

# Medico Legal Autopsies of Mechanical Asphyxial Deaths Carried Out in Allama Iqbal Medical College Lahore during the Year 2013: A Retrospective Study

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## ABSTRACT

**Background:** This study was on all mechanical asphyxias deaths which were received for autopsies in Allama Iqbal Medical College Lahore during the year 2013. The objective was to be carried out a retrospective analysis of 32 autopsies on mechanical asphyxias deaths. The relationship of age and gender was focused.

**Methods:** Total medico legal autopsies which were carried out at Forensic Medicine Department at AIMC Lahore were 221 during the year of 2013. Out of these, 32 were the cases of mechanical asphyxias deaths which were selected for this study. The documents scrutinized for this purpose were autopsies reports, police papers and hospital history charts.

**Results:** Out of 221 autopsies cases, 32 cases were of mechanical asphyxias deaths. 22 deaths were strangulated (Homicidal), hanging one, drowning nine and traumatic were found zero.

**Conclusion:** Out of 221 autopsies cases, 32 cases were of mechanical asphyxias deaths. Asphyxias deaths were mostly homicidal and male & female were equally suffered.

**Keywords:** Allama Iqbal Medical College (AIMC), Asphyxia, Homicidal

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## INTRODUCTION

Choking caused by a mechanism that prevents lung ventilation. This mechanism can be internal (by foreign bodies or by drowning) or external (hanging, strangulation, crushing, facial flushing, burial).

**General:** Asphyxia is the lack of oxygen supply to tissues/organs

**Types of asphyxia** include suffocation, strangulation / hanging, positional / mechanical / traumatic

**Suffocation:** Failure of oxygen to reach the blood. Smothering: obstruction of nose and mouth

**Accidental:** infant wedged between mattress and wall

**Suicidal:** placing plastic bag over one's head and tightening around neck

**Homicidal:** duct tape across nose and mouth, covering face with pillow, closing off nose and mouth of young child with hand

**Overlay:** infant death due to parent onto child in bed; involves smothering and mechanical asphyxia

No specific autopsy findings; may see signs of struggle (contusions/abrasions on face and mouth) in adult victims

Choking: blockage of internal airways

**Accidental:** large food bolus in airway, usually intoxicated adults, elderly with neurodegenerative disorders, young children

**Homicidal:** gag placed in oropharynx. Must find food bolus or other item in airway, or have report of its prior removal, to confirm choking. Environmental: inadequate oxygen in atmosphere; also called entrapment. Due to oxygen displacement by other gases (in silo), lack of oxygen in small enclosed space (child trapped in refrigerator). No specific autopsy findings

**Strangulation / hanging:** External pressure on neck resulting in compression of blood vessels and occasionally airway

**Strangulation:** neck compression due to something other than the victim's body weight, such as manual compression or ligature tightened by assailant; usually homicidal

**Ligature strangulation:** the ligature mark on the neck is usually horizontal. If homicidal (most common), may be signs of struggle (abrasions / lacerations and fingernail marks on neck) Suicidal strangulations can occur if individual ties cord or other ligature around neck with some sort of locking device. Accidental strangulations can occur if scarf or

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necktie becomes trapped in doorway or other mechanical device

**Hanging:** Neck compression due to ligature around neck, with at least a portion of body weight being used to tighten ligature. Usually suicidal; can be accidental (child trapped in cord) or homicidal. Ligature mark on neck is oblique, with highest point usually at back of head, where ligature knot is tied. This is in contrast to strangulation (usually homicide), where ligature mark is usually horizontal around neck. Ligature mark may be absent if soft fabric (i.e., bed sheet) used as ligature. May see pattern markings in ligature mark that correspond to patterns on ligature (i.e., weaved fabric, metal chain). 4 pounds of pressure required to occlude jugular veins (preventing venous drainage of head) and 5-11 pounds to occlude carotid arteries. Loss of consciousness occurs in 10-15 seconds; death within 3-5 minutes. Fractures of hyoid bone, tracheal cartilage, cervical vertebrae are rare; hemorrhage in neck muscles also rare. Hyoid fractures are more common in older victims, because hyoid bone is cartilaginous and incompletely ossified in children and young adults. Injuries are more common if struggle between decedent and assailant. In hanging, where body is completely suspended, autopsy may show congestion and petechiae of lower legs due to blood pooling. May have no specific findings at autopsy

**Positional / mechanical / traumatic asphyxia:** Position of body or external pressure on chest prevent respiration

**Positional asphyxia:** body is positioned in a way that restricts airflow

Twisting or compression of neck resulting in occlusion of oropharynx or trachea seen in intoxicated individuals or elderly persons who become trapped

