ Oxygen therapy

(ii) Breathing
- Hypoxia & pneumonia are managed
- Hyperventilation
- Manage shortness of breath

→ O_2 therapy, Thoracentesis & Paracentesis are given.

(iii) Circulation.

→ Altered mental Status.

→ Pallor, cold clammy skin, thin or thready pulse.

→ Increased respiratory rate.

1) Inotropic support
- Milrinone : 50 microgram / Kg IV
- Insulin euglycaemic.
Short acting

(iii) Drug-induced arrhythmias.
→ QT prolongation & torsades should be monitored.
→ Electrolyte include Mg & Ca^{+2} corrected.
→ Adverse drug effect rang mild to fatal.
→ Manage all the cardiac diseases.

(iv) Sedation
→ The reduction of irriability or agitation by administration of sedative drug
→ Toxic dose can cause hyper sedation

(v) Seizure
→ Common type of complication.
→ It happen due to toxic dose or over load of drugs thus called drug induced seizure.
→ Antidepressive, stimulant & antihistamic may cause seizure.

* Management
- Airway managment, ventilation etc.
- Gastric decontentration & enhanced

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Management of drug eclucce
- Magnesium sulfate 50% 5to10ml
- Hypocalcaemia → Ca^{2+} supplimant
- Hypokalaemia → K^+ supplimant
- Isoprenaline 20 mcg

Managment of Sedation.
- Patient keep away from risk of potential harm.
→ Make patient hydrated.
→ Ensure airway & ventilation.

— Elimination
→ Sugar, B.P etc are maintain.
→ Benzodiazepines.

(vii) Nephrotoxicity :-
Drug & toxic effect cause on nephron cause nephrotoxicity
→ Myoglobinuria can be treated by NaHCO3 infusion, prevent acidic tubular fluid

- Air way, breathing, symptoms are managed

Q4 (2) Note on Gut decontamination :- Emesis & ~~earth~~ activation charcoal.
→ Gastrointestinal decontamination refers to the practise of functionally removing an ingested toxin from gastrointestinal tract in order to decrease or increase the clearance.

→ Poision clearance from the GIT can be accomplised in a variety of way.
- Emesis
- Gastric lavage
- cathartic
- Whole bowel irrigation

(1) Emesis

- The sole option for getting a poisoned patient to vomit by provided ipecac syrup.
- Ipecac syrup should only be used in exceptional condition.
- Syrup ipecac
- It is utilized in treatment of some type of poisoning in emergency situation.
- Indication
- Administered of syrup of ipecac is recommended for alert patient.
- Usually it is not effective more than 4-6 hr after ingestion, unless the tablet itself delay.

Adr
- Esophageal injury
persistant vomiting
Nausea

⇒ Safety :- These produce side effect, including prolonged vomiting, diarrhea lathergy, aspiration

- complication & contraindication

① Relative :- Seizure include drug
- Rapid coma inducing agent.

② Pregnancy :- heart diseases

③ Absolute :- corrosive
- children under 6 month of age.
- comatose

* Dose :- Infant (6-12 month of age)
= 5-10ml + 15ml of clear fluids / kg / day
→ children (12 month 5-12 yr of age)
- 15ml + 240ml of clear fluid / kg / B.W

* Activated charcoal.
→ Activated charcoal is formed from organic material that has been burned. such as coconut, shells, peat or wood.

- Administration decrease the absorption of various poision by adsorbing them on to surface.

Name of preparation	Dose
Actidose - aqua carbomix charcodote liqui-char ~~Dacd~~	- Oral suspension 50g in 240ml powder 25g & 50g - Oral suspension 25g & 50g
Medical	- Granules 5g/sachet

Q5 ~~Write~~ write classification of poisioning & mechanism of toxicity

Ans ① Corrosive poision :- Sulfuric acid
- HCl, H_2SO_4
- Boric acid
- Acetic acid
- Formic acid
- Carboxylic acid

② chemical poision :- Aluminium phosphide
- chlorine
- Bromine
- Sulphur
- Iodine

③ Organic poisoning :- Red pepper
- Croton
- Colocynth

④ Venomous bite :- Snake like viper
- cobra
- color snake
- sea snake

⑤ Hydrocarbon & pesticide poisoning :-
- Benze
- Naphthalene
- pyrethrin
- Rodenticide

⑥ Therapeutic drug :- All drug overdose

⑦ Microbial food poisons :- Bacteria
- virus
- Protozoa
- Fungal
- Parasite.

⑧ Poision due to abuse :- Tobacco
- cocaine
- cannabis

Mechanism:

① Interfere with transport & utilization of oxygen

② Depress or Stimulate CNS

③ Adversely effect ANS

④ Affect lungs by aspiration

⑤ Directly toxic to heart

⑥ Tissue damage

⑦ Delayed: effect on liver & kidney

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Answer's MID 2

Q13 Write Clinical symptom & management of hydrocarbon poisoning.

(i) A hydrocarbons are compound containing carbon and hydrogen and thus are group 14 hydride.

(ii) There are 5 type of hydrocarbon.

1) Aliphatic Hydrocarbon :- Saturated molecule e.g. butane, ethane, propane (gas)
Oil, petrol, diesel (liquid)
Paraffin wax, grease (semi solid).

2) Aromatic Hydrocarbon :- Has atleast 1 benzene ring e.g. Benzen, toluene, xylene

3) Halogenated Hydrocarbon :- Clear colourless liquid
e.g. Tetrachloride, ethylene

4) Cycloparaffin :- Saturated hydrocarbon with closed ring e.g. Naphthenes.

5) Alkenes :- One carbon-carbon double bond.
e.g. Halogenated hydrocarbon.

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* Sign Symptom.

