

Bibliography details

Name of the Serial/Publication: Veritas

Volume No.: 1

Issue No.: 1

Month & Year of publication: August 2021

Page numbers: Feature Articles (76-79)

Title of Article: Thanatology and stages of Death

Contributor (s)

1. Ms. Athira E C
2. Ms. Jocelyn Kunju John

THANATOLOGY AND STAGES OF DEATH

Ms. Athira E C
Ms. Jocelyn Kunju John

“Thanatology is the description or study of death and dying and the psychological mechanisms of dealing with them. Thanatology is concerned with the notion of death as popularly perceived and especially with the reactions of dying.” Thanatology is derived from the Greek word “Thanatos” meaning death.

Do you know how to estimate time since death?

Post-mortem interval (PMI) has been classified into three stages – immediate, early and late.

1) Immediate Post-mortem interval: During this period, the body undergoes rapid biochemical changes and even physiological changes because of the absence of circulation of blood and regulatory mechanisms. These changes are detectable in the skin and eyes. In the eyes, the first observable sign is the segmentation of retinal vessels. This usually occurs within half an hour or two hours after death. The other sign is clouding of the cornea, as the intraocular pressure decreases to 4mmHg. This clouding of the cornea occurs within 2 hours after death. The skin loses its elasticity and lustre within the first few hours after death and appears pale. Thus the post-mortem interval between somatic and cellular intervals is within 2 to 3 hours after death and usually denotes a lack of discernible changes in the morphology.

2) Early Post-mortem interval: This period is most relevant in establishing the timeline of events and developing a theory of circumstances of death. This period runs from 3 to 72 hours after death. The early post-mortem phase is most frequently estimated using post-mortem changes – rigor mortis, livor mortis, and algor mortis.

Pallor Mortis - The first stage of death where the corpse becomes pale in the face and other parts of the body. This is the first sign and occurs immediately within 15- 30 minutes after death. This paleness occurs without any gender difference.

Rigor Mortis - This occurs immediately after death, it is stiffening of muscles caused by the depletion of adenosine triphosphate (ATP), which is necessary to break down the actin-myosin filaments in muscle fibers. The cessation of oxygen supply causes the stoppage of aerobic respiration in the cells and leads to a lack of production of ATP. Rigor mortis appears approximately 2 hours after death in the muscles of the face, progresses to the limbs over the next few hours, completing between 6 to 8 hours after death. Rigor mortis then stays for another 12 hours. In the last phase of Rigor Mortis, the actin-myosin complex that has formed starts disintegrating, resulting in the dissolution of the stiffness. Rigor mortis generally disappears 36 hours after death, followed by a phase known as secondary flaccidity. The different stages of rigor mortis are :

A) Autolysis - In this stage the blood circulation stops not long after death. There won't be any oxygen supply and it creates an acidic environment as the cell starts to burst.

B) Bloat - The enzymes produce numerous gases. In this stage, putrefaction occurs where the sulphur mixes up with microorganisms and produces a foul smell.

C) Active decay - All the parts of the body become liquified and hair, bones etc remains.

D) Skeletonisation - There is a loss of organic and inorganic components on the ground.

Algor mortis - Is the process where the body cools down as body heat is lost to the environment. The temperature decreases due to fluid evaporation until it reaches equilibrium with the environment. This happens only if the ambient temperature is cooler than the body temperature at the time

of death. This algor mortis is applicable up to 24 hours after death. Usually, body temperature is maintained stable for 30 min to 1 h after death before starting to decrease, although this can persist for 5 h in extreme cases.


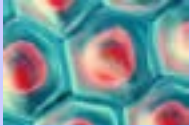

Livor mortis - Which is the purplish-blue discolouration of the skin, due to collection of blood in skin vessels, caused by gravitational pull. The discolouration becomes 'fixed' after a certain period, owing to the disintegration of blood cells and the seepage of haemoglobin. This occurs within hours after death. Lividity occurs because the heart doesn't pump the blood over the body. Lividity begins 30 minutes to 4 hours after death and lasts up to 12 hours. This can help in determining the position of the person when they died. For example, if a person died on their back the lividity occurred at their back, like the back of their legs, buttocks.

3) Late Post-mortem interval: In this phase, the body tissue starts disintegrating and is primarily describable as decomposition or putrefaction, adipocere formation, mummification, or skeletonizing. The body primarily undergoes decomposition or putrefaction, resulting in greenish discolouration, bloating due to gas formation, and liquefactive necrosis. The decomposition of remains is dependent on the climate, the season, body weight, and clothing.

Adipocere: It is a waxy or soap-like substance formed in the presence of anaerobic bacteria. It may occur in bodies deposited in waterlogged graves or by the side of a river. It is sometimes seen 3-4 weeks after death, although 3 months is more typical.

Mummification: Occurs when the body has been dried out due to heat, but can also be due to wind or any other factors. It results in the dehydration of the body and brittleness of the skin. The internal organs can be either dried depending on the conditions.

WHAT HAPPENS TO YOUR BODY AFTER DEATH?

SECONDS	MINUTES	HOURS	DAYS	WEEKS	MONTHS
<p>BRAIN ACTIVITY surges, then it stops.</p>  <p>Your body TEMPERATURE drops.</p>	<p>Your cells begin dying due to lack of oxygen, then starts to break down and leak- beginning the process of putrefaction.</p> 	<p>Calcium builds up in the muscles causing them to tense. This “rigor mortis” lasts 36 hours.</p> <p>Eventually your muscles relax, causing you to release any remaining faeces or urine.</p> <p>Your skin shrinks as it dries out, making your hair and nail seem like it’s growing.</p> <p>Gravity pulls your blood down, making light skin look pale with reddish splotches.</p>	<p>You turn green in spots because ENZYMES in your ORGANS start digesting themselves, usually with the help of the bacteria.</p>  <p>You start to smell terrible because your decaying body releases chemicals like cadaverine.</p>	<p>Bugs eat you MAGGOTS can digest 60% of a body within a week.</p> <p>You can turn purple then black as BACTERIA continue to digest your body.</p> <p>Your HAIR starts to fall out.</p>	<p>If your body is left at 50 degree F, it will take about months for your soft tissues to decompose until just your skeleton is all that is left.</p>

References:

- Jalan, M. (2018). What Are The 4 Postmortem Stages of Death?.Rattenbury, A. E. (2018). Forensic taphonomy. In Forensic Ecogenomics (pp. 37-59). Academic Press.<https://doi.org/10.1016/B978-0-12-809360-3.00002-3>