

Meeting

15:14 291 attendees



Microsoft PowerPoint interface showing a presentation slide titled "Drowning 2020.pptx". The slide content includes:

Both these factors can bring about *ventricular fibrillation* and *death* within 4 to 5 minutes due to heart failure.

Diagrams give the schematic illustrations and the actual mechanisms involved respectively.

Salt Water Drowning

Here water that has entered the lungs being hypertonic, draws the water from the blood in pulmonary circulation due to the osmotic pressure effect.

The slide is part of a presentation titled "Drowning 2020.pptx" and is slide 13 of 46. The interface shows various tabs like Home, Insert, Design, Animations, Slide Show, Review, and View. The status bar at the bottom indicates "Slide 13 of 46", "Office Theme", and "English (United States)".



Meeting

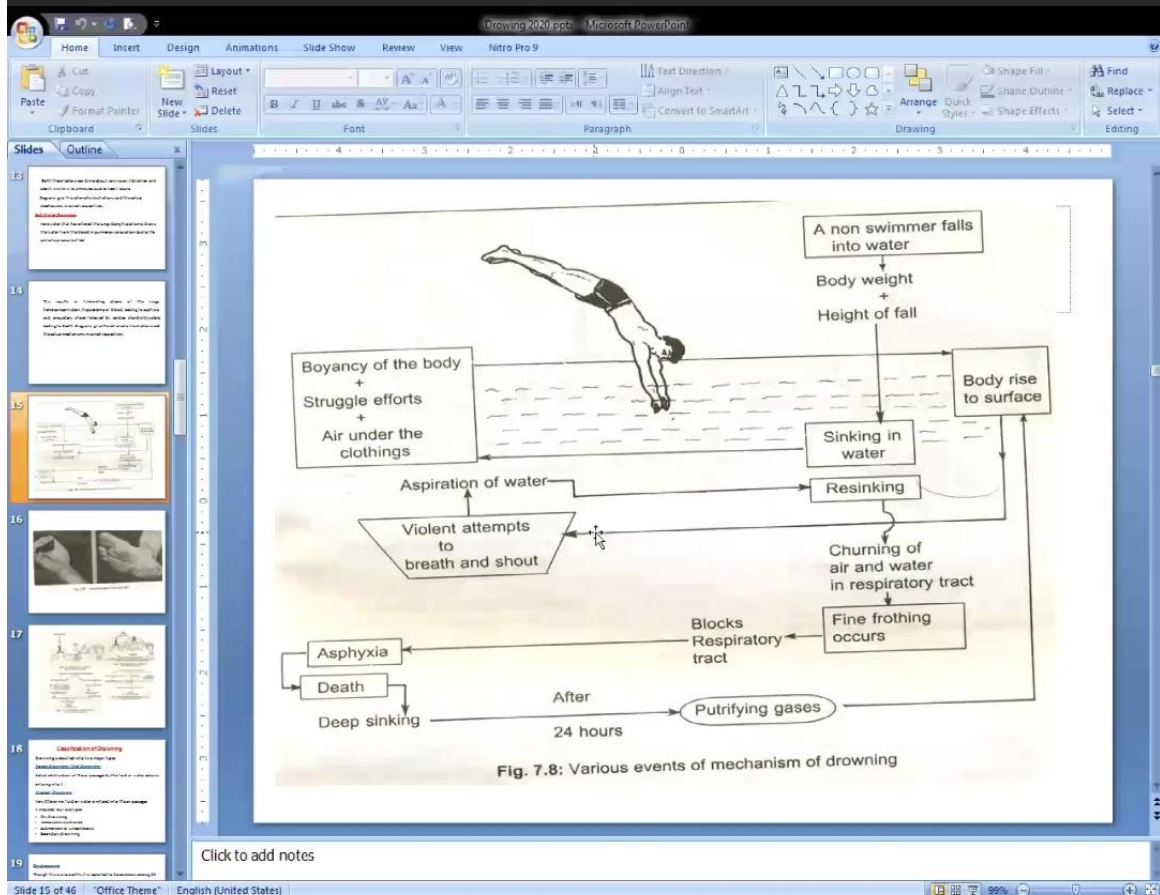
15:58 292 attendees



Microsoft PowerPoint interface showing a slide titled "This results in fulminating edema of the lungs, hemoconcentration, hypovolemia of blood, leading to asphyxia and circulatory shock followed by cardiac stand-still/systole leading to death. Diagrams give the schematic illustrations and the actual mechanisms involved respectively."

