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A Critical Study of Violent Asphyxial Deaths with Ancient Perspective

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ABSTRACT

Asphyxia is most commonly appearing as a major cause of unnatural deaths. Scattered references can be reviewed in ancient literature regarding asphyxial death. Description of various signs of asphyxial death is given briefly in ancient texts and it is worthwhile to study them with the help of modern science. In ancient literature these asphyxial deaths are described briefly as *Kanthapeedan*, *Dhoomopahat* and *Udakahat*. In modern literature asphyxial deaths are described as hanging, strangulation, suffocation and drowning which occur in homicidal or suicidal purpose or accidental. Viewing these references, asphyxial deaths are studied comprehensively with the object of highlighting it with the help of modern knowledge. Thus present article deals with exploration of ancient references of asphyxial death with the help of contemporary science.

Key words: Violent asphyxial death, Hanging, Strangulation, Suffocation, Drowning.

INTRODUCTION

In this era, number of unnatural and suspicious deaths is increasing day by day which generate intense need of *Vyavahara Ayurveda* and so *Agadatantra* has been combined with *Vyavahara Ayurveda*. In modern science it is known as Medical Jurisprudence, Forensic Medicine or Legal Medicine.^[1] It is that branch of medicine which deals with the application of the principles and knowledge of medicine to the purpose of law, both civil and criminal.^[2]

In modern science this branch is well developed, but in Ayurveda it remained in decline. From the

references available in ancient texts, it is obvious that *Vyavahara Ayurveda* was existing since ancient age. Highlighting these references with the help of modern knowledge may be fruitful in the evolution of *Vyavahara Ayurveda*. Taking this into consideration, this topic has been selected for study.

Asphyxial deaths are most common among unnatural deaths. Commonly asphyxial deaths are accidental or violent. Violent Asphyxial Deaths occur in homicidal or suicidal purpose through hanging, strangulation, suffocation and drowning. Scattered references of asphyxial death along with their post-mortem appearances can be noted in ancient literature. These signs are described very concisely in ancient texts and it is worthwhile to study them with the help of modern science. In ancient literature these above forms of death are described briefly as *Kanthapeedana*, *Dhoomopahata* and *Udakahata*.

So the aim of this paper is to explore ancient references of asphyxial death with the help of modern knowledge. This may be beneficial for the development of *Vyavahara Ayurveda*.

MATERIAL AND METHODS

Literature has been reviewed from both Ayurveda and contemporary sciences.

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Literature Review

Asphyxial death occurs due to failure of respiratory functions. It may occur in pathological condition of respiratory system such as pneumonia, poisoning etc. Commonly asphyxial deaths are violent. In violent asphyxial deaths, the process of respiration i.e. the exchange of air between the atmosphere and the lungs beds is prevented by some violent mechanical means.^[3]

Ancient view of Asphyxial Death

Asphyxial deaths are described briefly as *Kanthapeedana*, *Dhoomopahata* and *Udakahata* in ancient literature.

Kanthapeedana

Acharya Sushruta mentions symptoms and treatment of *Kanthapeedana* in *Shalyapanayaneeya Adhyaya*.

When throat is held tight by arms, rope or creepers (*Bahu*, *Rajju* or *Lata*), *Vata* gets aggravated along with *Sleshma* (*Kapha*) and blocks the passage of throat and brings about flow of saliva (*Lalastravam*), froth in the mouth (*Fenagamanam*) and loss of consciousness (*Sangyanasham*). Such a person should be anointed with oil with sudation, administered strong purgative therapy to the head and given soup of meat mitigating *Vata*.^[4]

The post-mortem appearances and medico legal aspect of *Kanthapeedan* can be viewed in *Koutiliya Arthashastra* in chapter *Ashu Mrutak Pariksha*.

1. Any person whose corpse is stained with faeces and urine (*Nishkirnamutrapurisham*), whose organs are inflated with wind (*Vatapurnakoshthatwakam*) with legs swollen (*Shunapadpaani*), eyes open (*Unmilita Aksham*) and neck marked with ligatures (*Savyanjankantham*) may be regarded as having been killed by suppression of breathing.^[5]
2. Any person with contracted arms and thighs (*Sankuchitbahusakthi*) may be regarded as having been killed by hanging.^[6]
3. Any dead person with swollen hands, legs and belly (*Shunapanipadodaram*), sunken eyes (*Apagat*

Aksham) and inflated navel (*Udvritta Nabhi*) may be regarded as having been killed by hanging.^[7]

