

# LETTERS TO THE EDITOR

## AGITATED DELIRIUM AND SUDDEN DEATH

*To the Editor:*—We read with great interest the paper by Kenneth Park and colleagues titled “Agitated Delirium and Sudden Death: Two Case Reports” in the April/June 2001 issue of *Prehospital Emergency Care*.<sup>1</sup> We applaud the authors for bringing this topic to the attention of prehospital care providers, the medical personnel most likely to first encounter patients suffering from agitated delirium. We support their work and its importance, and would like to add some additional commentary and clarification.

The cases presented exemplify the catch-22 of managing patients suffering from agitated delirium. The patients are placed into protective custody because they are acting bizarre and are either a danger to themselves or others or are gravely disabled, and while in custody and being brought in by emergency medical services (EMS) to the emergency department for medical evaluation, the patients suffer cardiac arrest.

The authors comment that as a cause for this sudden death, positional asphyxia “has been suggested due to the common occurrence of patients’ dying shortly after they were placed in physical restraints in a prone position, particularly after being ‘hog-tied.’” There is no literature that supports that death from asphyxiation in a restrained or prone position is a “common occurrence.” In fact, the cases linking the hog-tie position with positional asphyxia have included only case reports and case series, and the theory was based solely on the

work of Reay et al.<sup>2</sup> This theory has recently been restudied and found to be in error. As illustrated by the two cases presented, patients will suffer cardiac arrest from agitated delirium in positions other than hog-tie restraint (supine and sitting).

Additionally, the authors comment that “studies involving the effects of hog-tying on respiratory function in healthy subjects have been inconclusive.” The current data are *very* conclusive, and support that in healthy subjects, the maximal restraint hog-tie position does not result in respiratory or ventilatory compromise. In one study, subjects placed in the maximal restraint hog-tie position after a period of intense physical exertion suffered neither hypoxia nor hypercarbia based on serial arterial blood gas measurements, reflecting no negative effects on ventilation or respiration.<sup>3</sup> This refuted earlier work by Reay, who now considers the hog-tie restraint position to be “physiologically neutral.”<sup>4</sup> Similar results were found in subjects sprayed with oleoresin capsicum spray and placed into the maximal restraint hog-tie position, again demonstrating no effect on pulmonary ventilation or respiration.<sup>5</sup> Additionally, work studying subjects placed in sitting, supine, and prone positions showed that body position does not have any physiologically significant impact on pulmonary function.<sup>6</sup>

We appreciate the opportunity to offer additional insight into the management of patients with agitated delirium regarding patient position. As pointed out by the authors, other factors are likely

involved with sudden death in these patients, including underlying drug intoxications, metabolic acidosis, and catecholamine surges.

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## References

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2. Reay DT, Howard JD, Fligner CL, Ward RJ. Effects of positional restraint on oxygen saturation and heart rate following exercise. *Am J Forens Med Pathol*. 1988;9(1):16-8.
3. Chan TC, Vilke GM, Neuman T, Clausen JL. Restraint position and positional asphyxia. *Ann Emerg Med*. 1997;30:578-86.
4. Price v County of San Diego, et al. United States District Court. Case number 94-cv-1917-P (AJB). Jan 12, 1998, 12:4-11.
5. Chan TC, Vilke GM, Clausen JL, et al. Impact of oleoresin capsicum spray on respiratory function in human subjects in the sitting, prone and maximal restraint positions. Final report. U.S. Department of Justice NCJ Number: 182433, 2000.
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*In reply:*—We thank Drs. Vilke and Chan for their interest in our article and recognize their contributions on this and related topics. We agree that positional asphyxia does not stand alone as the cause of sudden death in these cases of agitated

delirium (AD). We were only presenting it as a possible contributing cause. As stated in our article, there were multiple other risk factors that contributed to the morbidity we saw in these two individuals.

With reference to the studies cited by Vilke and Chan, there may indeed be no evidence of hypoxia with positioning in healthy volunteers; however, our experience with individuals at risk for AD leads us to characterize them as a population somewhat unique when compared with a group of "healthy volunteers." In addition, at least one study excluded sub-

jects with body mass indexes (BMIs) in excess of 30 kg/m<sup>2</sup>. Our patient #2 was morbidly obese and while the effects of positioning may not have led to hypoxia, her ability to effectively "respire" may have been compromised; in isolation not a reason for her poor outcome but as a piece of a larger whole, perhaps a significant contributor.

The difficulty with prospectively studying or successfully treating patients with AD or positional asphyxia remains an obstacle for emergency physicians and emergency medical services (EMS)

workers alike. Presenting symptoms, violent behavior, drug toxicity, and body habitus all play an active role in obscuring the data needed for proper assessment and treatment of AD patients. The utilization of such restraining techniques as "hog-tying" may lead to increased morbidity and mortality.

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