The slide is part of a presentation titled "Drowning 2020.pptx". The left sidebar shows a list of slides, with slide 14 selected. The bottom status bar indicates "Slide 14 of 46", "Office Theme", and "English (United States)".





Meeting

18:07 295 attendees



Drowning 2020.pptx - Microsoft PowerPoint

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Font Paragraph Drawing

Slides Outline

13 Classification of Drowning

Drowning is classified into two major types.

Typical Drowning (Wet Drowning)

Actual obstruction of the air passages by the fluid or water column entering into it.

Atypical Drowning

Very little or no fluid or water is inhaled into the air passages.

It includes four subtypes.

- Dry drowning
- Immersions syndrome
- Submersion of unconscious
- Secondary drowning

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Font Paragraph Drawing

Dry drowning

Though this is a rare entity it is reported to be common among 20 percent of drowning cases.

mechanism of death:

Mechanism of death in dry drowning summarized in diagram

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Slide 19 of 46 Office Theme English (United States) 99%



1:23



16%

Microsoft PowerPoint interface showing a presentation slide titled "Dry drowning". The slide content includes:

Dry drowning

Though this is a rare entity it is reported to be common among 20 percent of drowning cases.

mechanism of death:

Mechanism of death in dry drowning summarized in diagram

The interface also shows a slide thumbnail on the left and a status bar at the bottom indicating "Slide 19 of 46".



The screenshot shows a Microsoft PowerPoint presentation titled "Drowning 2020.pptx" in the Nitro Pro 9 application. The presentation is on slide 19 of 46, titled "Dry drowning". The slide content includes:

- Dry drowning**
- Though this is a rare entity it is reported to be common among 20 percent of drowning cases.
- mechanism of death:**
- Mechanism of death in dry drowning summarized in diagram

The slide also features a "Click to add notes" section at the bottom. The presentation interface includes a ribbon with tabs for Home, Insert, Design, Animations, Slide Show, Review, and View. The left sidebar shows a list of slides, with slide 19 highlighted. The bottom status bar indicates "Slide 19 of 46", "Office Theme", and "English (United States)".



1:23



17%

Microsoft PowerPoint interface showing a slide titled "Fall into water column". The slide content is a flowchart illustrating the sequence of events following a fall into water:

- Fall into water column
- Water entering into
- Nasopharynx/ Larynx
- Intense Laryngeal Spasm
- Asphyxia
- Death

The slide is part of a presentation titled "Drowning 2020.pptx" and is displayed in the "Slide Show" view. The status bar at the bottom indicates "Slide 20 of 46", "Office Theme", and "English (United States)".



Microsoft PowerPoint interface showing a presentation slide titled "Immersion syndrome (vagal inhibition)". The slide content reads: "This also occurs rarely. Mechanism of death involved in this type of atypical drowning is enumerated in the Diagram." The interface includes a ribbon with tabs like Home, Insert, Design, Animations, Slide Show, Review, and View. The left sidebar shows a list of slides, and the bottom status bar indicates "Slide 21 of 46".



