Diagnosis of death

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What is death ?

Who can die ?

What is death ?

History of defining death

Medical and legal people were interested in defining death

Lose of bodily functions were considered as death

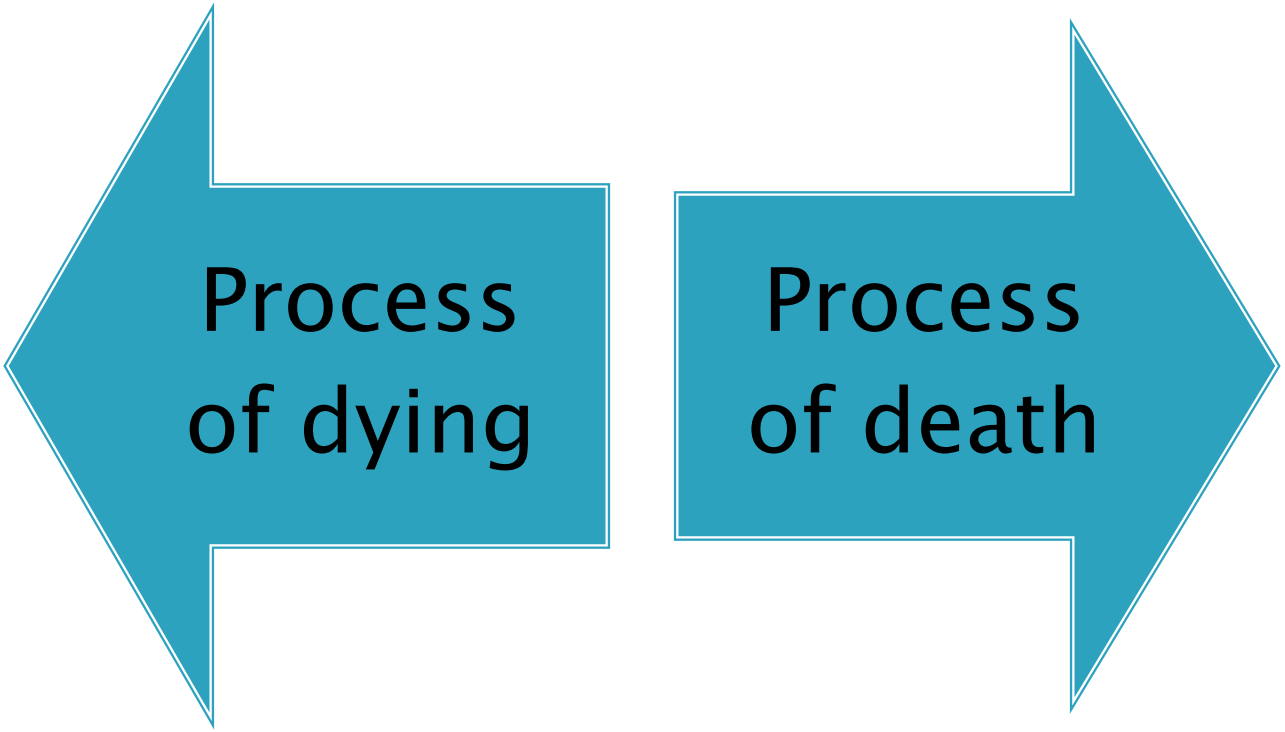
Problems with diagnosis of death

- Increasing ability to resuscitate people
- Patient connected to life support systems