4. One may hang himself or cut his throat under the fear of punishment.^[8]
5. If one hangs himself, then we must inquire thoroughly about the victim.^[9]
6. If a man or a woman under the infatuation of love, anger or other sinful passions commits or causes to commit suicide by means of ropes, arms or poison, he or she shall be dragged by means of a rope along the public road by the hands of *Chandala*.^[10]

Thus post-mortem appearances may be tabulated as follows,

Sr.No.	Post-mortem appearances of <i>Kanthapeedan</i>
1	<i>Lalastravam</i> (dribbling of saliva)
2	<i>Fenagamanam</i> (froth from nose and mouth)
3	<i>Nishkirnamutrapurisham</i> (purging of faeces, urine)
4	<i>Vatapurnakoshthatwakam</i> (inflated organs)
5	<i>Shunapadpaani</i> (swollen hands and legs)
6	<i>Unmilita Aksham</i> (partially opened state of eyes)
7	<i>Savyanjankantham</i> (ligature mark)
8	<i>Sankuchitbahusakthi</i> (contracted arms and thighs)
9	<i>Shunapanipadodaram</i> (swollen hands, legs and belly)
10	<i>Apagat Aksham</i> (sunken eyes)
11	<i>Udvritta Nabhi</i> (inflated navel)

Dhoomopahata

Acharya Sushruta describes symptoms and treatment of *Dhoomopahata* in *Agnikarmavidhi Adhyaya*. The

person has increased respiration, sneezing, flatulence, cough, burning sensation and redness in the eyes, inhales smoke, doesn't understand the smell of other substances, so also all the tastes, hearing also become destroyed, thirst, burning sensation and fever troubles the person, he becomes weak and faints. Such a person is called as *Dhoomopahata* i.e. troubled by smoke (suffocation). The treatment of such person is also mentioned.^[11]

Udakahata

It is also termed as *Jalanimmajjana*. The exact word *Jalanimmajjana* is not used by the texts. Description is related with removal of different types of *Pranashta Shalya*. Symptoms or signs are not described but different types of methods for removal of water have been advocated.

When any person has his abdomen filled with water (due to forcible immersion, drowning accidentally or intentionally), he should be held with his head down and his abdomen should be pressed, his body shaken, made to vomit of, buried in a heap of ash up to his face.^[12-14]

The post-mortem signs of *Jalanimmajjana* (drowning) are mentioned in *Koutiliya Arthashastra*.

Any dead person with protruded rectum and eyes (*Nistabdhagudaksham*), tongue bitten between the teeth (*Sandashtajivham*) and belly swollen (*Adhmatodaram*) may be considered as having been killed by drowning.^[15]

Complications of *Jalanimmajjana* are described in *Ashtanga Sangraha*.

If the *Jalanimmajjita* survives, he may get complications such as *Shwasa*, *Kaasa*, *Adhmaana*, *Peenasa* and *Jwara* and may die of these complications.^[13]

Thus post-mortem appearances may be tabulated as follows,

Sr. No.	Post-mortem appearances of <i>Udakahata</i>
1	<i>Nistabdhagudaksham</i> (protruded rectum and eyes)
2	<i>Sandashtajivham</i> (tongue bitten between the

	teeth)
3	<i>Adhmatodaram</i> (belly swollen)

Modern view of Asphyxial Death^[16-22]

In violent asphyxial deaths, the process of respiration i.e. exchange of air between the atmosphere and the lungs bed is prevented by some violent mechanical means. Violent asphyxia can be caused by constriction of neck, closure of nose and mouth, occlusion of lumen of the air passages by some materials, restricting movement of respiratory muscles.

The types of violent asphyxial deaths are Hanging, Strangulation, Suffocation and Drowning

Hanging : It is defined as the mode of violent asphyxial death in which entry of air to the lungs is prevented by constriction of neck because of suspension of body by a ligature tied round the neck, so that body's own weight act as a constricting force. It is classified as Complete hanging and Partial hanging

- Complete Hanging - The body is fully suspended and no part of the body touches the ground.
- Partial Hanging - Lower part of the body is in touch with ground. Sometimes only the toes, sometimes the whole foot or feet, sometimes the knees, sometimes the buttocks may be in touch with the ground.

Post-mortem appearances of hanging

External findings

Presence of ligature mark around the neck, Head is tilted to the opposite side of knot, Dribbling of saliva from the angle of mouth opposite to the knot, Stains of saliva on the chest, clothes etc., Incontinence of stools, urine and semen, Tongue is inside the mouth and rarely protruded out, Face is usually pale and placid, may be congested, post mortem lividity is seen on distal half of upper and lower limbs, Petechial haemorrhages under conjunctiva, over eyelids, Eyes may be partly opened or closed.

