

Commentary on: Sauvageau A, Boghossian E. Classification of asphyxia: the need for standardization. *J Forensic Sci* 2010;55(5):1259–67.

Sir,

I read with interest the recent paper by Sauvageau and Boghossian (1) in which the authors correctly point out the need for uniformity in the classification of asphyxia in a forensic context. Their proposed system certainly provides a unified framework to use in the assessment of cases. However, a difficulty that arises in using classifications that rely on a combination of circumstances and autopsy findings is that underlying mechanisms may not be clearly delineated (2). For example, in addition to asphyxia, drowning may involve complex electrolyte disturbances, and in hanging terminal mechanisms may involve a variety of processes. Classifications also do not always address where carbon monoxide inhalation or cellular asphyxia from cyanide should be placed.

For this reason, it may be helpful in addition to utilize a more pathophysiological system for classifying asphyxia that derives from underlying lethal mechanisms (3). Using this approach, asphyxial episodes can then be divided into those where there is a failure in the supply, transfer, transport, or uptake and utilization of oxygen:

- *Failure in the supply of adequate amounts of oxygen* occurs when there is reduced environmental oxygen levels owing to the displacement of oxygen by other gases or consumption of oxygen without replacement. Examples include individuals who asphyxiate in sewers or who are trapped in airtight spaces.
- *Failure to transfer oxygen from the environment into the blood* may be because of external or internal airway obstruction (smothering, choking, or hanging), extrinsic or intrinsic compromise of thoracic cage function (mechanical asphyxia or chest wall trauma), or reduced oxygen-binding capacity of the blood (carbon monoxide toxicity).

- *Failure of transport of oxygen* occurs when there has been a breakdown in the supply or uptake of oxygen (as described previously) or if there is a problem with blood flow from local vascular compression (hanging or strangulation) that reduces cerebral blood flow.
- *Failure of cells to take up oxygen* occurs when substances such as cyanide impede cellular utilization of oxygen by damaging or blocking enzyme systems (chemical asphyxia).
- *Complex cases and/or combinations of the above* include cases of drowning and hanging, the latter involving venoarterial occlusion, vagal inhibition, tracheal compression, and upper airway occlusion owing to lifting of the tongue and adjacent soft tissues (3).

It is true that classifications of asphyxia are sometimes confusing, as particular types of asphyxiating events may involve several processes and so may not be able to be precisely compartmentalized. A pathophysiological classification may be useful conceptually as it focuses more on grouping cases where there are similarities in mechanisms rather than circumstances.

References

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3. Byard RW. Issues in the classification and pathological diagnosis of asphyxia. *Aust J Forensic Sci*. In press.

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