INTRODUCTION TO TOXICOLOGY

Dr.Nirmala Perera

2019

Objectives

- Identify different types of poisons
- Identify the different circumstances of poisoning
- Different method of administration and action of poisons
- Able to recognize clinical features of poisoning

Objectives

- Able to diagnose and manage cases of poisoning
- Should know the medico-legal responsibilities of a doctor in a case of poisoning
- Able to collect samples and send them to the relevant places for analysis in cases of poisoning

What is toxicology?

- A science dealing with

- Toxicity
- Properties
- Fatal dose
- Actions

- Elimination
- Detection
- Interpretation of investigation results
- Treatment

Poison is a substance

When taken or administered into the body

Alters its functions

Causing ill health

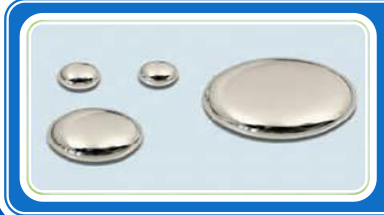
or death

Poisons we are dealing with

Therapeutic agents

Alcohol

Plant poisons



Heavy metals

Poisons we are dealing with

Agrochemicals

Animal toxins

Corrosives

Poisonous gases

Things to know

- General or specific name of the poisonous substance
- Action/s of poisonous substance
- Clinical features of poisoning
- Principles of management
- Circumstances of poisoning
- Post mortem features in a case of death

Forms of poisons

Liquid

Solid

Gas

Circumstances of poisoning

Accidental

Suicidal

Homicidal

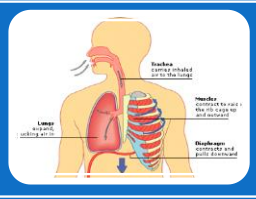
Occupational

Routes of administration

Ingestion

Inhalation

Skin absorption



Natural openings

Parenteral

Routes of excretion

Urine

Faeces

Breath

Sweat

Saliva

Breast milk

Action of poisons

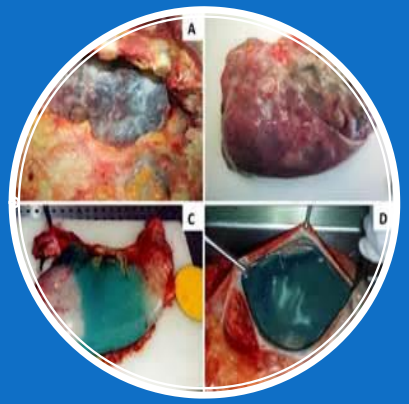
- Local action
- Systemic action

Local action

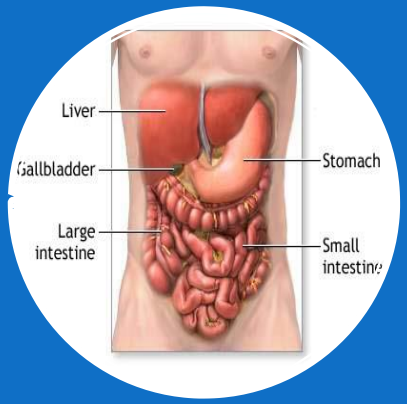
Skin

Mucosal surface

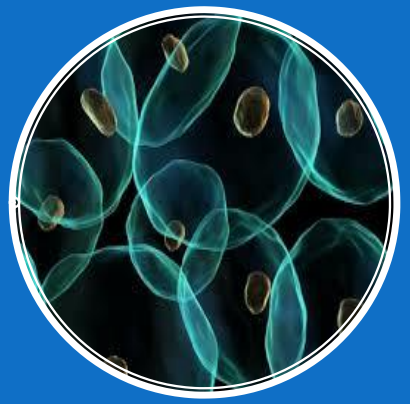
Systemic action



Principle organ system



Several organ systems



Cellular level

Factors modifying the action of poison

Nature	Route of administration	Amount
• CN act fast	• IV/IM faster than oral	• Higher or low