Internal findings

Dry, white and glistening pad of fat is present under the ligature mark, Laceration of blood vessels, muscles and lymph nodes, Congestion and haemorrhage in

trachea, larynx, epiglottis, salivary glands, Respiratory passage contains bloody froth, Petechial haemorrhage on lungs, heart, brain, abdominal viscera, Abdominal viscera congested.

Medico legal aspect

It is mostly suicidal, sometimes accidental and very rarely homicidal.

Strangulation

It is the mode of violent asphyxial death in which entry of air to the lungs is prevented by compression of neck, by ligature or some other method, but without suspension of the body so that the force constricting the neck is external.

Types

1. Ligature strangulation - compression of neck with ligature.
2. Throttling (manual strangulation) - compression of neck by one or both hands
3. Bansdola - compression of neck with bamboo or wooden sticks.
4. Garrotting - compression of neck by a rope thrown from behind
5. Mugging - compression of neck by elbow or in the bend elbow
6. Strangulation by knee or foot - compression of neck by knee or foot.

Post-mortem appearances

External findings

Ligature mark - It will vary depending upon the type of strangulation

- Strangulation by ligature - It is situated below thyroid cartilage, horizontal, complete, usually no knot is tied. Very often it is abraded, contused and sometimes parchmentised.
- Throttling - Injuries due to fingertips, nails, hand can be seen in throttling
- Bansadola - Horizontal injury mark of sticks with gross contusions and abrasions on neck

- Garrotting - A thin transverse circular ligature mark present around the neck
- Mugging / Strangulation with knee or foot - Multiple large contusions on anterior part of neck may be seen.

Deep cyanosis on face, lips, ear, tongue, nose and nails, face is highly congested, Frank bleeding from nose, ears, mouth, Usually no dribbling of saliva, Eyes may be partly opened or closed, Petechial haemorrhages on forehead, eyelids and under conjunctiva, Incontinence of urine, stools, semen.

Internal findings

Laceration and excessive haemorrhage in trachea, thyroid, lymph nodes, Petechial haemorrhages over lungs, brain, and heart, Cervical vertebral fracture is uncommon, Fracture of hyoid bone is common in throttling, Respiratory passage contains bloody froth and Viscera congested.

Medico legal aspect

It is mostly homicidal, sometimes accidental and very rarely suicidal.

Suffocation

It is defined as the mode of violent asphyxial death in which entry of air to the lungs is prevented by means other than compression of neck and drowning.

Types

1. Smothering - Suffocation by closure of nose and mouth.
2. Gagging - Suffocation by blocking of oropharyngeal area.
3. Choking - Suffocation by obstruction of respiratory passage by some foreign body.
4. Traumatic asphyxia - It refers to crushing injury to chest wall. Forceful compression of chest prevents respiratory movements causing lack of oxygen uptake.
5. Inhalation of irrespirable gases - Suffocation may result from, hypoxia at high attitude, Inhalation of irrespirable gases such as CO₂, CO and H₂S. Being

in confined space like bore well, improper oxygenation during anaesthesia.

6. Bansadola - Compression of chest with one or two sticks.
7. Burking - Combination of smothering, palmer strangulation and crush asphyxia.
8. Burying alive - Suffocation occurs from combination of smothering, gagging, choking and crush asphyxia.

Post mortem appearances

External findings

- Smothering - Area of compression of face is pale, Tongue may be bitten, Injuries due to nails, fingers on nose, mouth, cheek, chin etc. are seen, Bleeding from nose, mouth, nasal septum fracture.
- Gagging - Gag (cloth piece, cotton) may be seen in oral cavity, Bleeding may be present.
- Chocking / Inhalation of irrespirable gases - No external findings.
- Burying alive - Sand or mud is seen on nose, mouth, hairs, cloths, natural orifices etc.
- Traumatic asphyxia, Bansdola and Burking - Deep cyanosis of face, depending upon nature of object abrasion, contusion, laceration injury can be seen, Laceration of muscles of chest and back, severe haemorrhage.

Internal findings

- Bloody froth in respiratory passage, Lungs congested Tardieu spots on lungs, brain, kidneys.
- Cranial and abdominal viscera congested. In case of choking, item causing obstruction of respiratory passage is discovered. In case of suffocation due to inhalation of irrespirable gases, blood is cherry red in colour in CO poisoning, bluish green lividity in Hydrogen Sulphide poisoning. In traumatic asphyxia, fracture of ribs, sternum, vertebrae, scapula, clavicle etc. may be present, Penetrating or perforating injury to the lungs may be present.

