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## EDITORIAL

### POSTOBSTRUCTIVE PULMONARY EDEMA FOLLOWING HANGING: A MISNOMER

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Postobstructive pulmonary edema (POPE) is an uncommon but well-described complication of upper airway obstruction.<sup>[1-2]</sup> Two forms of POPE have been defined: POPE I is associated with sudden, severe upper airway obstruction, whereas POPE II follows surgical relief of chronic upper airway obstruction.<sup>[2]</sup> Among the numerous causes of POPE I figures hanging.<sup>[2]</sup> However, inclusion of hanging in the list of causes of postobstructive pulmonary edema is truly unfortunate, since airway obstruction is not an important component of asphyxia by hanging.

Hanging is a form of asphyxia secondary to compression or constriction of the neck structures by a noose or other constricting band tightened by the weight of the body.<sup>[3-4]</sup> Hanging can be either incomplete or complete, depending on whether or not parts of the body touch the ground (e.g., toes, feet, knees or

buttocks).<sup>[3-4]</sup> Death is caused by closure of the blood vessels and/or air passages of the neck, with insufficient amount of oxygen reaching the brain.<sup>[3-4]</sup> Typical hanging is different from judicial hanging, the latter being associated with fracture/dislocation of the upper cervical vertebrae with transaction of the cord rather than asphyxia.

For several decades, forensic pathologists have emphasized that the pathophysiology of asphyxia by hanging is mainly related to the occlusion of neck vessels, airways obstruction being only a minor component.<sup>[3-4]</sup> Recent studies of filmed hangings have reinforced this vision of the preponderant role of occlusion of the vessels in the pathophysiology of asphyxia by hanging. In 2006 the Working Group on Human Asphyxia was formed, with the aim of collecting and analysing filmed human hangings.<sup>[5-7]</sup> So far, 8 filmed hangings have been studied: 6 autoerotic accidents and 2 suicides. These videos have clearly demonstrated the absence of tracheal or upper airways obstruction. On these tapes, deep rhythmic abdominal respiratory movements were observed, starting between 13 and 24 seconds and stopping between 1 minute 02

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seconds and 2 minutes 05 seconds. These respiratory movements were not only seen but also heard, confirming the passage of air in the airways despite the hanging process.

For example, the first case of the series was a 37-year-old professional cameraman.<sup>[5]</sup> He tied his neck with a padded rope fixed on the rail system of an electric garage door. The padded rope consisted of a relatively large hanging ligature made of soft material, the knot being in the posterior part of the neck. The victim used the remote control to close the door, thereby hanging himself. His feet were fixed on ski boots, tied with chains to a metal platform. A video camera was previously set to film his suicide. The victim was an adult male weighing 148 pounds (67.3 kg). The amount of body weight involved in tightening the ligature in relation to the hanging position can be evaluated by using results from a previous study by Khokhlov: more than 65% for a hanging in a standing position with feet flat.

<sup>[8]</sup> In this case, 65% of body weight is about 96 pounds (44 kg). This pressure around the neck is highly superior to the weight of 33 pounds (15 kg) mentioned in textbooks as the closure point for the trachea.<sup>[3]</sup> Nevertheless, respiration was clearly audible in this filmed hanging.

Therefore, the terms 'postobstructive pulmonary edema' and 'postobstructive pulmonary distress'<sup>[9]</sup> in cases of hanging are misnomers. An alternative appellation such as post-hanging pulmonary edema would be a far better choice considering contemporary conception of asphyxia by hanging.

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