H45 Otorrhagia in Strangulations: An Important But Often Underestimated Finding in Forensic Pathology

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Learning Overview: After attending this presentation, attendees will have gained knowledge of strangulation cases in which otorrhagia is a useful sign for the diagnosis of death, representing a vital reaction of neck compression.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by emphasizing the importance of auricle examination and otoscopy in mechanical asphyxia deaths (particularly in strangulation cases). As this case demonstrates, ear bleeding can be an important vital sign of neck compression and can aid in the diagnosis of strangulation, especially when a ligature mark is absent.

This case report is an unusual case of massive bilateral otorrhagia produced during a particular case of strangulation (death by garroting). In forensic practice, it is not always easy to understand if a person has died from strangulation as ligature marks are sometimes absent, especially when soft devices are used. The recommended physical examination must always include a thorough inspection of the head, neck, oral cavity, and eyes. In fact, facial congestion, petechiae of the skin or conjunctiva, scleral hemorrhages, and neck injuries are characteristic external signs. Hemorrhage from the ears is poorly described in mechanical asphyxiation and is an underestimated finding.

Case Report: An 87-year-old woman with senile dementia was found dead on her bed. Around the neck, the woman wore a handcrafted garrote consisting of a cloth belt and an apron, tied to the handle of a hammer. The external examination showed an ecchymotic mask and subconjunctival petechiae. The neck had a superficial cord imprint of about 2cm, but the ligature mark was not present. The front of the neck showed only small bruises, discontinuous abrasion, and petechiae. There were no lesions of the scalp or skull. External examination showed marked bilateral otorrhagia. The tympanic membranes were ruptured with bleeding into the external auditory meatus. Internal examination showed hemorrhage of the tongue base, a small hemorrhagic infiltration of the anterior neck muscles, and thyroid membrane petechiae, but no laryngeal osteocartilaginous injury. Dissection of the head and brain examination showed no fractures of the skull or petrous bone and no intracranial hemorrhages.

Discussion and Conclusion: Otorrhagia is generally associated with skull base fractures, lightning strikes, abuse in children, and diving accidents. In forensic medicine, ear bleeding is also described with drowning and is only exceptionally described in cervical compression. Furthermore, their formation mechanism is somewhat controversial.

A traumatic otorrhagia may represent a sign of vitality and helps in the diagnosis of death. The mechanisms that can explain otorrhagia in cases of neck compression are different. The middle ear is drained by two veins that flow into the internal and external jugular veins. The compression of the neck easily creates blockage of the jugular blood return, vascular congestion of the middle ear, and hemorrhage. The second mechanism is based on the respiratory effort against a closed glottis that can cause rupture of the tympanic membrane. Compression of the neck simulates closed glottis as the upper respiratory tract is tightly closed during strangulation. Therefore, laryngeal or pharyngeal obstruction causes an increase in pressure in the middle ear, through the Eustachian tube (which opens when the pressure of the pharynx increases). This increase in pressure could cause a middle ear injury and bleeding.[1,2]

This case represents one of the first reports of bilateral massive otorrhagia during a particular case of strangulation (i.e., death by garroting). The use of a soft medium (i.e., the apron and the cloth belt) did not result in an evident ligature mark. Otorrhagia was certainly a very useful sign and confirmed the death by mechanical asphyxia. Ear bleeding could represent an important sign of vitality and is related to the compression of the neck, in the absence of head trauma. In fact, this sign implies a respiratory movement and blood flow during the agonal period.

Reference(s):

1. Rasmussen E.R., Larsen P.L., Andersen K., Larsen M., Qvortrup K., Hougen H.P. Petechial hemorrhages of the tympanic membrane in attempted suicide by hanging: A case report. *J Forensic Leg Med*. 2013;20(2):119-121.
2. Duband S., Timoshenko A.P., Morrison A.L., Prades J.M., Debout M., Peoc'h M. Ear bleeding: A sign not to be underestimated in cases of strangulation. *Am J Forensic Med Pathol*. 2009;30(2):175-176.

Otorrhagia, Strangulation, Garrote

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