1) Brain :- Lethargy with depressed
- Convulsion.
- Coma.

2) Lungs :- Gasping
- Dyspenia
- Shocking
- Cyanosis

3) Heart :- Arrythmia.
- Intravascular coagulation

4) G.I :- Nausea
Vomiting
Haematemesis
- Diarrhoea.

5) Liver :- Hepatomegaly - splenomegaly.
- Liver enzyme elevated.

6) Kidney :- Acute renal tubular necrosis
- Proteinuria
- Hematuria.

* Diagnosis.

1. Xray	4. LFT
2. CBC	5. RFT
3. Electrolyte.	6. ABG

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* Treatment:

① Respiratory Support
- Endotracheal intubation.
- Oxygen Supply
- Bronchodilator Salbutamol.
- High frequency jet ventilation

② Decontamination

If dermal Exposure
- Remove clothes
- wash with water

If Injested.
- Gastric lavage
- Stomach wash.

- Crystalloid Solution must be administered.

iii) Antibiotics & Corticosteroid are administered.

iv) Treat renal failure with dialysis & hepatic failure with plasma, vitamin K
- low protein diet,
- Neomycin
- Lactulose

v) Rewarming :- 40-42°C water bath
- ~~Hot~~ whirpool bath

vi) Wound care :- protective dressing

Q12 Clinical symptom & management of NSAIDs

Notes

Q11 What are the Sign Symptom & treatment of PCM poisoning

ω Paracetamol also known as Acetaminophen

ω It is white, odourless, Bitter crystal or Powder.

* Symptoms

ω The Symptom are according to the type of toxicity

(I) Acute Poisoning :-

(a) Stage I :- 1/2 to 24 hour
- Anorexia
- Vomiting
- Sweating
- Malaise

(b) Stage II :- 24 to 72 hours
- Right upper Quadrant Pain
- Abnormal LFT

(c) Stage III (72 to 96 hr)
- Coagulation defect
- Jaundice
- Encephalopathy
- Renal failure
- Coma
- Increase Total Bilirubin
- Prolong PT time

(d) Stage IV (4 days to 2 week)
- If Patient Survive Stage III
- Complete resolution of hepatic damage

(2) Chronic poisoning

→ Commeen in children then adult due to dose miscalculation
Symptom are :- Anorexia
- Vomiting
- lethargy
- oliguria

→ In pregnent women affect the baby and cause some birth defect

Treatment

(1) Decontamination.
- Stomach Wash
- Activated charcoal
- Albumin Dialysis
- Haemofiltration.

(2) Anti emetic.

(3) Supportive Measurement.
(a) 10-20% Dextrose for hypoglycemia
(b) Vitamin K - If PT is elevated
(c) Mannitol - 0.5mg/kg over 30 mint for cerebral Odema
(d) H_2 Antagonist - Prevent GI bleeding
(e) Broad Spectrum antibiotic IV. (Ceftazidime of fluoxacillin)

(4) Antidote :- Methionine - 2.5gm/4hr
- N-acetyl cysteine
  - 140 mg/kg
  - followed by 17 doses of 70mg/kg/4hr

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NSAID poisoning

- Diclo, Aceclo, Ibu, phen, Nap, Nime.

- M.O.A

Bind to cyclooxygenase

↓

Inhibit synthesis of - PG

- Prostacyclin

- Thromboxane

- Symptoms

- ~~Brain~~

- ~~Reproductive~~

① Renal :- Haematuria
- Proteinuria
- Anuria
- Nephropathy

② Respi :- Alkalosis
M. Acidosis

③ GI :- Vomiting
- Ulcer
- Abd pain
- Diarrhoea

④ Brain - Coma
- Vertigo
- Seizure

⑤ Liver :- Failure

⑥ Heart :- Hypoten
- Failure

⑦ Repro - Delay labour
- Post partum Bleeding
- delivery complication

Treatment :

① Decontamination
- Gastric lavage
- Activated charcoal
- Extracorporeal Elimination.

② Supportive Care
- Serum Electrolyte
- Renal function
- Urinalysis
- GI bleeding

} Control.

③ Drug
~~Antacid~~

① Decontamination
- Gastric lavage
- Activated charcoal
- Extracorporeal Elimination

② Supportive Measure
- Electrolyte maintance
- Renal function monitored
- Urinalysis
- GI bleeding
- Haemodialysis.

③ Drugs :- Antacid

Q10 Clinical Symptom & management of Monoamine Oxidase inhibitor.

MAOI have been replaced by cyclic antidepressant for psychiatric disorder.

e.g. of MAOIs are clorgyline, pargyline, selegiline, pimozide etc.

* Sign & Symptoms.

(1) Anxiety, flushing, headache, nausea, Tachycardia HTN, hallucination, delirium, tremors, convulsion

(2) Pupil may dilated

(3) Overdose complicated by hypotension leads to acute tubular necrosis.

→ Normal dose - 35-40 mg/kg.

(4) Chronic use of drug lead to withdrawal reaction like anxiety,
depression,
confusion
hallucination
Nausea, Vomiting.

Treatment

① Maintainence of airway, oxygen, assisted ventilation.

② Cardiac monitoring

③ Electrolyte monitor

④ Monitor LFT, RFT & CPK level.

⑤ If hypertension treated by IV sodium nitroprusside

⑥ Hypotension can be manage or shock is treated.

⑦ Decontamination with charcoal therapy

⑧ Acidic diuresis & Hemodialysis.

⑨ Seizure, Hyperthermia.

Q9 Discuss in detail treatment of acute poisoning with salicylate.

⇒ Patient with Symptom of

- Seizure
- Metabolic acidosis
- Mental Status change are admitted to ICU.

⇒ Now the treatment of Salicylate poisoning is initiated.

