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### BRIEF REPORT

## Homicide by combination of methods of asphyxiation

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### KEYWORDS

Burking;  
Asphyxia;  
Strangulation;  
Chest compression;  
Homicide;  
Forensic pathology

### Abstract

**Introduction:** Homicide by combination of suffocation methods is observed mainly in elderly people or with some physical impediment capable of counteracting the aggression.

**Material and methods:** A retrospective observational study was carried out on 634 autopsies. Five met the characteristics of homicides by combination of asphyxiation methods.

**Results:** Two (2) men and 3 women, average age 69 years, with negative toxicological studies, victims of a single aggressor, presented periorificial skin lesions (mouth and nose), muscle hemorrhages in the thorax, rib fractures, blunt injuries to the head interpreted as like submission.

**Discussion:** In the combination of asphyxia methods, the findings that must be seen together. Head injuries to subdue the victim, skin lesions on the neck, face, inner face of the lips, rib fractures, and counter-pressure injuries to the back, buttocks, or elbows, contextualized together, can explain the dynamics of this homicidal modality.

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### PALABRAS CLAVE

Burking;  
Asfixia;  
Estrangulación;  
Compresión torácica;  
Homicidio;  
Patología Forense

### Homicidio por combinación de métodos de asfixia

#### Resumen

**Introducción:** El homicidio por combinación de métodos de asfixia, se observa mayoritariamente en personas de edad avanzada o con algún impedimento físico capaz de contrarrestar la agresión.

**Material y métodos:** Se realizó un estudio observacional retrospectivo sobre 634 autopsias. Cinco cumplían las características de homicidios por combinación de métodos de asfixia.

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**Resultados:** Dos hombres y tres mujeres, edad promedio de 69 años, con estudios toxicológico negativo, víctimas de un solo agresor, presentaron lesiones cutáneas periorificiales (bucales y nasales), hemorragias musculares en tórax, fracturas costales, lesiones contusas en la cabeza interpretadas como de sometimiento.

**Discusión:** En la combinación de métodos de asfixia los hallazgos que deben ser vistos en conjunto. Traumatismos craneoencefálicos para someter a la víctima, lesiones cutáneas en cuello, cara, cara interna de los labios, fracturas costales y lesiones por contrapresión en la espalda, glúteos o codos, contextualizados en conjunto pueden explicar la dinámica de esta modalidad homicida.

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## Introduction

Although there is consensus among the different authors of forensic medicine textbooks that “burking” is synonymous with asphyxia by a combination of smothering and chest compression, there are few reports on this homicide modality, as these are primarily isolated case reports.<sup>1–5</sup>

We conducted a review of autopsy reports on cases of homicides by a combination of and simultaneous methods of asphyxia by smothering, strangulation, and chest compression; we made observations on regional incidence and findings; and use of the name for this homicidal modality was discussed based on a literature review.

## Material and methods

In the province of Rio Negro (Argentine Patagonia), the Forensic Investigation Corps of the provincial justice system covers a population of 158 120 inhabitants. We conducted a retrospective observational study of a total of 634 autopsy reports and photographs between 2007 and 2023 where the cause of death was mechanical asphyxia due to neck compression, smothering, or chest compression.

The incidence of different types of mechanical asphyxia were detailed as follows:

- Hanging
- Manual strangulation
- Loop strangulation
- Chest compression
- Suffocation

Cases closed from a judicial procedural perspective, in which the cause of death was linked to mechanical asphyxia by combined mechanisms comprising simultaneous chest compression, suffocation, and/or strangulation, were included in the observational study.

Findings detailed:

- Petechiae: In the cutaneous and conjunctival plane.
- Skin lesions: Periorificial on the face, neck, and thorax.
- Lesions to the buccal mucosa.
- Blood infiltration of the muscle planes of the neck and chest.

- Fractures of the hyoid bone, thyroid cartilage, and rib cage.
- Blunt or sharp injuries to the head: Compatible with gestures of subjugation and if these caused external or internal hemorrhage.
- Toxicological study.
- Defensive injuries: Characterized by contusions of varying intensity on the ulnar aspect of the forearms.
- Fighting injuries: Characterized by injuries to the knuckles.
- Injuries to the back, buttocks, or back of elbows: Interpreted as being produced by counter-pressure on the victim's back in the dorsal decubitus position under the weight of the perpetrator.
- Congested or exsanguinated lungs: According to macroscopic characteristics and their evaluation on cutting.

## Results

Of a total of 634 autopsies performed between 2007 and 2023, 60 corresponded to mechanical asphyxia (9.4%); of these, 49 were by hanging (81.6%), 4 by chest compression plus strangulation and suffocation (6.6%), 2 by chest compression (3.3%), 1 by chest compression plus suffocation (1.6%), 1 by burial (1.6%), 1 by manual strangulation (1.6%), 1 by loop strangulation (1.6%), and 1 by suffocation (1.6%).