Factors modifying the action of poison

Physical nature

- Gas and liquid faster than solid

Age

- Young and old

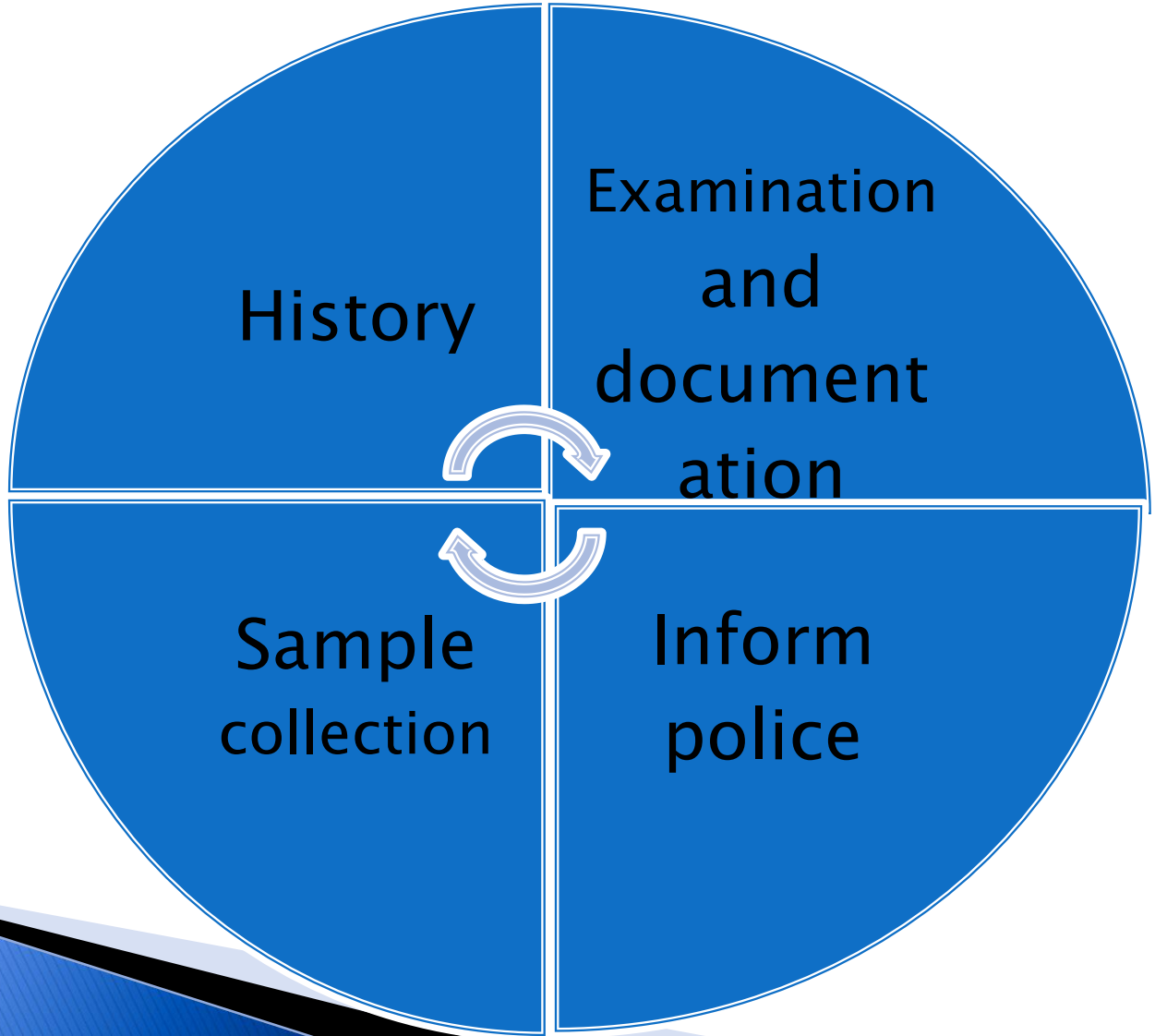
Synergism/ Cumulative effects

- Alcohol+ Barbiturates

Medico-legal responsibilities in a case of poisoning

- 23 year old girl was found semiconscious in the bed room with her mobile phone. It was noted that several text messages were sent to the boy friend few minutes before the incident. She was admitted to the hospital.
- Parents suspects ingestion of a poison.