(1) Stomach Wash with Whole bowel irrigation

(2) Activated charcoal 50mg.

(3) Urinary alkalinisation
(a) For Mild poisoning :- 1mEq/kg of $NaHCO_3$ in 5% dextrose

(b) For Severe poisoning :- 50 to 100 mEq of $NaHCO_3$

(4) Hemodyalasis when Salicylate is more than 100mg/100ml.

(5) If Skin Exposure then, treat with cold water, milk or Ice.

(c) If Ocular Exposure.
- Copious irrigation
- Systemic analgesic

(d) Supportive Measures

(a) Electrolyte balance

(b) Correct dehydration with 0.9 % To to 20 ml/kg/hr

(c) Hypoprothrombinaemia corrected by .25 to 5mg vit K

(d) Hyperpyrexia by ice

(e) $NaHCO_3$ for Metabolic acidosis

(f) Calcium gluconate for hypocalcemia

(g) 5% dextrose for hypoglycemia

(h) Benzodiazepines for convulsions

(i) Mannitol for Intracranial pressure management

(j) Vitamin k for PT maintance

Q.S What are Symptom, Sign, MOA & Treatment of Organophosphorous poisoning.

- It is a dust, granules or liquid.
- Some diluted with water or burn for smoke to kill insect.

* M.O.A

Normally

Acetylcholinesterase
↓
Acetyl choline
↓ Hydrolysis
Acetyl + choline
or
acetic acid

- Now

Organophosphorous
↓ Bind to
Acetyl cholinesterase
↓
Accumulation of acetylcholine with continuous stimulation cause nerve paralysis

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~~Action on other cycle~~

Organophosphorous also shows powerful inhibitory action on enzymes like
- Carboxylic ester
- Cholinesterase
- hepatic carboxylesterases
- chymotrypsin

Sign & Symptoms

Symptoms are according to type of poisoning

(a) Acute poision :-

(a) Muscarinic :- Salivation
Lacrimation.
Urination.
~~Diarrhoea~~
- CRT Distress
- Vomiting

(b) Nicotinic :- weakness
fatiguability
Hypertension
Paralysis
Tachycardia.

(c) CNS :- Ataxia
- Speech problem
- Delirium
- Hallucination
- Convulsion

(d) others :- Blurred vision
- Dyspenia
- QTc prolongation

(2) Chronic Poisoning

(a) Polyneuropathy :- Muscle cramp
- Weakness

(b) CNS Effect :- Anxiety
- Confusion

(c) Sheep farmer Diseases

(d) Chronic organophosphate induced neuropsychiartic disorder

r Treatment

1) Decontamination

If skin exposure - Have Shower,
wash with cold water
- Rinse hair
- Repeated washing skin

- If ocular exposure then copious eye irrigation with Normal Saline Water.

- If in case of ingestion
  - Gastric lavage
  - Whole bowel irrigation
  - Stomach washing
  - Activated charcoal.

2) Antidote
  - Atropine : a competitive antagonist of ach. 1-2 mg IV.
  - Oxime : Commonest is pralidoxime help to regenerate ach. 1-2 gm in 150 ml saline.

3) Supportive care.
  ① IV fluid.
  ② Maintain airway patency & oxygenation.
  ③ Benzodiazepine / Barbiturates for convulsion
  ④ Antibiotics.

Q.7 What are clinical feature & treatment of alkali poisoning.

→ Alkali poisoning include ammonia, carbonate of Sodium & potassium

→ Mode of action

Produce liquefaction necrosis

↓

Result in Extensive penetration damage

↓

Ulcers in Stomach & Oesophagus

→ Symptoms

1] Corrosion of GI mucosa causes
- Dysphagia
- Vomiting
- Drooling
- Haematemesis

2] Oesophagitis :- inflammation in oesophageal wall are of 4 type
- Non ulcerative oesophagitis
- mild ulcerative
- Severe ulcerative
- Oesophagitis & complication

3) Abd pain
4) Skin involvement result in greyish soapy necrotic area
5) Eye involvement Serious complication.
6) Ammonia ingestion causes manifestation that affect respiratory system

+ Treatment

① Intubation, tracheostomy for respiratory distress

② Diluter such as milk or water given on alkali ingestion

③ Gastric lavage, cathartic & activated charcoal

④ Electrolyte imbalance

⑤ Exploratory laparotomy for 2nd & 3rd degree burn in oesophagus

⑥ Corticosteroid

⑦ Antibiotic

⑧ Saline water irrigation of eye & skin for 20 to 30 minutes

Q6 Treatment in acid poisoning

(i) Acid ~~poisoning~~ poisoning occurs by 7 types of acids

(ii) The acids are ① Sulphuric acid
② Nitric acid
③ Hydrochloric acid
④ Hydrofluoric acid
⑤ Phosphoric acid
⑥ Boric acid
⑦ chromic acid

(iii) Treatment of different acid are different according to their strength

① Sulphuric Acid :- ⓐ Respiratory distress → give 100% oxygen

ⓑ Cold water or milk within 30 min.

ⓒ Remove clothes & clean skin with water

ⓓ Eye injury should be avoided; if any than irritation should be done

ⓔ After endoscopy if safe than Oral feed is given

ⓕ Steroid are administered (prednisolone) 𝑐̄ 60 mg/day for 4 day as loading dose & then maintained dose 6 mg/day

ⓖ Powerful pain is treated by administered

by Morphine

(d) Nitric acid

(e) HCl

(f) Hydrofluoric acid:
- ECG monitor
- Electrolyte
- Steroids
- Wash burnt.

→ If QTc prolonged & peaked T wave treat with calcium & potassium supplement.

→ If ingested than give fluoride or milk or chewable calcium carbonate tablet.