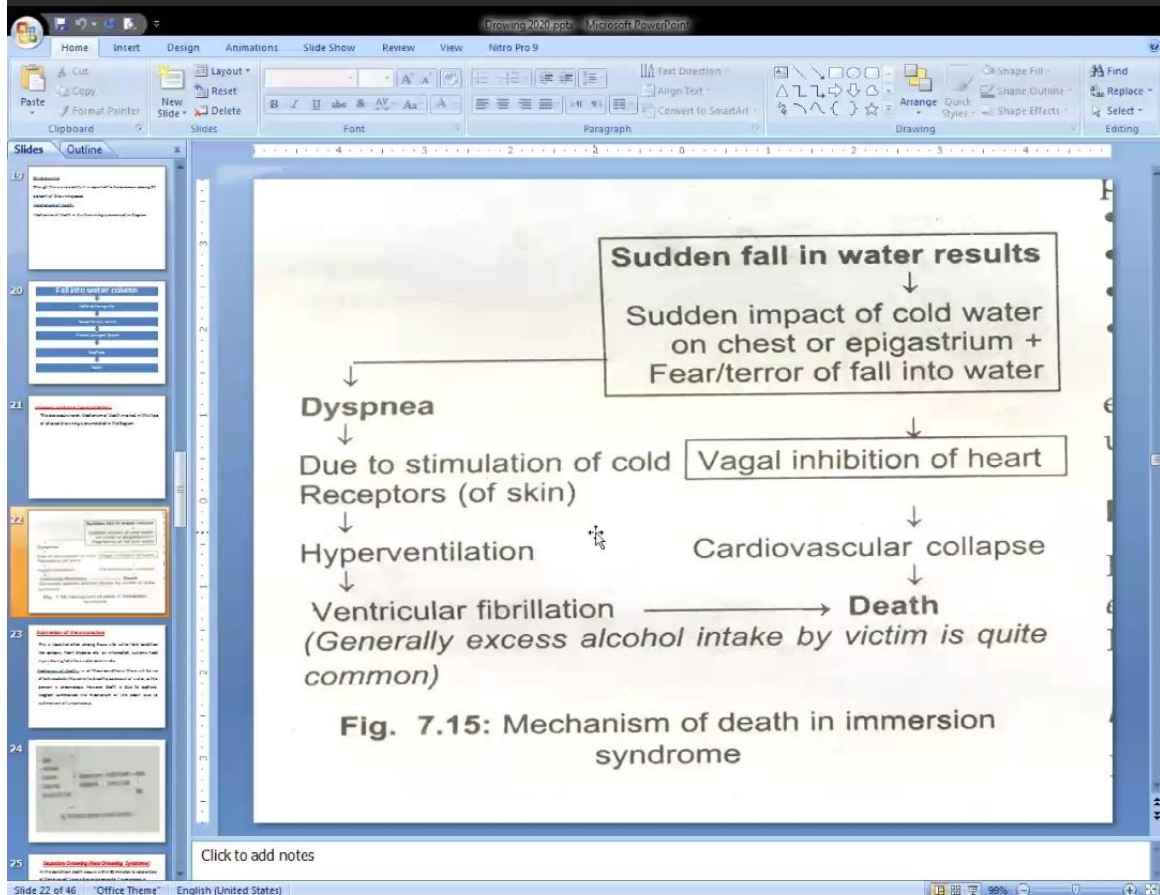
The screenshot shows a Microsoft PowerPoint presentation titled "Drowning 2020.pptx" in the Nitro Pro 9 application. The presentation is on slide 21 of 46. The slide content is as follows:

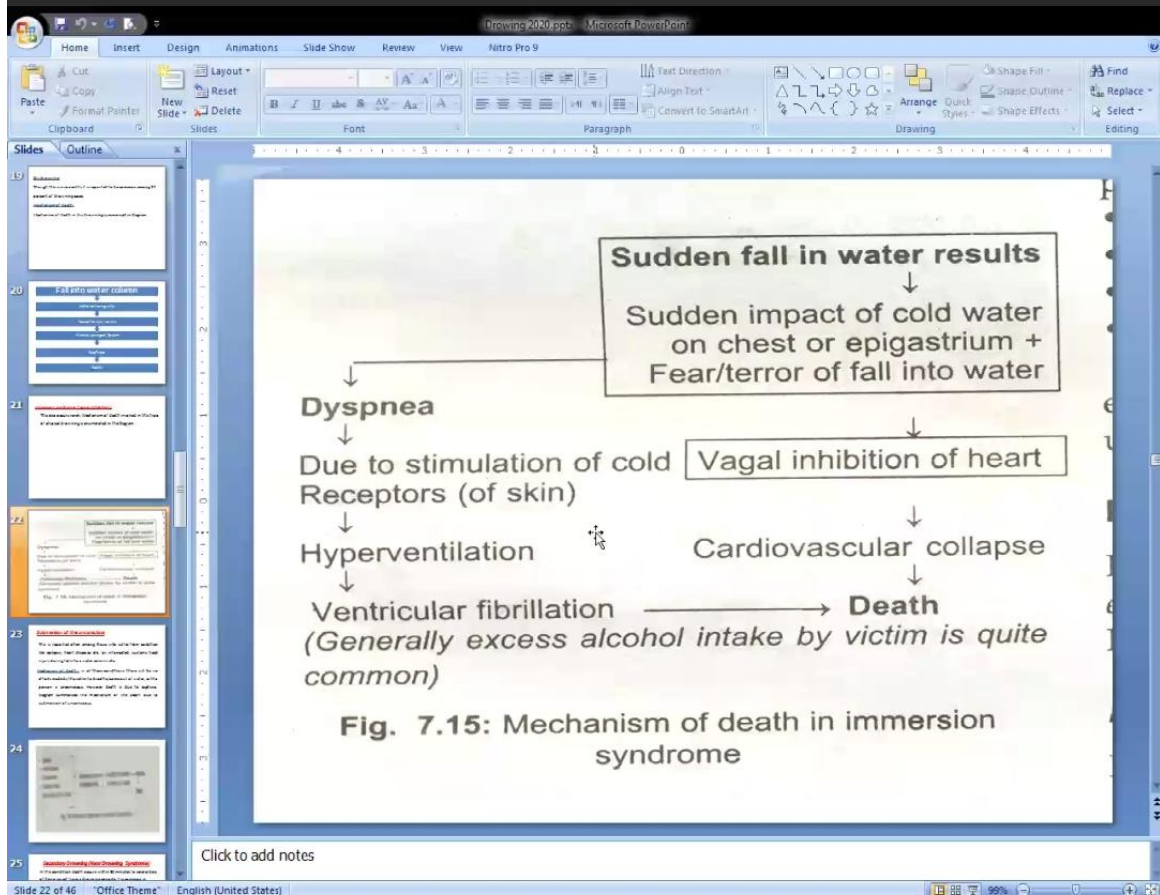
Immersion syndrome (vagal inhibition)