**Mechanical/traumatic asphyxia:** External compression of chest, preventing normal respiration. Example: vehicle collapsing on individual working under car. May have petechiae, face and upper chest congestion at autopsy

**Chemical asphyxia:** gases that prevent oxygen utilization at cellular level. Carbon monoxide, hydrogen sulfide, cyanide

**Sexual Asphyxia or autoerotic asphyxia:**

**Asphyxia or asphyxiation** is a condition of severely deficient supply of oxygen to the body that arises from abnormal breathing. An example of asphyxia is choking. Asphyxia causes generalized hypoxia, which affects primarily the tissues and organs. There are many circumstances that can induce asphyxia, all of which are characterized by an inability of an individual to acquire sufficient oxygen through

breathing for an extended period of time. Asphyxia can cause coma or death.

In 2013 about 1.6 million cases of unintentional suffocation occurred<sup>1</sup>. The word asphyxia is from Ancient Greek α-"without" and sphyxis, "squeeze" (throb of heart)<sup>2</sup>

**Causes:** Situations that can cause asphyxia include but are not limited to: the constriction or obstruction of airways, such as from asthma, laryngospasm, or simple blockage from the presence of foreign materials; from being in environments where oxygen is not readily accessible: such as underwater, in a low oxygen atmosphere, or in a vacuum; environments where sufficiently oxygenated air is present, but cannot be adequately breathed because of air contamination such as excessive smoke.

Other causes of oxygen deficiency include but are not limited to:

**Acute respiratory distress syndrome:** Carbon monoxide inhalation, such as that from a car exhaust and the smoke's emission from a lighted cigarette: carbon monoxide has a higher affinity than oxygen to the hemoglobin in the blood's red blood corpuscles, bonding with it tenaciously, and, in the process, displacing oxygen and preventing the blood from transporting oxygen around the body

Contact with certain chemicals, including pulmonary agents (such as phosgene) and blood agents (such as hydrogen cyanide)

- Drowning
- Drug overdose
- Exposure to extreme low pressure or vacuum to the pattern
- Hanging, specifically suspension or short drop hanging.
- Self-induced hypocapnia by hyperventilation, as in shallow water or deep water blackout and the choking game
- Ondine's curse, central alveolar hypoventilation syndrome, or primary alveolar hypoventilation, a disorder of the autonomic nervous system in which a patient must consciously breathe; although it is often said that persons with this disease will die if they fall asleep, this is not usually the case
- Respiratory diseases
- Sleep apnea
- A seizure which stops breathing activity
- Strangling
- Breaking the wind pipe.

**Smothering:** "Smother" redirects here. For other uses, see Smother (disambiguation). Smothering is the mechanical obstruction of the flow of air from the environment into the mouth and/or nostrils, for instance, by covering the mouth and nose with a

hand, pillow, or a plastic bag<sup>3</sup>. Smothering can be either partial or complete, where partial indicates that the person being smothered is able to inhale some air, although less than required. In a normal situation, smothering requires at least partial obstruction of both the nasal cavities and the mouth to lead to asphyxia. Smothering with the hands or chest is used in some combat sports to distract the opponent, and create openings for transitions, as the opponent is forced to react to the smothering.

In some cases, when performing certain routines, smothering is combined with simultaneous compressive asphyxia. One example is overlay, in which an adult accidentally rolls over onto an infant during co-sleeping, an accident that often goes unnoticed and is mistakenly thought to be sudden infant death syndrome<sup>3</sup>. Other accidents involving a similar mechanism are cave-ins or when an individual is buried in sand or grain. In homicidal cases, the term burking is often ascribed to a killing method that involves simultaneous smothering and compression of the torso<sup>4</sup>. The term "burking" comes from the method William Burke and William Hare used to kill their victims during the West Port murders. They killed the usually intoxicated victims by sitting on their chests and suffocating them by putting a hand over their nose and mouth, while using the other hand to push the victim's jaw up. The corpses had no visible injuries, and were supplied to medical schools for money<sup>5</sup>.

**Compressive asphyxia: Positional asphyxia**



The knee-on-belly position compresses the chest, making it difficult for the person on the bottom to breathe. Compressive asphyxia (also called chest compression) is mechanically limiting expansion of the lungs by compressing the torso, hence interfering with breathing. Compressive asphyxia occurs when the chest or abdomen is compressed posteriorly<sup>6</sup>. In accidents, the term traumatic asphyxia or crush asphyxia usually refers to compressive asphyxia resulting from being crushed or pinned under a large

weight or force. An example of traumatic asphyxia includes cases where an individual has been using a car-jack to repair a car from below, and is crushed under the weight of the vehicle<sup>4</sup>. Pythons, anacondas, and other constrictor snakes kill through compressive asphyxia. In cases of co-sleeping ("overlay"), the weight of an adult or large child may compress an infant's chest, preventing proper expansion of the chest. Risk factors include large or obese adults, parental fatigue or impairment (sedation by drugs or alcohol) of the co-sleeping adult and a small shared sleeping space.