→ For topical 3.5gm calcium gluconate in 16ml & form gel & apply.

→ In case of arterial ingestion give 10ml 10% calcium chloride in infusion.

→ Treat other symptom

→ Autopsy may perform for severity of poisoning

(g) Phosphoric acid:- Same as sulphuric

(h) Boric Acid:- Gastric lavage
- Emesis

- Cathartica administration
- Forced diuresis : 1mg/kg furosemide
- Haemodialysis

(2) Chromic Acid : Chelation therapy with BAL (British anti lewisite)
- Haemodialysis
- DMPS (Dimercapto propane sulphonic acid)
- Respiratory restored.

Q5 Clinical Sign Symptom & mangement of Radiation Therapy.

⇝ Radiation poisoning affect death within 24 hr of exposure.

⇝ It mainly affect at cellular level which is more hazardeous to health.

⇝ There are 3 type of Radiation poisoning

(a) Ionization poisoning

(b) UV poisoning

(c) Non ionization poisoning.

c) Ionization poisoning

→ It caus by exposure to high energy x-ray, neutron reactor, Uranium atom & radioactive isium.

- Diagnostic detectors are responsible for this
- Radon gas from earth crust are also cause poisoning.

Sign symptom

(1) Alteration of somatic cell structure
(2) Damages DNA
(3) Trigger mutation
(4) Sudden exposure caus: Bleeding
- Skin infection - Anorexia
- Tetying - Nausea
- Swelling - Vertigo
- Edema.

(b) Treatment:

→ Diagnostic radiation should spread in weeks & months.
- Electrolyte balance
- Symptomatic management
- Reduce dose of radiation.
- Corticosteroids for topical.

(b) UV radiation.

(i) UV radiation do not affect internal organ but damage skin.

(ii) UV create reactive O_2 species that damage & inhibit melanin production.

(iii) High dose of UV cause DNA mutation & damage metabolite.

1. Sign & Symptom
   - Partial skin loss
   - 2nd degree skin burn.
   - Erythematous blisters.
   - Severe sunburn.
   - Keratotic lesions.
   - Papules.
   - Dehydration, scaling, scarring etc.

4. Treatment: Antibiotics.
   - Thiazide
   - Corticosteroid.
   - Suncream.
   - H_2 blockers.
   - Hydroxychloroquin.

(c) Non ionization radiation

ω Non ionization radiation lower frequency & longer wavelength.

ω IR, UV, Micro wave are example.

ε Sign & Symptom

① Burns
② Thermal burns
③ Pacemaker affected
④ Headach
⑤ Dizziness

ρ Treatment
- Skin lotion or cream
- NSAID
- Ondensetsone
- Supportive measures
- Care for the usage

Q4 Note on Barbiturate poisoning & its treatment.

ω Barbiturates are derived from barbituric acid and used as sedative & hypnotics.

* example

① long acting :- Mephobarbitone
Phenobarbitone

② Intermediate :- Amobarbitone
Butobarbitone

③ Short acting :- Pentobarbitone
Hexobarbitone

④ Ultra Short :- Thiopentone
Methohexitone

* Fatal Dose
Phenobarbitone :- 6-10 gm
other 2-3 gm

* Sign & Symptoms

① Brain :- Slurred, ataxia, lethargy
confusion

② CNS depression, coma, shock

③ Eye :- Pupil contracted

④ Hypothermia

⑤ Cutaneous blister :- Bulb Burn

⑤ Skin :- Bush Burn
- Erythromatous blistes

④ Respiratary or CVS arrest or delay death due to collapse of Renal failures, pulmonary, cerebral Edema.

⑦ Others :- Insomnia
- Cramps
- Seizure
- delirium
- Hypotension

* Diagnosis,

① Serial plasma level useful in managment of phenobarbitone

< 8 mg/dl indicate toxicity

② E & C

③ CBC, ESR, Electrolyte, BUN

* Treatment.

① Decontamination

(a) Gastric lavage :- It benefit upto 12 to 24 hr post ingestion

(b) Activated charcoal

(c) Forced alkaline diuresis

(d) Haemodialysis or haemoperfusion

(e) Exchange transfusion

(f) 10 to 20 ml/kg Saline Solutions to treat hypotension

↓

If no response

↓

Administer Dopamine/Nor adrenaline.

(2) Supportive care

(a) Supplement of Oxygen

(b) Intubations

(c) Ventilations

(d) IV fluid.

Q2 Write a note on universal antidote.

(i) It formed from organic material that has been burned, such as coconut shell, peat or wood & then heated to very high temperature in steam, air or carbon dioxide.

(ii) The end product is finely divided powder with a large pore structure that can absorb a variety of chemical.

(iii) The availability of a chemical adsorbed by charcoal to be absorbed systemically is reduced.

(iv) Each gram of activated charcoal would cut to surface area of 10000 sq meter

(v) Mode of Action

→ Decrease the absorption of various poison by adsorbing them on it surface.

(vi) Activated charcoal is effective to varying extent, depending on nature of substance ingested

→ Dose :- 1 gm/kg :-

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w) Activated charcoal is more effective when administer within 1 hour of ingestion of poisoning.

w) Add 4 to 8 times the quantity of water to the calculated dose & feed in the suspension

w) Due to repeated dose administration 150 to 200 gm may help in elimination of drug like Theophylline
- phenobarbitone
- Quinine
- digitoxine
- Phenylbutazone

w) The charcoal preparations are

	Preparation	Dose
(1)	Actidose-aqua	Oral suspension 50g in 240ml
(2)	Carbomix	25g & 50g
(3)	Liqui char	Suspension 25g & 50g
(4)	Medicoal	Granules 5g/sachet

Uses :- Taken toxin & can be treat with charcoal
- More effective when given within hr of toxin ingestion.

r contraindications :- Unprotected airway obstruction
- Absent of bowel sound
- caustic ingestion
- Ingestion of petroleum product.