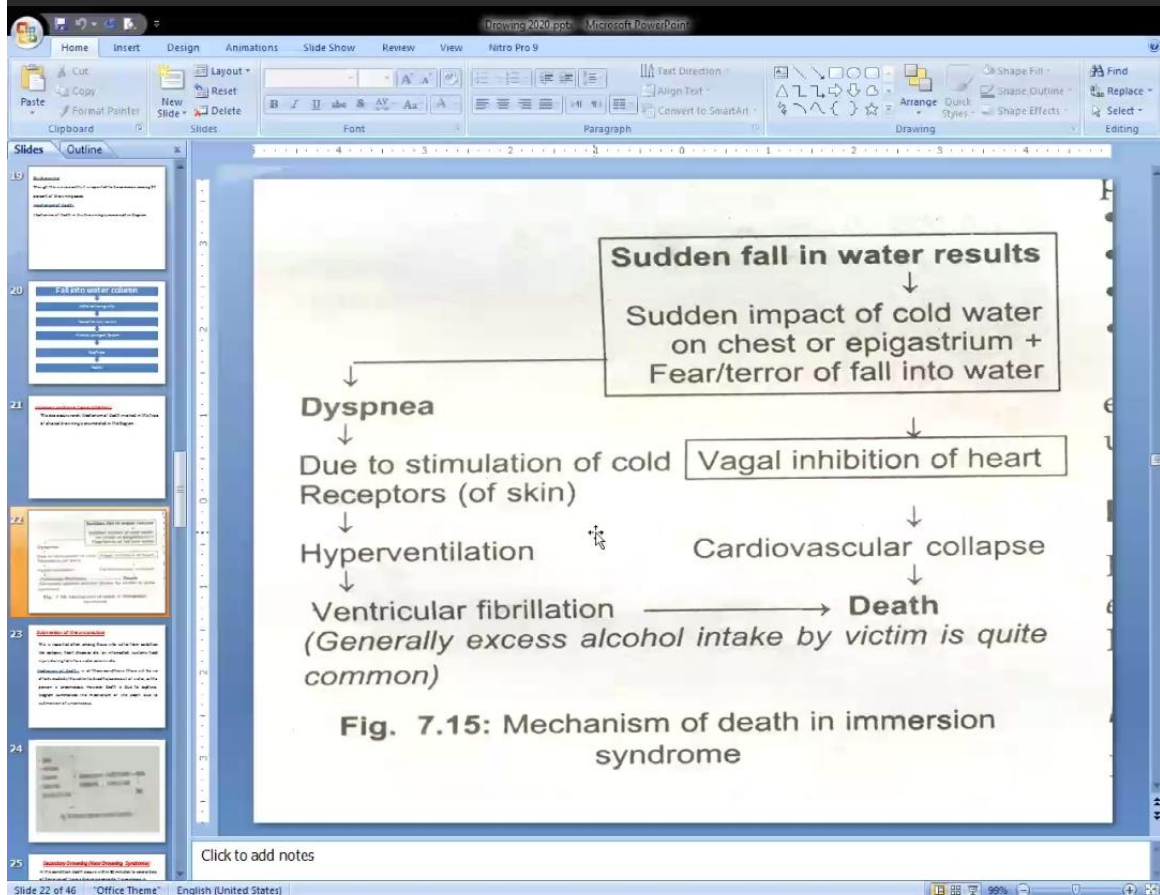
This also occurs rarely. Mechanism of death involved in this type of atypical drowning is enumerated in the Diagram.