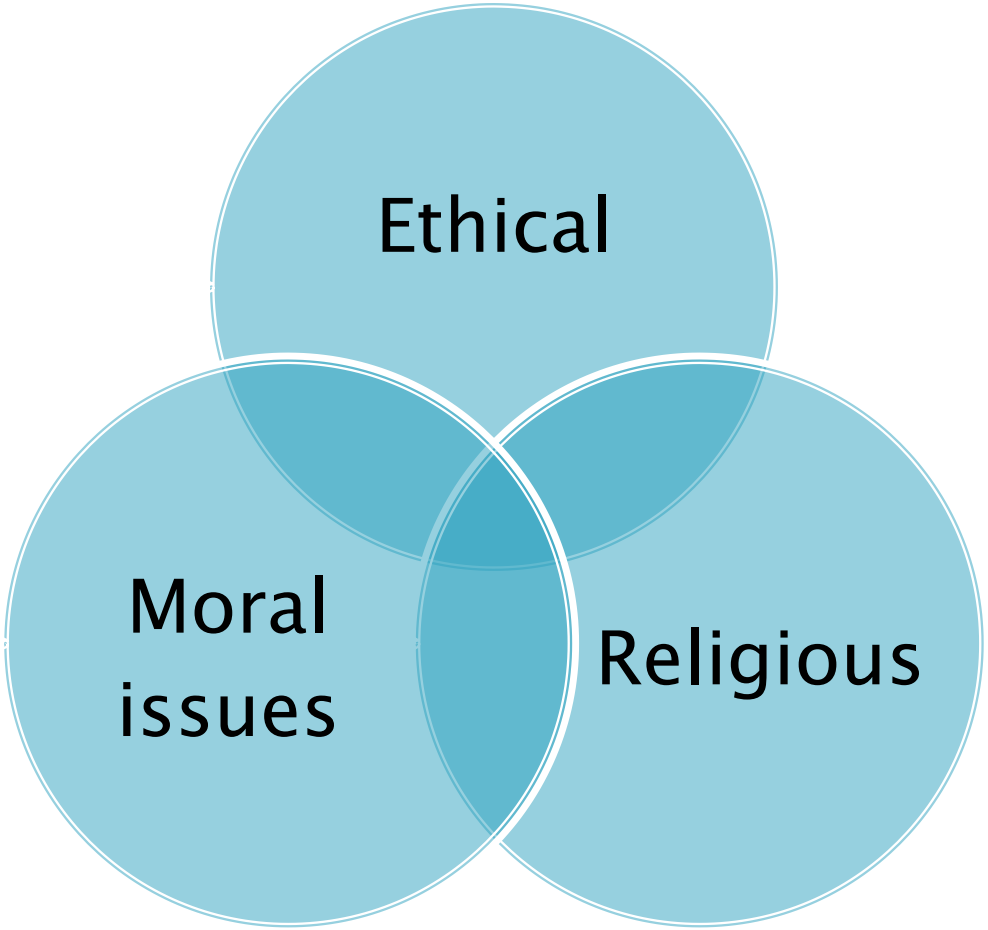
What is death?

- Death is not an event, it is a process
- More specialized internal organs cease their functions at different rate

What is death?



Issues in rate of death



Death is refereed to

- Somatic death
- Molecular death
- Brain death

Somatic death

Irreversible disintegration of biological process has began

Somatic death

- **Permanent cessation** of
  - functions of brain stem
  - spontaneous respiration
  - circulation of the blood

Somatic death

- Irreversible lose of
- Awareness on environment
- consciousness

Somatic death

- The person is unable to
  - respond to sensory stimuli
  - initiate voluntary movements
  - have spontaneous respiration
  - have circulation

Diagnosis of somatic death

- Absence of **pulse**
- absence of **heart sounds**
- Absence of **breathing**
- Absence of **breath sounds**
- Absence of **brain functions**

Diagnosis of absence of brain functions

- Person is unconscious
- loss of reflexes
- lose of tone
- Fixed dilated pupils

Case

- You are called to see a 75 year old terminally ill patient in the ward at midnight by the nursing officers.
- In spite of resuscitation patient expired.
- How do you confirm the death of this patient?

Suspended animation

Mimic death

"temporary cessation" of circulation and respiration

Resuscitation becomes successful

Circumstances of suspended animation

- General anesthesia
- Near drowning
- Electrocution

Circumstances of suspended animation

- Barbiturate poisoning and narcosis
- Syncope attacks
- Complete heart block
- Yoga exercise

Molecular death

Cellular death depends on the sensitivity of the cells in different tissues to **anoxia.**

Molecular death

cerebral cortex	few minutes
cornea	8 hrs
skin graft	24 hrs
Bone graft	48 hrs
Arterial graft	72 hrs

Problems of diagnosis of death

In cardio respiratory arrest respiration and the circulation can be maintained artificially keeping brain alive

The movement of death

Time of the diagnosis of **somatic death**

Time of the diagnosis of **brain stem death**

Brain death
Sensitivity to anoxia

- Cortex – most sensitive
- Thalamus– next
- Brain stem– last

Brain death

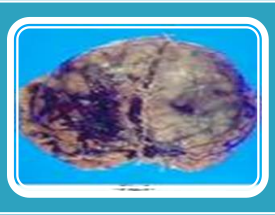
The **brain stem death** is the physiological decapitation of the person.