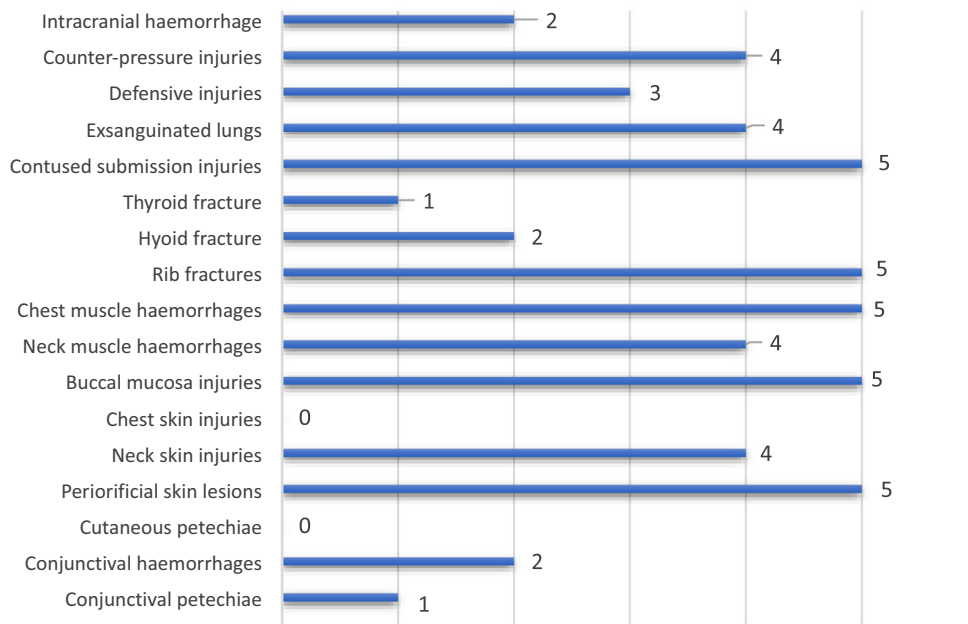
In the study group of asphyxias by combined methods, a total of 5 cases (8.2%) of mechanical asphyxias and 0.7% of the total autopsies, 4 were by a combination of chest compression plus strangulation and suffocation; 2 men and 3 women, with a mean age of 69 years, with a range of between 29 and 88 years, 4 were aged between 66 and 88 years. The toxicological study was negative in all cases. In all cases, the judicial investigation determined the actions of a single aggressor.

Periorificial skin lesions (oral and nasal), muscle hemorrhages in the chest, rib fractures, blunt injuries of the head, all with macroscopic signs of vitality, interpreted as subjugation, were present in all 5 cases.

Counter-pressure injuries were observed in 4 cases.

Cutaneous petechiae were not observed in any of the 5 cases, conjunctival petechiae, and lung congestion were only present in the chest compression and suffocation case, in the other cases, petechiae were absent and the lungs were exsanguinated (Fig. 1).

## FINDINGS



**Fig. 1** Description of findings in the cadaveric examination of the 5 cases of asphyxia by combination of methods.

## Discussion

Brouardel in 1897<sup>6</sup> referred to certain conditions that must be met in cases of strangulation or suffocation, in the victim–perpetrator interrelationship, the victim must be overcome, and the perpetrator must have freedom of action.

In this type of aggression, the strength and size of the aggressor exceeds that of the victim, and it is rare rather than common for the perpetrator to be a woman.<sup>7</sup>

Homicide by a combination of methods of asphyxiation by chest compression, suffocation, and/or strangulation requires the victim to be finally positioned prone, in dorsal decubitus position, with the perpetrator on top of them (Fig. 2).

This implies the need for the victim to be in that position beforehand, for example, already lying down or to have been taken to floor level; in the first case, the methods of subjugation will be less violent and with injuries of less severity than in the second.



**Fig. 2** Dynamics and position of the victim and perpetrator in homicide by combination of chest compression, strangulation, and suffocation.

William Burke and William Hare used a combined method of asphyxiation by chest compression and smothering prior to intoxicating their victims with whisky, the doctors who intervened in the trial against Burke and Hare stated that there were few signs of external violence.<sup>8</sup>

The signs of external violence are related to the victim's previous state of consciousness and capacity for action; in situations where the subjugation was violent with active resistance from the victim, skin and bone lesions, facial congestion, cutaneous or conjunctival petechiae, and pulmonary congestion are more evident.<sup>1–12</sup>

In our series, all the victims whose toxicological study was negative had blunt injuries to the head, which were interpreted as subjugation, in line with Brouardel's observations on the need to surprise and overpower the victim.

The judicial investigation determined that all cases involved a single aggressor, based on the considerations made by forensic and investigative teams.