Q) Detail Sign Symptom & Treatment of Methanol poisoning

w) It also known as colonial spirit, Columbian spirit. Or wood alcohol

Toxicokinetic

w) well absorbed through GIT, skin & lungs.

w) Plasma level after 30 to 60 min

w) ADH in liver metabolise methanol to formate

w) Elimination half life 3.5 hr

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* Mechanism of toxicity

Methanol
↓
Formaldehyde
↓
5-hydroxymethyl glutathione
↓
Formate
↓
Cause of toxicity

* Fatal dose 70 to 100 ml

* Sign & ~~symptom~~

① Brain :- Vertigo
- Headache
- Stiff neck
- Convulsion

② ocular :- Blurred vision
- Photophobia
- Retinal edema

③ GIT :- Nausea
Vomiting
Abd pain

(4) Lungs :- . Respiratory failure
- Metabolic acidosis

(5) CVS :- Tachycardia
- Cardiac arrest
- Hypomagnesemia
- Hypokalemia.

3 Diagnosis
- CBC
- Urinalysis
- ABG
- Electrolyte.

4 Treatment.

(1) Decontamination
(a) Stomach wash with sodium Bicarbonate.

(b) Haemodialysis

(c) Emesis

(d) Ipecac

(2) Antidotes

(a) Ethanol :- Same enzymatic action
- Prevent methanol metabolism

(ii) 10% ethanol at a dose of 10 ml/kg administered over 30 min followed by 1.5 ml/kg/hr
- maintained 100 - 130 ml/kg of blood.

(iii) Fomepizole :- Do not cause CNS depression
- 20 mg/kg for 5 days

(3) Sodium bicarbonate : 500 to 800 ml slowly

(4) Folinic acid :- 1 to 2 mg/kg @ 6 hr

(5) Hemodialysis : more than 50 mg/dl.

md-12

(1) Hydrocarbon
(2) NSAID
(3) PCM
(4) monoamine
(5) Salicylate
(6) Organophosphorus
(7) Alkali
(8) Acid
(9) Radiation
(10) Barbiturate
(11) Toxicokinetic
(12) Universal antidote
(13) Methanol

Mnd-2

Hydrocarbon (13)
NSAID (12)
PCM (11)
monoamine (10)
Salicylate (9)
Organophosph (8)
Akali (7)

Acid (6)
Radiation (5)
Barbiturate (4)
Toxicokinetic (3)
Universal antidod (2)
Methanol (1)

(3) Write breif note on toxicokinetics.

→ Toxicokinetics is the study of toxicants movement & fate, often known as disposition.

→ Toxicokinetics deals with Absorption, distribution, biotransformation & excretion of chemicals.

(1) Absorption

→ Absorption is the process by which the chemical enters the body.

→ It depends on the route of administration.

- Oral route - the GIT is the most imp route of absorption, as most acute poisonings involves ingestions.
- Dermal route :- lipid solubility of a substance is an important factor affecting the degree of absorption through the skin.
- Inhalation route = toxic fumes, particulate & noxious gases may be absorbed through the lungs.

→ Bioavailability :- is the fraction of unchang

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drug reaching the systemic circulation following of non-vascular administration.

(2) Distribution

- Distribution is defined as the apparent volume into which a substance is distributed.

→ Vd calculated from the dose taken & the resulting plasma concentration.

Vd = volume of distribution

⇒ Importance of Vd in toxicology is
- predicting peak blood conⁿ of the chemical taken.
- deciding whether to apply systemic toxic elimination technique.

⇒ Factor determining the rate of distribution of chemicals in the body are
- Protein binding -
- Plasma conⁿ -
- physiological barriers -

(3) Biotransformation (Metabolism)

⇒ Biotransformation is a critical body defence process in which xenobiotic chemicals are transformed in the body through chemical reaction.

→ It can produce metabolites that are pharmacologically & toxic

Ex. parathion — paraoxon

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→ There are two phases

(1) phase I :- the drug is converted into more polar compound.
Ex oxidation, reduction, & hydrolysis

(2) phase II (conjugation) :- a drug or its metabolite is conjugated to an endogenous sub.
Ex glucuronide conjugate

⇒ Enzyme Inhibition - cause of ↑ toxicity
⇒ Enzyme Induction = cause of therapeutic failure
⇒ First pass effect :- Biotransformation of some chemicals by the liver during the initial pass from the portal circulation after oral administration
⇒ Half life ($t_{1/2}$) - time require to reduce the blood conⁿ of the chemical to half.

(4) Excretion

→ Excretion is the final means of chemical elimination, either as metabolites or unchanged parent chemical.
→ Additional routes include sweat, saliva, tears, nasal secretions, milk, bile & feces.

→ Clearance - elimination of chemicals from the body may be described by the term clearance (CL)

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→ clearance is calculated as follows :-

$$CL = 0.7 \cdot (Vd)\ (t^{1}/_{2}) = ml/min \quad (1)$$

→ Drug absorption after a toxic ingestion may be delayed & prolonged.

→ The half-life & total body clearance are often lengthened.

