

The therapeutic range for tapentadol is 5-300 ng/mL. The tapentadol concentration found in the heart blood submitted in this case was 6600 ng/mL; more than 20 times the upper limit of the therapeutic range. Possible mechanisms of death include respiratory depression, CNS depression, and serotonin syndrome.

Based on the scene investigation and autopsy findings in this case, the medical examiner determined that the cause of death was narcotic (Nucynta®) intoxication and the manner-of-death was undetermined.

Tapentadol, Nucynta®, Overdose

G19 Nasal Mucociliary Motility: New Forensic Tool for Estimating Time Since Death

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After attending this presentation, attendees will understand the potential contributions of postmortem investigation of nasal mucociliary motility in time of death estimation.

This presentation will impact the forensic science community by emphasizing the potential role of nasal scraping that could become a routine procedure in estimating time-since-death.

Postmortem interval (PMI) estimation is one of the most difficult issues in forensic medicine. Time-of-death is usually appreciated by recognizing early postmortem changes to the body prior to the onset of gross decomposition phenomena: algor mortis, rigor mortis, and livor mortis.

The study of these physical processes is strictly connected to the operator's subjectivity hence it can be source of confusion in estimating PMI. Moreover these body changes can be altered by several internal and external factors: body temperature at death time, subcutaneous fat, muscular mass, clothes, environmental temperature, humidity, and ventilation.

There have been many proposed innovative methods in attempts to avoid this trouble defining PMI objectively as possible. The goal of these new techniques is to find a link between PMI and objectively detectable values such as infrared tympanic thermography, skin fluorescence, electrolyte concentration in cerebro-spinal fluid, pericardial fluid or vitreous humor. All these samples, on the other hand, present practical difficulties in performing and require invasive methods and long time waiting.

Some studies have been published about nasal scraping role in clinical practice (ciliary dyskinesia, NARES, allergic rhinosinusitis), but no studies have never been performed in cadavers for PMI estimation.

A study concerning the examination of ciliary motility as residual life phenomenon, realizing a study on time of death evaluation using a new, rapidly available requiring substrate: nasal mucosa is presented.

Nasal mucosa is composed by numerous cell types (globose cells, basal cells, ciliated and not ciliated cells) and can be easily obtained by nasal scraping, a technique commonly used in otolaryngology; it consists of a curette crept on nasal mucosa and cells picked up in this way are then observed.

From June 2009 to June 2010, nasal scraping in 70 cadavers was performed. Age ranged from 24 to 95 years and the cause of death was most frequently due from ischemic cardiopathy, septic shock, and car accident. The only exclusion criteria of this study was nose bleeding.

A specimen of ciliated epithelium was obtained by scraping from the middle third of the inferior turbinate with a spoon-shaped nasal probe (Rhinoprobe). An *in vitro* evaluation of ciliary movement was performed. Ciliary beat frequency (CBF) was analyzed by phase-

contrast microscopy. Three different samples at different postmortem intervals were carried out: between 4 and 6 h (T1), between 10 and 12 h (T2) and after 24 h (T3). Then CBF (beat number/second) was classified in: present (3-4/sec), hypo-valid (1-2/sec) and absent.

Results demonstrated that, except for those cases which showed fungal or bacterial infections, at T1 motility was present in the majority of cases; at T2 motility was still present, but it was hypo-valid in a higher percentage. Ciliary activity was absent at T3. It is believed that all these findings can be explained with progressive metabolic reserves lowering: the more time passes after death, the more ciliated cells loose energetic substrates for ciliary motility.

In conclusion, mucociliary motility seems to be linked to PMI and thus nasal scraping can be considered as a new, easy, cheap, and efficient objective tool in detecting PMI; further studies are required.

Nasal Scraping, Mucociliary Motility, Time Since Death

G20 Fatal Spontaneous Non-Traumatic Subdural Hematoma and Terson Syndrome

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After attending this presentation, attendees will learn that a ruptured cerebral aneurysm can cause a compressive acute subdural hematoma without concomitant subarachnoid hemorrhage.

This presentation will impact the forensic science community by expanding the attendees knowledge base by increasing awareness of causes of non-traumatic subdural hematomas and retinal hemorrhages.

This presentation will inform attendees of something that they do not know. While most acute subdural hemorrhages are the result of trauma, forensic pathologists must be aware that a ruptured cerebral saccular aneurysm can cause a spontaneous non-traumatic subdural hemorrhage along with associated retinal hemorrhages (Terson syndrome).

Cerebral saccular aneurysms frequently rupture into the subarachnoid space, accounting for 70-80% of non-traumatic subarachnoid hemorrhages (SAH); however, aneurysmal rupture also may result in concomitant intraparenchymal, intraventricular, or subdural hemorrhage. Most acute subdural hematomas (SDH) in adults are due to traumatic head injuries, although less common causes include coagulopathies, non-traumatic intracranial hemorrhage, intracranial hypotension, or post-surgical complications. A ruptured cerebral berry (saccular) aneurysm causing only an acute SDH is rare, representing < 0.5 - 2% of all ruptured aneurysms in several large case series. In 1881, Litten first described intra-retinal hemorrhage associated with SAH. However, Terson's description in 1900 of vitreous hemorrhage following SAH is now associated with this syndrome. Although originally defined by the presence of vitreous hemorrhage in association with SAH, Terson syndrome now encompasses any intraocular hemorrhage associated with intracranial hemorrhage and elevated intracranial pressures.

A case of 46-year-old woman who died suddenly and unexpectedly at her residence is presented. Found on the bathroom floor, she had no obvious injuries. According to investigations by the medical examiner and law enforcement, she had a vague past medical history significant for hypertension but did not consume alcoholic beverages or use illicit drugs. Subsequent toxicological analysis did not reveal any licit or illicit drugs.

At autopsy, she appeared well nourished and had a body weight, length, and body mass index of 49.1 kg, 160 cm, and 19.1, respectively. Postmortem monocular indirect ophthalmoscopy revealed bilateral retinal hemorrhages. The right and left fundi exhibited 25-35 and 15-20 flamed-shaped and dot retinal hemorrhages over the posterior poles, respectively.