Are certain pathological findings in adult autopsies absent in the very young?

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It is well recognized that infants and children can have quite significant disease without manifesting obvious clinical signs. Published studies have demonstrated that even medical professionals in controlled hospital environments may not detect subtle features that are associated with potentially major declines in the health status of their young patients [1]. It comes as no surprise, therefore, that forensic pathologists may encounter cases where infants have died of an established disease that was not noticed by their carers [2, 3]. An example of this was a 16-week-old boy who died suddenly and unexpectedly and was found at autopsy to have widely disseminated leukemia; and yet a home video recording taken the day before death showed an apparently quite healthy and interactive infant [4].

The focus of this editorial is, therefore, to ask whether infants' failure to manifest symptoms of disease during life may also translate to the post mortem environment where cases may have a paucity of pathological signs to suggest a particular lethal mechanism. Three characteristic autopsy findings in adults have been chosen for examination: facial petechiae in neck/chest compression, Wisniewski's spots in hypothermia and differential aortopulmonary intimal staining in fresh water drowning.

Facial and conjunctival petechiae occur in cases of neck and chest compression due to vascular engorgement with rupture of pre-capillary venules. The resultant dot-like hemorrhages are a very characteristic finding in adult cases of accidental and inflicted mechanical venous obstruction from compression/positional asphyxia, low suspension hanging or strangulation [5]. However, although such petechiae have been reported in a study of infant and toddler hangings, they

were only found in a minority (20%) of cases of wedging [6]. The reasons for this difference remain unclear.

Wisniewski's spots were first described by a Russian district medical officer in 1895 in cases of fatal hypothermia, as multiple superficial hemorrhagic lesions in the gastric mucosa. The pathogenesis has yet to be elucidated with an incidence in hypothermic deaths ranging from 44 to 100% [7, 8]. Although there is evidence that younger adults may be more likely to develop these lesions [9] the literature appears silent as to whether these lesions may occur in the very young; studies tend to describe only adult cases [10], or do not specify age, although the circumstances and underlying medical conditions in a number of cases suggests that they were adults [11].

Differential aortopulmonary intimal staining in fresh water drowning has been recognized in the German literature for some time and is known as "hämoglobinimbibiert" or "hemoglobin imbibition" [12]. Although apparently not a particularly sensitive marker it arises from the hypo-osmolar effect of water entering the circulation from the lungs, causing red cell lysis with hemoglobin staining of the aorta, and less commonly the chambers of the left side of the heart [13, 14]. However, reported series have not included infants and young children, although they not infrequently drown [15].

Thus, it has been the author's experience that autopsy markers such as facial petechiae in wedging, Wisniewski spots in hypothermia, and differential great vessel intimal staining in fresh water drowning are either uncommon or are not found at all in autopsies in the very young. There may be a number of reasons for this including observations being skewed by the low number of such cases, particularly of lethal infant hypothermia, in the South Australian environment. However, inquiries to colleagues in other parts of the world have not been particularly successful in identifying pediatric cases. Another possibility to consider is that infants may succumb to lethal challenges more quickly than adults and so may not have time to develop and manifest certain features. Finally, infant pathophysiology may be sufficiently different

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to that of adults [16] resulting in far more subtle manifestations of lethal mechanisms at autopsy.

It would, however, be of interest for pathologists to review their files and to share their experience of the youngest decedents with these features that have been documented and photographed at autopsy. The forum of “Letters to the Editor” in *Forensic Science Medicine and Pathology* could be used to disseminate this information to determine firstly whether these findings are indeed found in infant autopsies, and if not, at what age the transition from infantile to adult pathophysiological responses occurs with resultant positive post mortem findings. If the very young truly do not manifest autopsy findings that are expected to be present in adults this will serve as yet another example of why the evaluation of forensic features in infants and children is often so complex and subtle.

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