Medico-legal responsibilities in a case of poisoning



History

Circumstances of poisoning

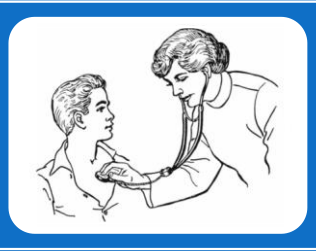
Reason for poisoning

Type and route

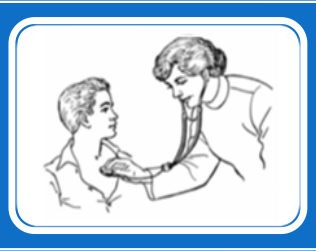
Clinical features

Evidence from scene

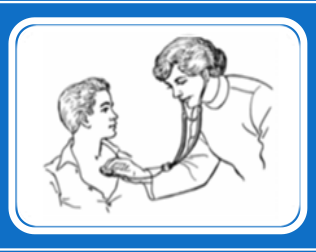
Examination and documentation



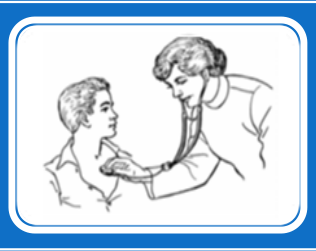
External evidence of poisoning



Systemic evidence of poisoning



Evidence of assault/restrain



Evidence of forcible ingestion

Inform police- If any doubt immediately

Suicidal – not legally bound but cautious

Accidental – occupational/industrial

Homicidal- always

Sample collection

Poisonous substance/container

Clothing if stains are present

Samples such as
blood/urine/gastric lavage

Sample collection–Chain of custody

- Collect
- Labeling the sample
- Safe custody
- Handed over to the police/JMO
- Write on BHT

Medico-legal responsibilities in a case of death due to poisoning

- Dying declaration
- **Information** to the police
- Inquest
- Post mortem examination
- Evidence in courts

Diagnosis of poisoning in the autopsy

1. **Relevant history**
2. Scene visit
3. Clinical features
4. Post mortem examination
5. Investigation

2. From the scene

Presence of poisonous substance

Evidence of struggle

Sample collection

Photo/video

Post mortem examination – External

Hypostasis

Injuries of forcible ingestion /puncture marks

Eyes / mucous membranes

Post mortem examination – External

smell from nose and mouth

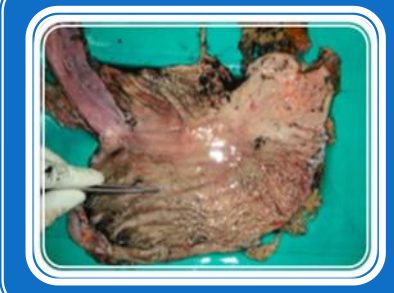
Evidence of chronic poisoning

clothing

Post mortem examination – Internal – GIT

Oesophagus/ stomach – Burns/erosions/ulcerations

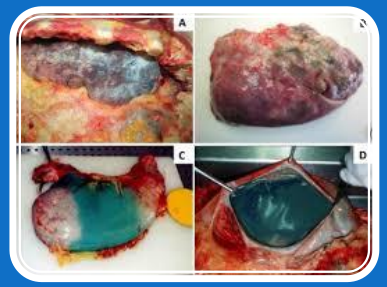
Liver necrosis/fatty liver



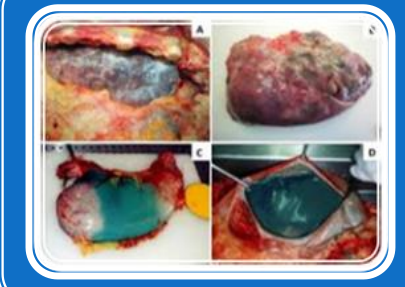
Presence of poison

Post mortem examination -Internal -RST

Epiglottis-oedema



Lungs -Parquet - honey comb lung



Lungs-Mucosal oedema /pulmonary oedema/ congestion

Post mortem examination – Internal

Brain –pink in CN poisoning

Kidney– swollen

Heart – non specific changes– petechial haemorrhages

Sample collection in forensic Medicine

Places of laboratory analysis

Toxicology	Government analyst
Serology	Government analyst
Virology	MRI Colombo
Bio chemistry	Hospital lab

Autopsy Specimens

Histopathology	M-L laboratory
Diatom studies	M-L laboratory
Ballistics, Explosives	Government analyst

Specimen collection

- They are collected into clean wide mouthed Stoppard bottles or tubes.