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Q: Write symptom & managment of arsenic poisoning

* Arsenic Poisoning *

- It is silver-gray or tin-white, shiny, brittle, crystalline element

* Toxicokinetics

- well absorbed
- well distribute & depossit in hair & bone
- No BBB cross but cross placenta

* M.O.A. of Arsenic toxicity

From Pentavalent to trivalent
↓
Bind to SH & OH grp
↓
Inhibit enzyme function
↓
Inhibit Oxidative pathway
↓
prevention of formation of ATP
↓
Disrupt cell function

Symptoms

1] Skin :- Hair loss
- Hyperpigmentation
- Hyperkeratosis
- Facial odema
- Skin cancer

2] Eye :- Diminess of vision
- Conjunctivitis

3] GI :- Anorexia
- Nausea
- Diarrhoea
- Abd pain
- Weight loss

4] lungs :- Perforation of nasal septum
- Lyrngitis
- Bronchitis

5] liver :- Hepatomegaly
- Jaundice
- Cirrhosis

6] Brain :- convulsion
coma
- tremor
- Ataxia

8) CVS :- Tachycardia
- Hypertension
- Myocarditis.

* Diagnosis *

- CBC
- Urine
- Hair Volume
- Xray - Abd
- LFT.
- Skin biopsy.

* Treatment * -

1) Supportive care :-
- Gastric lavage
- IV fluid
- CVS monitoring
- Haemodialysis

2) chelating agent therapy
- British Anti lewisite :- 3 to 5mg/kg @ 4hr
(BAL)
till urinary arsenic below 50mcg/24hr.

- Penicillamine - 100mg/kg @ 5hr.

Q2 Discuss the treatment strategies for snake bite.

Mainly the strategie use for treatment of snake bite as.

First aid treatment
↓
Transport to hospital
↓
Rapid clinical assessment and resuscitation
↓
Antivenom treatment or other therapy
↓
Neurotoxic envenoming
↓
Manage the vital & treat symptoms
↓
Rehabilitation

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⇒ Description of Step in Strategy for the treatment of snake bite.

① First Aid :- Calm down the patient.
- Immobilize the bitten area
- Remove ornament if present.
- Clean the wound but not with water
- Make sure the bitten area at or below heart level
- Tigh the upper area & make sure not affect blood flow directly
- Bandage are bound to affected area firmly.
- Don't try to take out venom if you have no practice

② Identification snake :- By describing the snake type, the consultant may get idea of snake & initalize the treatment as soon as possible

③ Other therapys :- Other therapy enclude Cryotherapy, in which local cooling is done to affected areas & Electric shock in which electric treatment given to affected

area, Corticosteroid therapy:

④ Antivenom treatment:

Initial dose :- 8-10 vial

Max dose :- 25 vial

ⓐ Common krait :- 100ml

ⓑ Russells viper :- 100ml

ⓒ Saw scaled viper :- 50ml

ⓓ Indian cobra :- 100ml

⑤ Neurotoxic envenoming :-

Atropine - 0.6mg
Neostigmine - 0.02mg/kg
Dopamine - 2.5-5 mcg/kg/min

⑥ Resuscitation :- Assess the vital and maintain proper ABC (Airway, breathing, Circulation), vitals

Q3 What is opioid poisoning ? Symptoms & treatment of it.

(w) The symptoms develop like miosis, coma, respiratory depression, vomiting, headache etc after consuming more than a limit of opioid is called opioid poisoning.

* N.O.A :-

Opioid acts on
opioid receptor & bind
to them
↓
Stimulate receptor
↓
lead to analgesia, nausea,
sedation etc.

* Symptoms

(i) Nervous System :- CNS depression,
Respiratory depression,
Seizure
- Hypertonicity

② Respiratory :- ↓es Tidal volume
- Bronchospasm
- Odema
- Bradypnoea.

③ Eyes :- Miosis

④ Cardiac :- Hypotention
- Bradycardia
- Sinus tachycardia.

⑤ Gastro Intestinal :- Nausea
Vomiting
~~Giddiness~~
- Dizziness

⑥ Renal :- Urinary retention
- Hyperkalemia.

Treatment.

ABC analysis
↓
Gastric lavage
↓
Activated charcoal
↓
Antidote therapy.

- ABC analysis means maintain airway, breathing, circulation & other vital.
- Gastric lavage perform to excrete the opioid.
- Activated charcoal. 1gm/kg PO given.
- Antidote Therapy.

@ Naloxone :- opioid antagonist.
Reverse the poisioning condition.

Dose :- 1 - 2mg IV adult
0.4 mg IV child.
Max dose :- 10mg.

(b) Nalmefene :- 0.1mg IV

(c) Naltrexone :- 50 mg/day PO

(d) Physostigmine :- 0.04mg/kg IV

⇒ If opoid poisoning occur due to it withdrawal than give

methadone :- 20 mg oral
or
10 mg IM

clonidine :- 0.1mg oral
every 30 - 60 min

Q4 Detail cause of food poisoning

⇒ Food poisoning is an acute illness, usually of sudden onset due to eating of contaminated or poisonous food.

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* causes of food poisoning

→ By 2 way food poisoning is cause

① Biological :- Bacteria, Virus fungi etc
② chemicals :- Metal leaching, Pesticide, Degraded preservatives etc.

① Biological agent are as

Incubation

@ Bacteria :- campylobacter - 2-5 day
- salmonella enteriditis - 12-36 hr
- E. coli - 3-4 day
- listeria monocytogenes 3-7 day
- clostridium botulinum 4-8 da

ⓑ Virus :- Hepatitis - A - 10-50 day
- Norwalk - 10-50 hr
- Rota 1-3 day

ⓒ Fungi :- mold
yeast

ⓓ Parasite :- Trichinella spiralis

Q2. Treatment Strategies of tobacco addiction.

The 5 A's Strategies are there for treatment of tobacco addiction.

① Ask :- ask about tobacco use. Document the answer every time of visit.

② Advise :- Advise to quit in clear, Strong & personalized manner.

③ Assess :- assess willingness to make quit attempt.
Is the tobacco user willingly try to quit tabacco.

