**Drowning**

* Drowning is a form of asphyxia due to aspiration of fluid into air-passages, caused by submersion in water or other fluid.
* Complete submersion is not necessary, for submersion of the nose and mouth alone for a sufficient period can cause death from drowning.

**Mechanism**

Drowning occurs when a person is unable to breathe due to submersion in water, leading to insufficient oxygen supply to the body. It can result from respiratory impairment, such as water entering the airways, causing the person to suffocate. Secondary complications, like water-induced spasms or cardiac arrest, may also contribute.

**Types of Drowning**

(1) **Wet drowning**: In this, water is inhaled into lungs and the victim has severe chest pain. This is also known as primary drowning (typical drowning), in which death occurs within minutes of submersion secondary to cardiac arrest or ventricular fibrillation.

(2) **Dry drowning**: In this type, water does not enter the lungs, but death results from immediate sustained laryngeal spasm due to inrush of water into the nasopharynx or larynx.

(3) **Secondary drowning** (post- immersion syndrome or near drowning): Near drowning refers to a submersion victim who is resuscitated and survives for 24 hours. The person may or may not be conscious.

(4**) Immersion syndrome** (hydrocution or submersion inhibition): Death is not caused by drowning but caused by cardiac arrest due to vagal inhibition.

**Causes of Death**

1. Asphyxia: Inhalation of fluid causes obstruction to the air-passages. Circulatory and respiratory failure occurs simultaneously, due to anoxia.
2. Ventricular fibrillation
3. Laryngeal spasm may result from inrush of water into the nasopharynx or larynx.
4. Vagal inhibition is due to icy cold water, drunkenness, high emotion or excitement (intending suicides) and unexpected immersion.
5. Exhaustion.

**Fatal Period**

* Death usually occurs in four to five minutes of complete submersion in fresh water.
* 8 to 10 minutes in sea water.

**Forensic significance**

1. It determines cause of death.
2. It determines ante mortem drowning and postmortem drowning.

(Antemortem drowning occurs while a person is still alive, whereas postmortem drowning happens after death.

Signs of antemortem drowning may include water in the lungs, frothy fluid in the airways, and changes in the lungs due to inhalation of water.

In postmortem drowning, these signs might be absent)

* **In ante mortem drowning,** (if person is still alive when entering the water), then diatoms will enter the lungs if the person inhales water & drowns. The diatoms are then carried to distant parts of the body such as brain, kidneys, and bone marrow by circulation
* **In post-mortem drowning,** (if person is dead when entering the water) then there is no circulation and the transport of diatoms cells to various organs is prevented because of lack of circulation & diatoms cannot enter the body.

1. It determines freshwater drowning and sea water drowning.

* (Freshwater leads to quick absorption into blood from GIT due to lower osmotic pressure, it increases blood volume in short span of time that result in loss of red blood cell-hemolysis)
* (In Saltwater having equal osmotic pressure to blood and it just slightly increases NaCl causing mild symptoms)
* In freshwater drowning, the influx of hypotonic water into the body can cause dilution of electrolytes in the blood, leading to a condition known as hemodilution. This results in low sodium levels (hyponatremia). On the other hand, seawater drowning leads to an increase in sodium levels (hypernatremia) due to the hypertonic nature of seawater.

1. Autopsy findings, including the state of the lungs, stomach contents, and the presence of water in the airways, can help forensic experts to determine the timing of drowning.