The slide is part of a presentation with a blue-themed interface. The left sidebar shows a list of slides, with slide 21 highlighted. The bottom status bar indicates "Slide 21 of 46", "Office Theme", and "English (United States)".









Microsoft PowerPoint interface showing a presentation titled "Drowning 2020.pptx". The slide content is as follows:

Submersion of the unconscious

This is reported often among those who suffer from condition like epilepsy, heart diseases etc. or intoxicated, sustains head injury during fall into a water column etc.

Mechanism of death:- In all these conditions there will be no efforts made by the victim to breathe/come out of water, as the person is unconscious, However death is due to asphyxia. Diagram summarizes the mechanism of the death due to submersion of unconscious.

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Microsoft PowerPoint interface showing a slide titled "Fig. 7.16: Mechanism of death due to submersion of unconscious". The slide content includes a list of conditions and a flowchart illustrating the mechanism of death.

- Epilepsy
- Heart diseases
- Drunkenness
- Sustains a head injury during fall into water.

Flowchart:

```
graph LR; A["Submersion occurs in] --> B["unconscious state"]; B --> C["No efforts to breathe } or come out of water"]; C --> D["Asphyxia"]; D --> E["Death"];
```

Fig. 7.16: Mechanism of death due to submersion of unconscious

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23%

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Slides Outline

25 Secondary Drowning (Near Drowning Syndrome)

26 Secondary Drowning (Near Drowning Syndrome)

27 Secondary Drowning (Near Drowning Syndrome)

28 Findings in the water

29 Findings in the water

30 Findings in the water

31 Findings in the water

Slide 25 of 46 "Office Theme" English (United States) 99%

Secondary Drowning (Near Drowning Syndrome)

In this condition death occurs within 30 minutes to several days of *being saved* from a drowning episode. It is common in children, elderly or sickly person, who die because of causes such as:

- Septic pneumonia
- Pulmonary edema
- Chemical pneumonitis
- Metabolic acidosis.

In all cases of atypical drowning deaths, examination of the body discloses none of the usual signs of drowning,



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Slides Outline

Postmortem Findings of Drowning

Postmortem findings are described under *external* and *internal* findings

External

- Includes findings in face, skin, hands and feet.

Findings in the face These are:

- Face —is congested and livid
- Eyes

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26%

Microsoft PowerPoint interface showing a presentation slide titled "Browning 2020.pptx". The slide content is as follows:

- i. Palpabral fissure – open/ closed (half)
- ii. Conjunctiva – congested
- iii. Pupils – dilated

- Mouth and nostrils — show *Fine froth* collected around, which may be whitish like shaving cream. It may be blood stained too. The various events on formation of froth in the respiratory tract are described in the diagram.

Note:- This froth being very light rises up in the respiratory passages and flow out of the mouth and nostrils — passively in a cadaver.

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Slide 27 of 46 | Office Theme | English (United States) | 99%



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Find: Find, Replace, Select

Slides Outline

25 Findings in the skin:-

26 The skin changes in general include *cutis anserina* and *postmortem lividity*. Cutis anserina (goose skin appearance): Here the skin appears like an orange peel. This is due to the rigor mortis of erector pilo-rum muscles of hair follicles in the skin and subcutaneous tissues.

27 Postmortem lividity:-

28 lividity will be seen on dependent parts of the body. This solely depends on the position in which the body was floating.

29

30

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Find, Replace, Select, Editing

Slides Outline

25 Findings in the skin:-

26 Findings in the skin:-

27 Findings in the skin:-

28 Findings in the skin:-

29 Findings in the skin:-

30 Findings in the skin:-

31 Findings in the skin:-

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Slide 28 of 46 "Office Theme" English (United States) 99%



1:31



32%

Microsoft PowerPoint interface showing a presentation titled "Drowning 2020.pptx". The slide content is as follows:

Findings in the hands :-

Common findings observed in the hands include *cadaveric spasm* and *washerwoman's hands*.