④ Assist :- Assist in quit attempts.
- Give CBT or NRT therapy along with some medication like Bupropion
- Give motivation & support.

⑤ Arrange :- arrange the follow up.
- Make a contacts of patient & take follow up & fix their improvement

- Other therapies like

① Nicotine gum.
② Nicotine transdermal patches
③ Nicotine spray

- Other like :- Moxidine,
  Antidepressants
  Lobeline
  Mecamylamine.

Q6 Define drug abuse. Diagnosis & management of amphetamine poisoning.

→ Amphetamine influence the neurotransmitter that related to attention, alertness, blood flow, reward, motor control, & motivation.

→ People use amphetamine drug to boost there performance by increasing such neurotransmitter.

→ By continuous use of drug develop tolerance and hence the dose should be increase for it effect.

→ Due to it addictive property, the person try to quite this drug but the body

Start consuming for drug.

→ People misuse this drug ~~for~~ as

① For relieving fatigue
② For be happy
③ To increase productiveness
④ To boost athletes performance
⑤ To reduce stress & anxiety
⑥ To ~~make~~ increase confidence etc

* Diagnosis.

① Urine specimen of choice.

level above 2mg/100ml - Acute toxicity.

Methods like - TLC, RIA, HPLC etc

Most accurate :- GC-MS.

② New method (electron - impact mass fragmento - graphy) help in quantity of amphitamine in hair, nail, sweat & saliva.

③ Hair analysis show amount of drug use for several month.

* Treatment

① Stabilization : IV line,
Oxygen
- Hearl sounds care.

② Supportive : ABC, vitals
- Rehydration.
- Gastric decontamination

③ Symptomatic : Anxiety } Benzodiazepam
- Hyperactivity } - Diazepam 10 mg

- Hyperthermia controlled by blanks, heater etc.

- Ventricular tachycardia managed by lignocaine, amiodarone and sotalol.

- Rhabdomyolysis : Early aggressive fluid replacement therapy.

- Amphetamine induced Chorea treated ⊏ diazepam & chlorpromazine.

- Imipramine & fluoxetine used to treat amphetamine dependency syndrome.

Q8 Write mode of intake and mode of action of cannabis. Describe it treatment.

w) Cannabis toxicity or poisoning occur through various mode of intake and it severity also based on mode of poisonings.

w By 6 mode the cannabis poisoning occur.

① Marijuana :- Plant part or it extract used to induce psychotomimetic or therapeutic effect.
Synonym :- Mary Jane, weed, dagga.

② Ganja :- It is resionous mass compound of leaves & bracts.
- Smoked in pipes or cigarettes
- It has 1% - 2% THC

③ Bhang :- consist of dried mature ~~matter~~ leaves & flower stem mixed ~ milk.

④ Hashis (charas) :- Dried resin from flower tops & contain varying of 10% THC.
- Hashis oil is an alcohol which occurs dark green viscous liquid containing

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⑤ Sinsemilla :- Refer as seedless plant with average 5% THC (Tetra hydro cannabinol)

⑥ Marijuana Blunts :- cheap cigar sliced open, packed with cannabis & resealed.

* Treatment.

① Acute poisoning
(a) Decontamination measures in case of ingestion.
(b) Acute psychotic reaction respond to benzodiazepam.
(c) Supportive measure
- Airway
- Breathing
- Circulation
- Other vitals

② Chronic poisoning

- psychosocial therapy
- family therapy.
- Drug focussed group therapy :- lowering burden or stress
- Anxiolytic agent - benzodiazepam.
- Anti psychotic medication.

Q9 Important principle involved in mangment of curare poisoning.

⇒ Curare directly blocks the neuromuscular receptor & thus 1st step is to reverse the condition by administering

Neostigmine :- 0.04 - 0.08 mg/kg

Pyridostigmine :- 0.2 - 0.4 mg/kg

Atropine (0.02 - 0.03 mg/kg).

⇒ Proper respiratory ventilation

⇒ Succinyl choline & other drug shows contraindication.

⇒ Supportive therapy :-
- Oxygen
- Airway
- Breathing
- Circulation
- Other vitals

⇒ control & maintain malignant hyperthermia with dantrolene : 2 - 3mg/kg IV bolus

- Treat the symptoms like
  - Arrythmia with antiarrthmic drug
  - hyperkalemia with hyperventilation, sodium bicarbonate glucose & 2 to 5 mg/kg calcium chloride
- Maintain urine out flow
- For rhabdomyolysis :- fluid replacement therapy & prevent renal insufficiency.
- Pre treatment with 0.125 mg/kg

Q10 Sign, Symptom & treatment of mycotoxin.

Sign & symptom of mycotoxin.

① Brain :- Headache
- Insomnia
- Brain fog
- Depression
- Anxiety

② Respiratory :- Asthma
Allergic condition
Dyspenia.

③ Digestive :- ~~Hemorrhage~~ Ulcer
dizziness
- Abd pain
- Maldbsorption.

④ Immune :- Autoimmune diseases
- Weakness
- lower antibodies.

⑤ Skin :- Eczema
- Rashes.

⑥ Bone :- Damage bone marrow
Cause bone fracture.

Treatment

① Supportive care.
- Airways
- Breathing
- circulation
- Vitals like
heart rate
Temprature
consciousness
pulse

② Antifungal medication.

Amphotericin B :- 0.3 - 1 mg/kg IV.

Fluconazole :- 200 - 400mg PO.

Itraconazole :- 200 - 400mg

③ Symptomatic treatment.

For fever :- PCM 500mg
Nausea :- Ondansetron 4mg
GI Burning :- Pantaprazole 40mg.

Q.1) Sign, Symptom & management of mercury poisoning.