- In burying alive, sand or mud is seen in respiratory tract, stomach etc.

Medico legal aspect

- Smothering, Gagging - May be accidental, homicidal or rarely suicidal.
- Choking, Inhalation of irrespirable gases - Mostly accidental in nature
- Traumatic asphyxia - Mainly accidental but can be homicidal as in burking and bansdola.

Drowning

It is defined as the mode of violent asphyxial death in which entry of air to the lungs is prevented by presence of water or any other fluid in lungs and respiratory passage, water having entered through nose and mouth i.e. death due to submersion or immersion.

Types

1. Typical Drowning - It refers to as wet drowning, because due to submersion, there is entry of water into respiratory passage and lungs, and therefore findings of fluid and froth are present during P.M. examination. It is classified as fresh water drowning and salt water drowning.
2. Atypical drowning - It refers to the drowning in which even after submersion of body in water, little or no water enters the respiratory passage and lungs. Hence typical findings in the form of fluid and froth are not found. It is classified as follows:
 - a. Dry drowning - Contact with water, especially cold water, triggers intense laryngeal spasm, so no water enters the respiratory tract and death may result from asphyxia.
 - b. Hydrocution (Immersion syndrome) - Sudden impact with very cold water causes vagal inhibition and death
 - c. Submersion of unconscious - If person is unconscious since before submersion in water, little or no water enters respiratory passages. Unconsciousness may be due to head injury, during fall, drunkenness, Epilepsy etc.

- d. Secondary drowning syndrome – It refers to death at a later stage, after removal from water. This is mainly due to infection from contaminants in inhaled water causing lung complication.

Post-mortem Appearances

External Findings

- White, fine, leathery, abundant, tenacious froth from nose and mouth, and increase in amount with compression of chest. This is the diagnostic sign of drowning.
- Cadaveric grip - Aquatic plants sand, mud etc. may be hold in tightly clenched hand.
- Cutis anserina - caused due to contraction of erector pilae muscles of skin.
- Washer woman's hands and feet - sodden and bleached appearance of palmer aspect of hands and soles of foot.
- Post-mortem lividity may be confined to head, neck and front of chest and pink coloured due to cooling of oxygenated blood in stagnant water.

Internal Finding

- Respiratory passage contains sand, water, froth, algae etc.
- Overdistention of lungs classically described as, emphysema aquosum.
- During P.M. examination, on cutting the ribs and sternum, lungs bulge out of the chest cavity - known as, ballooning of lungs. They are heavy, oedematous, and doughy to feel and pits on pressure and often indented by ribs. On squeezing the cut section frothy fluid oozes out.
- Paltauf's haemorrhage may be seen on lungs, due to rupture of alveolar walls.
- Presence of water in the middle ear, oesophagus, stomach and intestine.

Medico legal Aspect

It is mostly accidental, sometimes suicidal and rarely homicidal.

DISCUSSION

While going through ancient literature, violent asphyxial deaths can be traced under *Kanthapedana*, *Dhoomopahata* and *Udakahata*.

In Ayurveda both hanging and strangulation are described under *Kanthapedana* as in both of them throat is tightly held by ligature. Throttling is found to be mentioned as *Kanthapedana* by *Bahu*.^[4]

The term *Kanthapedana* suggests *Peedan* of *Kantha* (throat trouble) which may come about by any means, external or internal. Thus it not only includes hanging, strangulation but also other asphyxial deaths of traumatic, toxic or pathological origin.

From above it is evident that *Kanthapedana* was caused by *Bahu*, *Rajju* or *Lata*. In modern theory *Kanthapedana* by *Bahu* is throttling and by *Rajju* or *Lata* is strangulation by ligature. When a man hangs himself or other person by means of *Rajju* or *Lata*, it is termed as hanging.

Also the other forms i.e. *Dhoomopahata* and *Udakahata* could be considered under *Kanthapedana* as *Peedana* of *Kantha* is brought about internally by smoke and water respectively.

Thus it can be said that this term *Kanthapedana* represent all the types of asphyxial deaths.