Diagnosis of brain stem death

Applicable to those on artificial life support systems and those awaiting organ donations

Diagnosis of brain stem death

Conditions to be established

- No reversible cause for unconsciousness
-  Brain damage is not reversible
- Respiratory cessation is not due to drugs

Diagnosis of brain stem death

- Exclude reversible causes for unconsciousness
- Over dose of sedatives
- Hypothermia
- Metabolic disorders

Diagnosis of brain stem death

- reversible causes for unconsciousness
- Endocrine disorders
- Severe electrolyte abnormalities

Clinical criteria for diagnosis of brain stem death

Absent brain stem reflexes

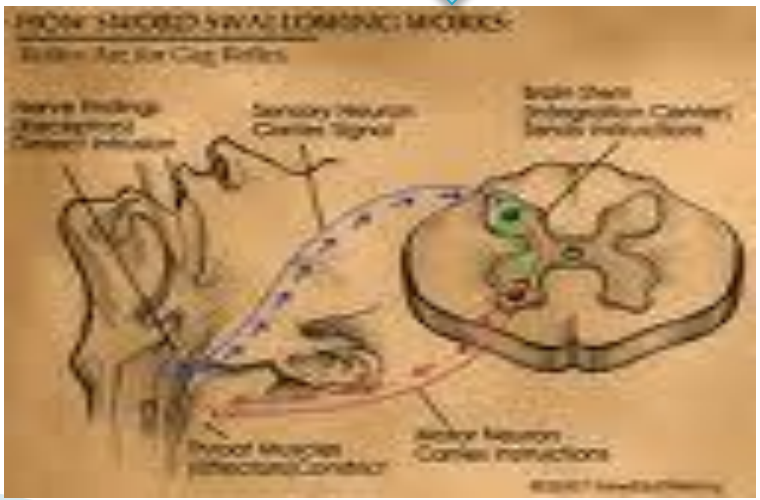
Absent motor responses

Apnoic test is positive

Test of brain stem functions

No gag reflex

The bulbar function is best tested by examining cough response to bronchial suctioning