In 4 cases, the injuries involved external hemorrhage, which was associated with the presence of exsanguinated lungs and the absence of cutaneous petechiae.

Although the presence of petechiae or pulmonary congestion were described as common findings in this type of asphyxia, their absence can be explained by the mechanism of an "escape" of blood that causes a decrease in the vascular pressure necessary for petechiae to develop.<sup>8</sup>

In these cases, checking the scene for signs of external hemorrhage will be relevant in order to contextualize the findings.

Skin lesions on the neck or face are produced during manual mechanical compression of the victim's neck or smothering. They are described as ecchymoses produced by thumb pressure and/or excoriations by the free edges of the fingernails (excoriation by scratching), the latter may be absent if the aggressor had short fingernails or wore gloves.

In our series, skin lesions on the neck were always present and characterized by circular ecchymoses on the neck in the 4 cases where the strangulation component was part of the combination of methods. In all cases of suffocation by smothering, the skin lesions were characterized by excoriations representing the sliding of nail edges over the skin plane (excoriation by scratching).

However, it should be borne in mind that the victims of this method of homicide are mostly elderly, where epidermal thinning and flattening of the subcutaneous interpapillary ridges results in a weaker dermal–epidermal junction, making it less elastic and rigid, thus more vulnerable to tangential trauma.<sup>13</sup>

Therefore, skin injuries may have a different morphology to those of the skin of younger victims, and where a pressure ecchymosis should be found, epidermal detachment may be found.

Other skin lesions to consider in combined asphyxia due to chest compression and strangulation and/or suffocation are counter-pressure lesions,<sup>9</sup> which are located in the posterior region of the body and are produced by pressure, sliding, or friction mechanisms against the hard surface where the victim lies.

They are more evident in situations where the victim has had more active interaction with the aggressor and are manifested by ecchymosis or excoriated areas on the back,

buttocks and eventually, the posterior region of the elbows. In our series, it was present in 4 of the 5 cases.

During suffocation, during manual smothering, the lips are pressed against the teeth producing blunt lesions of different entity,<sup>1,2,4,8</sup> that can be manifested by ecchymosis or laceration to the internal face of the lips. In the elderly, the teeth can loosen and even become detached through manual suffocation. In our series, these lesions were present in all cases.

The position of the perpetrator on top of the victim who is lying flat compressing the chest is reflected by the presence of rib fractures and blood infiltration of muscles and subcutaneous tissues. The absence of contusions to the skin plane of the chest is evidence of a compression maneuver and not of a blow.

In general, there are multiple rib fractures, in our series, the 5 cases presented between 2 and 5 rib fractures, in one case causing pulmonary laceration and hemorrhage, and in another case hepatic laceration and hemorrhage in an individual with cirrhotic liver.

It should be noted that in elderly individuals, it is more common to find rib fractures due to their bone fragility, which will make adequate respiratory mechanics difficult regardless of the weight of the victim, which may contribute to the final outcome.

In manual strangulation, fractures of the thyroid cartilage and hyoid bone have been described in up to 70%–80% of cases, in addition to the presence of blood infiltration to the front and sides of the larynx.

Fractures of the thyroid cartilage are mostly found in the horns, and in the greater horns in the hyoid bone; in our series, unilateral fractures of the hyoid were present in 2 cases and in 1 case, fracture of a horn of the thyroid was found, perilaryngeal blood infiltration was observed in all cases.

The lower percentage of presentation of these fractures in our series with respect to the observations in the literature may be because they were not the only methods used to cause death by asphyxia, but were part of a combination of methods.

Hemorrhages or blood infiltrations of the anterior muscles of the neck and upper chest are produced by the alternating compression of the aggressor and the victim's attempts to avoid it when they are still conscious, i.e., they reflect the dynamics of struggle and defense.

These hemorrhages and blood infiltrations will be more visible in the different muscle layers of the anterior and lateral face of the neck, with variable intensity according to the victim's resistance efforts. In our series, it was present in the 4 cases of asphyxia by a combination of the 3 methods.

Findings of petechial hemorrhages in the serosa of the lung and heart mentioned by Tardieu, although they have been described in this type of death, are non-specific, since they can be observed in other situations.<sup>14</sup>

At present, according to case reports,<sup>1–5,15</sup> and based on the findings in our series, asphyxia by combination and simultaneity of methods is related to violent aggressions that require prior subjugation of the victim.

This type of aggression is more frequent in older individuals and in the hierarchy of physical findings we find

the capacity of defense or interaction between the victim and aggressor.

The low number of cases is a limitation of the present study, but we consider that the number fits the population covered by our institution, with the condition that only suspected cases of criminality corresponding to 4 cities in the interior of the Argentine province, which together represent 90% of the 158 120 inhabitants, are autopsied.

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## Declaration of competing interest

The authors have no conflict of interests to declare.

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