Cadaveric spasm (instantaneous rigor):-

Hands of the dead body will be clenched and on opening may show water, plants, seaweeds, etc. This is due to the struggle efforts finally made by the drowning victim to catch hold of whatever available in water and try to surface up. Thus, if a dead body removed from water presents the feature of *cadaveric spasm*, it is a finding in favor of ante-mortem drowning.

Slide 29 of 46, Office Theme, English (United States), 99%



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Slides Outline

25. **Washerwoman's hands: definition**
A specific change that is seen in the skin of the palm, which comprised of wrinkled, swollen, whitish sodden appearance constitutes washer-woman's hand. It is also considered as the maceration of skin of the hand.

26. **Washerwoman's hands: etymology**
The term 'washerwoman's hands' is derived from the fact that washerwomen used to wash clothes in water for long hours, leading to the development of this condition.

27. **Washerwoman's hands: clinical features**
The clinical features of washerwoman's hands include:
1. Swelling of the palms
2. Whitening of the skin
3. Wrinkling of the skin
4. Softening of the skin
5. Loss of elasticity of the skin
6. Formation of blisters
7. Itching
8. Pain
9. Discomfort
10. Redness
11. Tenderness
12. Sensitivity to cold and heat
13. Sensitivity to chemicals
14. Sensitivity to detergents
15. Sensitivity to soap
16. Sensitivity to water
17. Sensitivity to air
18. Sensitivity to sunlight
19. Sensitivity to wind
20. Sensitivity to dust
21. Sensitivity to pollen
22. Sensitivity to mold
23. Sensitivity to bacteria
24. Sensitivity to viruses
25. Sensitivity to fungi
26. Sensitivity to parasites
27. Sensitivity to insects
28. Sensitivity to animals
29. Sensitivity to plants
30. Sensitivity to minerals
31. Sensitivity to vitamins
32. Sensitivity to hormones
33. Sensitivity to enzymes
34. Sensitivity to antibodies
35. Sensitivity to antigens
36. Sensitivity to allergens
37. Sensitivity to irritants
38. Sensitivity to toxins
39. Sensitivity to drugs
40. Sensitivity to food
41. Sensitivity to alcohol
42. Sensitivity to tobacco
43. Sensitivity to caffeine
44. Sensitivity to nicotine
45. Sensitivity to marijuana
46. Sensitivity to cocaine
47. Sensitivity to heroin
48. Sensitivity to amphetamine
49. Sensitivity to methamphetamine
50. Sensitivity to ecstasy
51. Sensitivity to LSD
52. Sensitivity to PCP
53. Sensitivity to ketamine
54. Sensitivity to nitrous oxide
55. Sensitivity to laughing gas
56. Sensitivity to nitric oxide
57. Sensitivity to carbon monoxide
58. Sensitivity to cyanide
59. Sensitivity to arsenic
60. Sensitivity to lead
61. Sensitivity to mercury
62. Sensitivity to cadmium
63. Sensitivity to chromium
64. Sensitivity to cobalt
65. Sensitivity to copper
66. Sensitivity to iron
67. Sensitivity to nickel
68. Sensitivity to silver
69. Sensitivity to tin
70. Sensitivity to zinc
71. Sensitivity to aluminum
72. Sensitivity to silicon
73. Sensitivity to boron
74. Sensitivity to phosphorus
75. Sensitivity to sulfur
76. Sensitivity to selenium
77. Sensitivity to tellurium
78. Sensitivity to iodine
79. Sensitivity to bromine
80. Sensitivity to chlorine
81. Sensitivity to fluorine
82. Sensitivity to oxygen
83. Sensitivity to nitrogen
84. Sensitivity to hydrogen
85. Sensitivity to helium
86. Sensitivity to neon
87. Sensitivity to argon
88. Sensitivity to krypton
89. Sensitivity to xenon
90. Sensitivity to radon

28. **Findings in the feet:-**
Skin of the sole of the feet may also present with similar changes as seen in the hands, constitutes washer-woman's feet. **Note** The washerwomen's hand and feet changes are seen invariably in dead bodies recovered from water but may not be considered as a sign of ante-mortem drowning as it can be seen in dead bodies removed from water but not died of drowning.