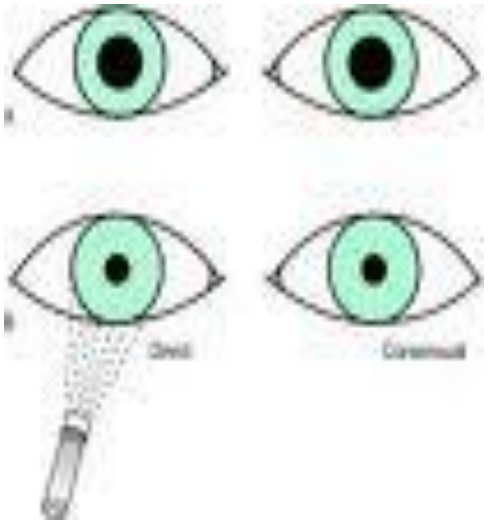


Absence of corneal reflex

Absence of light reflex

Mid position −4 to 6 mm

If uncertain use magnifying glass

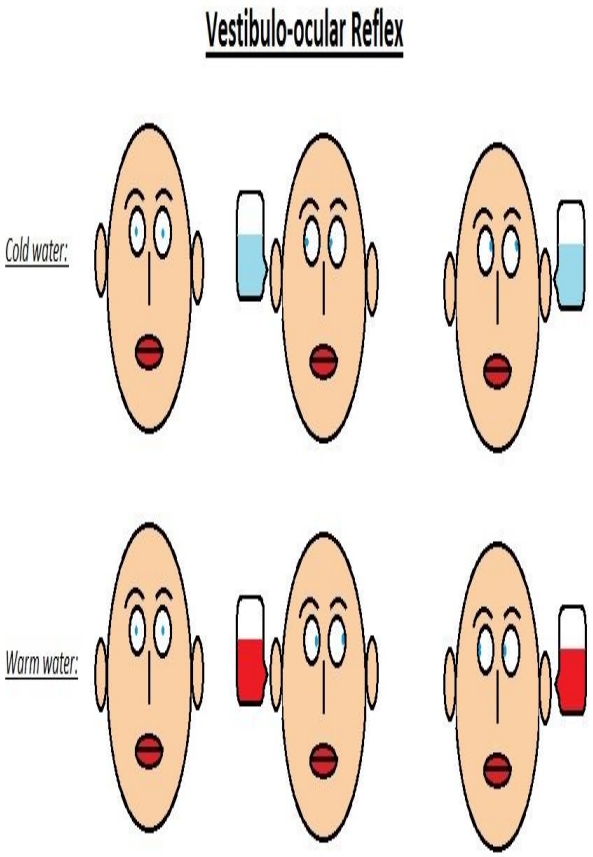


No vestibular ocular reflex

Head is elevated to 30 degrees

50-cc ice water into the external auditory canal

tonic movement to the side of the stimuli

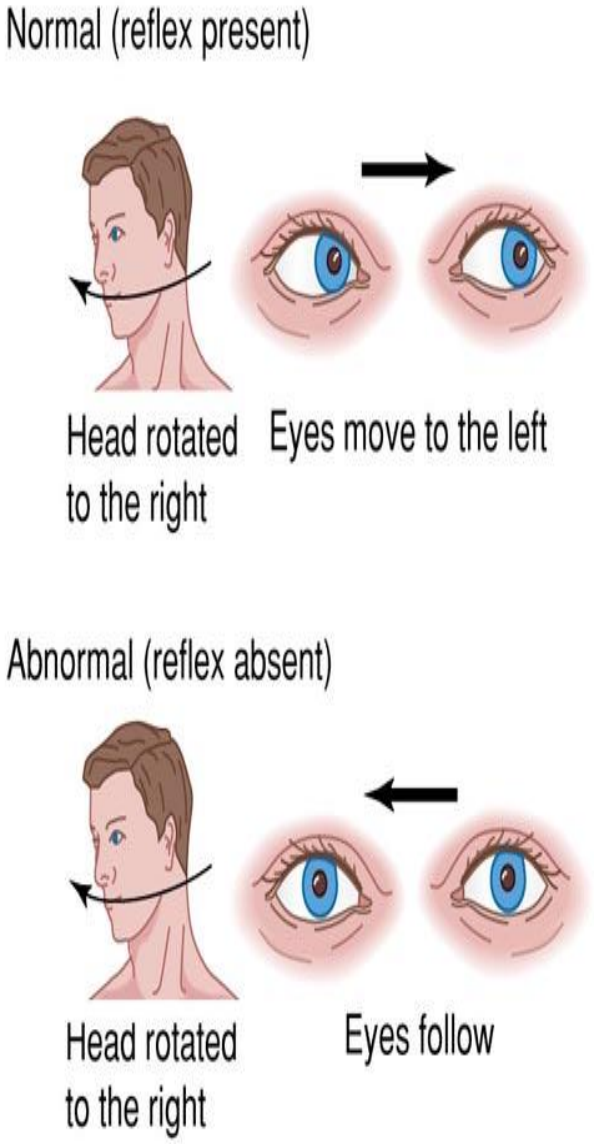


Doll's head or ocular-cephalic phenomenon

Elevate the eye lids

Rotate the head from right to left

Eyes do not move within the orbit and follow the head



Absence of motor responses

Compressing the supra-orbital nerve

forceful nail bed pressure

Temporo-mandibular joint compression

Absent limb movements

Aponic test

- Correct hypothermia (36^0c – $37\ ^0$ C)
- Ventilate with 100% oxygen for 10 min
- Carbon dioxide for 5 min

→ No respiratory stimulation

- Repeat all the tests in 2-4 hrs

Diagnosis of brain stem death

These tests are repeated maximum of 2 hr interval

Brain death should be diagnosed by 2 doctors, not from transplant team

Importance of brain death

In beating heart cadavers organs are ideal for transplantation

While patient is on ventilator confirm brain death and remove the organs for transplant

Summary

- **Death**
- Somatic death
- Molecular death
- Brain death

Thank you