In fatal crowd disasters, compressive asphyxia from being crushed against the crowd causes the large part of the deaths, rather than blunt trauma from trampling. This is what occurred at the Ibrox disaster in 1971, where 66 Rangers fans died; the 1979 The Who concert disaster where 11 died; the Luzhniki disaster in 1982, when 66 FC Spartak Moscow fans died; and at the Hillsborough disaster in 1989, when 96 Liverpool fans were crushed to death in an overcrowded terrace. In confined spaces, people push and lean against each other; evidence from bent steel railings in several fatal crowd accidents have shown horizontal forces over 4500 N (equivalent to a weight of approximately 450kg, or 1014lbs). In cases where people have stacked up on each other forming a human pile, estimations have been made of around 380kg (838lbs) of compressive weight in the lowest layer<sup>7</sup>.

"Positional" or "restraint" asphyxia is when a person is restrained and left alone prone, such as in a police vehicle, and is unable to reposition him or herself in order to breathe. The death can be in the vehicle, or following loss of consciousness to be followed by death while in a coma, having presented with anoxic brain damage. The asphyxia can be caused by facial compression, neck compression, or chest compression. This occurs mostly during restraint and handcuffing situations by law enforcement, including psychiatric incidents. The weight of the restraint(s) doing the compression may contribute to what is attributed to positional asphyxia. Therefore, passive deaths following custody restraint that are presumed to be the result of positional asphyxia may actually be examples of asphyxia occurring during the restraint process.

Chest compression is also featured in various grappling combat sports, where it is sometimes called wringing. Such techniques are used either to tire the opponent or as complementary or distractive moves in combination with pinning holds<sup>8</sup>, or sometimes even as submission holds. Examples of chest compression include the knee-on-stomach position; or techniques such as leg scissors (also referred to as body scissors and in budō referred to as do-jime<sup>9</sup>;

"trunk strangle" or "body triangle")<sup>10</sup> where a participant wraps his or her legs around the opponent's midsection and squeezes them together<sup>11</sup>. Pressing is a form of torture or execution that works through asphyxia e.g. Burking.

**Perinatal asphyxia:** Perinatal asphyxia is the medical condition resulting from deprivation of oxygen (hypoxia) to a newborn infant long enough to cause apparent harm. It results most commonly from a drop in maternal blood pressure or interference during delivery with blood flow to the infant's brain. This can occur as a result of inadequate circulation or perfusion, impaired respiratory effort, or inadequate ventilation<sup>12</sup>. There has long been a scientific debate over whether newborn infants with asphyxia should be resuscitated with 100% oxygen or normal air<sup>12</sup>. It has been demonstrated that high concentrations of oxygen lead to generation of oxygen free radicals, which have a role in reperfusion injury after asphyxia<sup>13</sup>. Research by Ola Didrik Saugstad and others led to new international guidelines on newborn resuscitation in 2010, recommending the use of normal air instead of 100% oxygen<sup>14,15</sup>.

## METHODOLOGY

Total medico legal autopsies which were carried out at Forensic Medicine Department at AIMC Lahore were 221 during the year of 2013. Out of these, 32 were the cases of mechanical asphyxias deaths which were selected for this study. The documents scrutinized for this purpose were autopsies reports, police papers and hospital history charts. All data was collected and analyzed by using SPSS 13.

## RESULTS AND DISCUSSION

Out of 221 autopsies cases, 32 cases were of mechanical asphyxias deaths. 23 deaths were strangulated (Homicidal), hanging three, drowning five, throttling one and traumatic were found zero (Table 1). Out of 23 deaths (Strangulated) 13 were female and 10 were male (Table 2).

Table 1

Types of Asphyxias Deaths	n
Strangulated	23(71%)
Drowning	5(15%)
Hanging	3(12%)
Traumatic	0
Throttling	1(2%)

Table 2:

Gender	Strangulated Asphyxia Death
Male	10(44%)
Female	13(56%)

## CONCLUSIONS & RECOMMENDATIONS

Two hundred and twenty one autopsies cases, 32 cases were of mechanical asphyxias deaths. Asphyxias deaths were mostly homicidal and male & female were almost equally suffered.

Following recommendations were suggested:

1. Need for massive improvement of the law & order situation of the country.
2. Impediment of Social Taboos.
3. Improve the social and economy of the population.

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