



### G78 Non-Chemical Suffocation Deaths in Forensic Setting: A Six Year Retrospective Study of Environmental Suffocation, Smothering, Choking, Traumatic, and Positional Asphyxia

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After attending this presentation, attendees will be afforded a six- year review of forensic autopsies of non-chemical suffocation deaths in the province of Quebec, Canada.

This presentation will impact the forensic community by providing evidence-based data to support common knowledge on non-chemical suffocation deaths.

Suffocation has been the object of several papers but mainly case reports or cases series. Studies of subsets of suffocation deaths, limited to a specific scenery or category, have also been reported, such as suffocation in motor vehicle crashes, lethal crush/traumatic asphyxia, fatal entrapments in on-farm grain storage bins, suffocation by plastic bags, coffee thrombosis deaths, or overlaying and wedging deaths in children. However, no systematic study has ever portrayed non- chemical suffocation deaths in forensic setting. A six year retrospective study of all non-chemical suffocation cases in the laboratory in the forensic victim population aged of more than one year will be presented.

In the province of Quebec (Canada), a single centralized forensic laboratory covers the entire 7.5 million province population. Over a six year period (2000-2005) all autopsy cases performed at this laboratory were retrospectively reviewed for non-chemical suffocation deaths in the forensic victim population aged of more than one year. For each case, the type of suffocation, manner of death, gender, and age were compiled. In the case selection, cases of suffocation occurring in association with another type of trauma, such as sharp or blunt weapon, were excluded. Cases of suffocation in association with another category of asphyxia, such as hanging combined with suffocation by a plastic bag overhead were also excluded.

During the six year study period (2000-2005), a total of 96 non- chemical suffocation cases were autopsied in the forensic laboratory of the two Lab Sciences Judiciaires. This represents 2.3% of all forensic autopsies for the same period. Overall, cases were aged from two to 90- years-old (mean  $\pm$  standard deviation,  $46 \pm 19$ ), with similar averages for men ( $46 \pm 19$ ) and women ( $48 \pm 24$ ).

*Type of suffocation:* Traumatic /positional asphyxia ranked as the leading type of non-chemical suffocation, with over half cases (54%). Smothering and choking followed, in 30% and 14% of cases respectively. Entrapment/ environmental suffocation, on the other hand, was found in only 2% of cases.

*Gender and Age:* Overall, a strong male predominance was observed, with two-thirds of male victims. Traumatic /positional asphyxia remained the leading type of non-chemical suffocation in male victims. However, the type distribution of non-chemical asphyxia differed in female victims, smothering being the most common type (64%), relegating mechanical/positional asphyxia to second position (32%). Choking occupied third position in both gender, with 16% and 5% in males and females respectively. As for age, the average in each type of suffocation did not seem to differ significantly.

*Manner of death:* Taken as a whole, manner of death in non-chemical suffocation is generally ruled as accidental (73%). In fact, all entrapment/ environmental suffocations and traumatic/ positional asphyxia deaths were accidental, as well as the vast majority of choking (85%). Smothering, in contrast, is associated with a higher variability of manner of death between cases: though suicide makes up the main core (17 cases), manner of death was ruled differently in 12 cases, including six homicides and five accidents. The most common form of smothering was from a plastic bag overhead (69%), with all suicidal smothering cases being related to this method.

In the last 15 years, evidence-based medicine has been advocated as a new paradigm, proclaiming that evidence from research is the best basis of clinical decisions and practice. In this global context, forensic pathology is no exception and is increasingly becoming a science and decreasingly an art. Nevertheless, there are still several areas of forensic pathology mainly based on tradition, with textbooks describing common knowledge that is not supported by modern research data. The present study is intended to contribute to evidence-based data on non-chemical suffocation deaths. Despite several case reports, case series and a few studies on suffocation subsets, this is the first time non-chemical suffocation deaths are systematically studied. Taken as a whole, the outcomes of this study corroborate the literature data, thus supporting the common knowledge with evidence-based data.

#### Asphyxia, Suffocation, Manner of Death