29. **Ante-mortem drowning**
Ante-mortem drowning is a condition in which a person dies while in the water, but the body is not found in the water. This is a rare condition and is often confused with post-mortem drowning.

30. **Post-mortem drowning**
Post-mortem drowning is a condition in which a person dies while in the water, but the body is found in the water. This is a common condition and is often confused with ante-mortem drowning.

31. **Ante-mortem drowning: clinical features**
The clinical features of ante-mortem drowning include:
1. Swelling of the face
2. Redness of the face
3. Whitening of the face
4. Wrinkling of the face
5. Softening of the face
6. Loss of elasticity of the face
7. Formation of blisters
8. Itching
9. Pain
10. Discomfort
11. Redness
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13. Sensitivity to cold and heat
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79. Sensitivity to iodine
80. Sensitivity to bromine
81. Sensitivity to chlorine
82. Sensitivity to fluorine
83. Sensitivity to oxygen
84. Sensitivity to nitrogen
85. Sensitivity to hydrogen
86. Sensitivity to helium
87. Sensitivity to neon
88. Sensitivity to argon
89. Sensitivity to krypton
90. Sensitivity to xenon
91. Sensitivity to radon

31. **Post-mortem drowning: clinical features**
The clinical features of post-mortem drowning include:
1. Swelling of the face
2. Redness of the face
3. Whitening of the face
4. Wrinkling of the face
5. Softening of the face
6. Loss of elasticity of the face
7. Formation of blisters
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Internal:-

All findings are in favor of asphyxia. Changes in the important viscera like lungs, middle ear and blood and also relevant findings in other viscera in favor of ante-mortem drowning are as follows;

Lung finding:-

Vary in typical and atypical drowning cases.

Typical drowning cases Called *emphysema aquosum* and are seen only in wet drowning cases.

gross findings:-

Lungs will be pale and grayish, voluminous, edematous, and bulges out like balloon on cutting open the sternum. They will be heavy, boggy and doughy with a surface, which showed *rib impressions* and *pits on pressure*.

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- When a victim submerges consciously, violent respiratory efforts to breath results in rupture of the alveolar walls, particularly underlining the pleura near the lower margins. The ruptured large alveolar spaces contain watery thin, hemolysed blood and some amount of air and presents in the form of bullous lesions called emphysematous bullae and Paultaups hemorrhages. Apart from this Tardieu's spots due to asphyxia are also noticed.
- Cut section Streaming out of fine froth, blood with sand, mud and slit particles in the trachea, bronchi and bronchioles are the usual observation in cut section of the lung, in favor of death due to drowning.

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Findings in atypical drowning case:-

These findings are called as edema aquosum, which will be never the same as in typical drowning cases. Lung may show little water in the respiratory passages flown in passively, but there will not be pulmonary edema/other findings as described under emphysema aquosum.

Middle ear findings:-

In a case of ante-mortem drowning there will be water in the middle ear. The mechanism entry of water is unique. Normally no water can get into the middle ear while in drowning due to the violent attempts made by the victim to breathe in air water also gets aspirated with air into the naso/oropharynx, which forces little water into the middle ear also.

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- **Medico-legal importance:-**
Demonstration of air in the middle ear at autopsy is suggestive of antemortem drowning.
- **Blood changes in heart:-**
These are usually biochemical. In all cases of antemortem drowning blood from left side of heart showed following changes;
 - a) *In salt water* Increased chloride ions concentration.
 - b) *In fresh water* Decreased chloride ions concentration — increase potassium ions concentration.

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 - b) *In fresh water* Decreased chloride ions concentration — increase potassium ions concentration.

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Mechanism of heart blood changes:-

Blood from pulmonary circulation drains directly into the left side of heart any changes the blood has been submitted to in the lungs will still be maintained in the blood within the left sided chambers of heart. This mechanism constitutes basis for the biochemical test, Getler's test,

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Getler's test

principle:-

It is a biochemical test and developed based on blood changes in the heart.

Procedure This test is done during autopsy and includes following steps.

- First dry the surface of the heart
- Puncture it with a clean knife on the either sides
- From each chamber now aspirate 20 ml of blood by separate pipettes
- Now analyze the .blood for chloride ions.