Specimen collection

They should be labeled with

- Name of the deceased
- Serial number
- Type of sample

Specimen collection con't

Send **without delay**

If delay **refrigerate** or add **preservatives**

Send through the **investigating police officer / hospital employee**

Request form

- police station
- history
- cause of death
- date of death
- date of incident
- suspected poison
- types of samples
- specimen seal

Type of samples collected at the autopsy

1.Blood

- alcohol –10 ml
- other poison and drugs– 100 ml
- carbon monoxide –10 ml

Type of samples

2. Urine

- 100 ml for drugs and poisons
- 10 ml for alcohol
- bladder

Type of samples

3.Vitreous humour

4. Bile

5. Stomach with contents

6. Small intestine

7. Liver

Type of samples

7. Kidneys

8. Brain

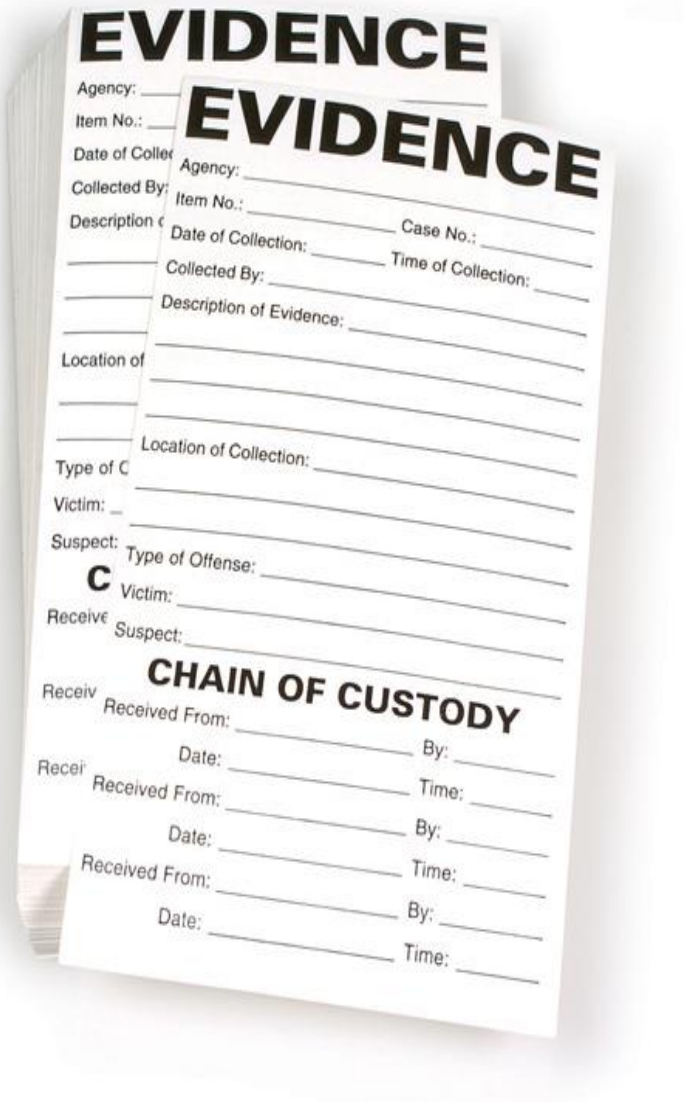
9. Injection sites

Type of samples

10. **Plucked hair & nails** for chronic arsenic poisoning

11. **Muscles & fatty tissue** in exhumed bodies

Handling of samples



Chain of custody should be maintained for all the samples

Summery

- Any suspected case of poisoning should be referred to the police.
- Keep your medico –legal duties in mind when you are handling the case.
- Collect necessary samples from admission
- Send them to the proper place
- Maintain chain of custody


FloridaGardener.com