Post-mortem signs of hanging and strangulation are widely described in modern, but in Ayurveda they are very concise. Among the post mortem findings of hanging ligature mark and dribbling of saliva have some special importance and are considered as diagnostic signs of hanging which are already explained in Ayurveda as *Lalatravam* and *Savyanjankantham* respectively.^[4-5] *Fenagamanam* was found to be specific for strangulation.^[4] Ante mortem nature of dribbling of saliva can be noticed in Sushrut Samhita.^[4]

Nishkirnamutrapurisham i.e. Incontinence of urine, stools occurs due to relaxation of sphincters.^[23]

Unmilita Aksha i.e. partially opened eyes can be observed in hanging and strangulation.

The other signs such as *Vatapurna Koshtha Twakkam*, *Shunapaneepadodaram*, *Apagat Aksham*, *Sankuchitbahusakthi*, *Udvritta Nabhi* are merely a sign of death.

Soon after death as intraocular tension falls, eyeball becomes flaccid and sinks into the orbit. Thus *Apagat Aksha* i.e. sunken eyes are just a change in the eyes occurring soon after death.

The putrefactive gases forming below the skin, in hollow viscera and eventually in solid viscera may give rise *Vatapurna Koshtha Twakkam*. Also *Udvritta Nabhi* may appear due to the pressure effect of putrefactive gases over the umbilicus. Thus these are delayed signs of death and not specific of hanging. In ancient time, our Acharyas might have observed suspended body after many hours of death in the decomposition state and documented the findings accordingly.

Shuna Panee Padodaram means oedema of hands, legs and abdomen. This sign may be cumulative effect of asphyxia and suspension. Due to prolong suspension, the blood gravitates toward lower part of the body. Increased capillary permeability due to asphyxia leads to transudation of fluid in the tissues resulting oedema.^[24] Thus due to this reason, oedema over both hands and legs may develop. The abdominal oedema may appear due to the congested and oedematous condition of the internal abdominal organs.

Sankuchita Bahu Sakthi means flexed condition of both arms and thighs. It may be found in the cases of partial hanging. Partially suspended bodies if recovered from the hanging position after appearance of rigor mortis, this sign may appear. Thus this sign of Ayurveda focuses on the partial hanging.

The textual references also provide evidences for hanging as a common form of suicide, obviously it was treated as a sinful act and the victim was subjected to punishment.^[8-10] Modern theory also suggests suicidal nature of hanging.

Sushrut describes suffocation due to inhalation of irrespirable gases under *Dhoomopahata*. But the description appeared in relation to its symptoms and treatment.^[11] The post-mortem signs are not

mentioned anywhere. *Dhoomopahata* means suffocation by smoke which consists of irrespirable gases such as CO₂, CO, H₂S etc. Inhalation of these gases causes asphyxia and death. Thus in ancient theory this term is restricted to suffocation due to inhalation of irrespirable gases, but in modern theory, suffocation is a broad term which describes traumatic asphyxia, smothering, choking, inhalation of irrespirable gases, overlying, burking and gagging.

Udakahata implies for drowning. A detailed description of drowning regarding its types, post-mortem appearances, and medico legal aspect is observed in modern theory but in Ayurveda the description is found to be related with treatment of a drowned person. Several methods for removal of water from the abdomen are mentioned.^[12-14]

Besides this, references of secondary drowning syndrome or near drowning are found in *Ashtanga Sangraha* in relation to the complications of drowning.^[13]

Nistabdhagudaksham, *Sandashtajivham*, *Udaradhman* are post-mortem signs of drowning mentioned by ancient science.^[15]

Nistabdhagudaksham i.e. protrusion of rectum and eyes may be due to the pressure effects of putrefactive gases. *Sandashtajivham* i.e. tongue bitten between teeth's may be due to protrusion of tongue by the pressure effects of putrefactive gases. *Udaradhman* i.e. collection of gases in the abdomen may also be due to putrefaction.

The post-mortem findings of drowning stated by Ayurveda are findings of decomposition.

In modern science it can be seen that these signs are present in the decomposed bodies recovered from water.

CONCLUSION

After reviewing these asphyxial deaths it becomes very clear that the post-mortem signs documented by Ayurveda are only external signs. No internal signs were described that means no internal examination was conducted in that ages, whatever seen externally

was mentioned accordingly. Most of the findings mentioned by ancient science are early and late signs of death. Very few signs are specific of asphyxial death. The term *Kanthapeedana* can be applied to all asphyxial deaths being specific to hanging and strangulation. The ancient references of *Kanthapeedana*, *Dhoomopahata* and *Udakhata* could be considered as Hanging - Strangulation, Suffocation and Drowning respectively which are collectively described under violent asphyxial death in modern literature. This is a literature study only. Further observational study can be carried out in retrospective or prospective manner.

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