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Inferences

Normal blood chloride concentration is 14 mEq/L. Normally no difference in values is seen on either sided blood samples. If the left sided sample chloride concentration is very high (5-44 times the normal level) it is suggestive of *sea water* drowning. Conversely if the levels are low, it confirms *fresh water* drowning

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Findings in other viscera

Stomach:-

May contain the water swallowed along with the various contents in it, such as mud, algae (diatoms), plankots, etc. detected microscopically. Brain, liver, spleen, bone marrow may also show the presence of algae (diatoms), plankots, etc. A specific test *Diatom test* is specially designed for the purpose.

Medico-legal importance.

Their presence con-firms antemortem drowning.

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Findings in other viscera

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May contain the water swallowed along with the various contents in it, such as mud, algae (diatoms), plankots, etc. detected microscopically. Brain, liver, spleen, bone marrow may also show the presence of algae (diatoms), plankots, etc. A specific test *Diatom test* is specially designed for the purpose.

Medico-legal importance.

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Diatom test

- *Principle* Diatoms are unicellular algae live in water. They vary in size and shape and have got a hardcalcified cell wall which resists acid digestion. They are seen in both sea and fresh water. They enter systemic circulation via lungs and reach various organs and remain there. Thus their presence in these viscera is suggestive of antemortem drowning.
- *Procedure* Includes several steps and are enumerated in the schematic representation .
- *Inference* If diatoms are present, drowning is confirmed as antemortem.

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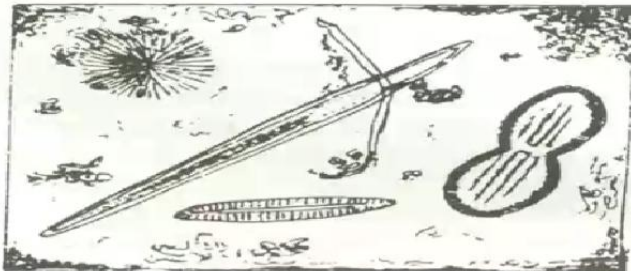
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Diatoms

Take 2-5 gm of tissue suspected of diatoms
or
40 gm of currettings of bone marrow
+
Add concentrated nitric acid, which digests all
other tissues, except diatoms
↓
Boil for 10 to 15 minutes
↓
Collect only the supernatant fatty,
yellowish colored fluid
↓
Centrifuge
↓
Examine the deposits microscopically for diatoms
when the preparation is wet under cover glass

Procedure of diatom test

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Signs of antemortem drowning: Scene of crime—case of death due to drowning. Dead body removed from water (with froth around nostrils, cadaveric spasm of hand, washerwoman's hand and foot changes seen)

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Signs of antemortem drowning:
Froth around nostrils

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Signs of antemortem drowning:
Cadaveric spasm

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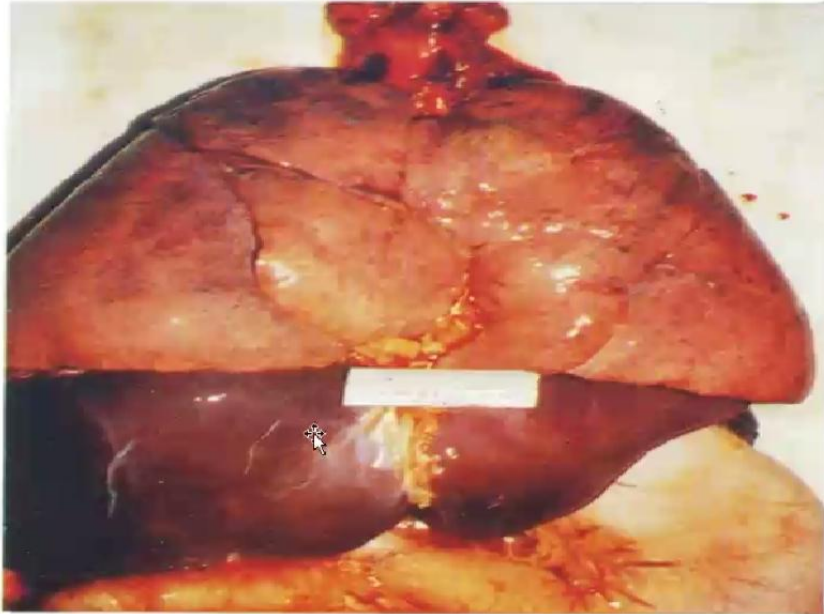
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Signs of antemortem drowning:
voluminous, edematous lungs as seen on en masse
removal of viscera in same case 2

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(United States)