⇒ The sign and symptom of mercury poisioning differ according to the route of administration.

⇒ By 2 route the mercury poisoning occur.

① Inhalation route
② Ingestion route.

① Inhalation route.
- Danbury tremor
- Ataxia
- Parkinsonism
- metallic taste
- Anorexia
- Nausea
- Gingivitis

② Ingestion → colitis
- Melanosis
- Dementia
- Tremor
- Renal failure
- Acrodynia

- Treatment

① BAL therapy (British Anti Lewisite)
- 100mg IM @ 4hr. for 48 hr
followed by
100mg @ 8hr for 10 days.

OR

① DMPS [2,3 dimercapto propane 1 Sulfonate)
- 5mg/kg IV followed by 100mg BD
for 24 days

OR

① DMSA [Meso 2,3 Dimercapto Succinic acid)

30 mg/kg/day for 5 days.
followed by
20mg for 14 days.

OR

① D-penicillinamine

250 mg QDS for 5–10 days

② Supportive therapy

③ Symptomatic treatment

Q) Sign Symptoms & management of mushroom poisoning.

a) The sign symptom of mushroom poisoning are divided in the phase.

① Phase I
- Abd pain.
- nausea
- vomiting
- Tachycardia
- Hypotention
- Electrolytic imbalance

② Phase II
- Treacherous phase of remission.

③ Phase III
- Hepatic failure.
- Renal failure
- Pancreatic failure
- Cardiovascular collapse

- Treatment

① Stabilization

- Restoration of fluid and electrolyte balance for hypotension
- IV glucose for hyperglycemia
- Vit. K : 50 to 100 mg/day for hypoprothrombinemia

- Potassium Nitrate in 5% dextrose :- hyperkalemia

② Decontamination

- Activated charcoal
- Forced diuretic :- 6-9 L/day
- Hemoperfusion
- Plasma exchange

③ Antidotes

- Benzyl penicillin :- 3,00,000 to 10,00,000 unit.
- Thioctic acid :- alpha lipoic acid
- Silybinin
- Cimetidine
- N-acetyl cysteine

④ Symptomatic treatment.

Q13 Define drug abuse. Describe diagnosis & management of CNS depressant poisoning.

⇒ Drugs or substance used for the purpose of creating pleasurable effect on brain which give physical & psychological relief. Uses same period of time is called drug abuse.

⇒ CNS depresent contain 2 main content.
① Barbiturates
② Benzodiazepine

⇒ Diagnosis.

- Serial plasma level may be useful in diagnosis.
- plasma exceeding 8mg/dl are associated with degree of coma.
- EEG
- Urine Test : remain positive from 24 hours to 7 days after last dose for barbiturate
& remain positive for 3 days for benzodiazepam.
- Skin test : Blister develop on skin

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Managment.

① Supportive measures
- Airway
- Breathing
- Circulation
- Electrolytes balance
- Oxygen therapy
- Alertness
- Hemodialysis

② Prevent Symptoms.

① Vomiting by Ondansetron :- 4mg

② Fever :- PCM 500mg

③ GIT burning :- Antacid or Pantaprazole.

④ Weakness :- Multivitamin.

⑤ If any inflammation give NSAIDs.

③ CBT therapy :- Helpful in case depressant addiction.

④ Antidots :- For benzodiazepam toxicity give 1mg flumazenil following administering as series of dose as.

0.2 mg every 12 mintues.

(c) Decontamination

(d) Stomach lavage

(e) Flash therapy.

Q14. Note on LSD.

- Lysergic acid diethylamide is the full form of LSD.
- It is the most common stimulant of central nervious system.
- It is an ergot alkaloid.
- It is said to be most powerful substance produce high level of hallucination by taking b/w 50 mg to 1000 mg.
- It obtained from plant like morning glory, Hawaii baby woodrose.
- More than 20mcg produce Toxic effect like Euphoric & psychotic effect.
- By taken orally it onset of action is quick & last for 12 hours.

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* M.O.A.

LSD
↓
Stimulate 5-HT$_{2c}$ receptor on glutaminergic axon of thalamus
↓
Thalamocortical fibre project to layer IV cortex
↓
affect cortical pyramidal cell
↓
Release glutamate

* Sign Symptoms

- Grade I :- Diaphoresis
  Sweating
  Flushing
  Mydriasis
  Tremor

- Grade IV :- Hyperactivity
  - Confusion
  - Fever
  - Tachycardia

Grade III :- Delirium
Mania
Arrythmia

Grade IV :- convulsion
coma
cardiovascular collapse.

* Treatment :

① Quiet environment.
② Social support.
③ CBT therapy
④ Reassurance
⑤ for panic attack
diazepam 5 to 10 mg IV.
Or
Haloperidol.

⑥ for psychosis.
- Anti anxiety agent
- Neuroleptic
- Anticholinergic.

⑦ for post hallucinogen perception
- clonazepam
- Carbamazepine
- Valproic acid

Q15 Explain briefly management on plant poisoning.

ans) The plant poisoning are managed by step wise

① Identify the plant.
↓
② Determine when expossure happen
↓
③ Determine amount of ingestion
↓
④ Try to manage symptoms.
↓
⑤ Syrup Ipecac for vomiting inducing
↓
⑥ Decontamination as Activated charcoal therapy.
↓
⑦ If antidot present start immidiately like

for mushroom poisoning
Benzyl penicillin : 3 to 10 lack unit / day
or
Thiotic acid + cimetidine
or
N - acetyl cystein.
↓
⑧ Supportive therapy.
- Airway, Breathing & circulation management.

- Electrolyte balance
- Vital should be manage

↓

(a) Advice for use of any barrier that prevent direct contact to plant.

↓

(b) Proper rest & immune booster.