

The logo for the journal "Annals of Emergency Medicine" is displayed on a blue rectangular background. The words "Annals of" are in a smaller, italicized serif font, while "Emergency Medicine" is in a larger, bold serif font. A thin white horizontal line is positioned between the two lines of text.

Annals of
Emergency Medicine

Volume 32, Issue 1, Pages 116-117 (July 1998)
Positional Asphyxia

John D Howard and Donald T Reay

To the Editor:

The recent article by Chan et al¹ concerning restraint position and positional asphyxia reports a well-done study providing further valuable insight into the complex issue of sudden death during police custody. We were involved in a similar study a decade ago and have reviewed this more recent work with great interest.² However, we are concerned with one aspect of the interpretation of the results.

The authors measured significant differences in pulmonary function test results between control and restrained individuals, but describe the changes as “not clinically relevant.” Based on their findings, the authors suggest that factors other than body positioning are more important determinants for the sudden deaths that occur while in the restraint position. We agree that many factors should be considered in evaluating a case of sudden death, but urge caution in the application of clinical parameters to the situations of death in police custody that prompted these studies.

As physicians, our training and experience have provided insight into matters of clinical relevance. As forensic pathologists, our training and experience have routinely provided insight into the spectrum of illness, injury, and death that occurs, often quite literally, in the “street” and is not well known to clinicians. The clinician’s involvement in such cases, if any, is at the end of an unsuccessful resuscitation attempt. Applying only “clinically relevant” values to a measurement may lead to misinterpretation of findings in deaths that occur outside the clinical setting. For example, blood morphine levels founds in individuals who have died after intravenous injection of heroin might well be considered “low” based on the range of morphine levels commonly seen in hospitalized patients receiving pain medication, yet these individuals are quite dead from the drug. Restrictive pulmonary function alteration that may not be “clinically relevant” might well be one of several contributing factors in some deaths where restraint is used.

In the past decade, we have had the opportunity to investigate or review numerous cases of death during law enforcement custody, involving various forms of physical restraint. The processes leading to death in these cases

developed well separate from any clinical setting. Forensic pathologists see cases of death that are caused by drug intoxication alone and others where death is caused by positional or restraint asphyxia alone. Our experience in reviewing deaths in police custody leads us to believe that multiple factors, rather than one single cause, play a role in deaths where restraint has been applied. The exact pathophysiologic mechanisms of death have not been fully defined. Significant hypoxia from restraint may or may not occur, but a contribution from the restraint position itself to death should not be dismissed.

There are now two controlled studies showing the restraint position to have a measurable physiologic effect. An animal model for the physiologic effect of restraint exists, which was mentioned briefly by the authors.³ The model was used to demonstrate that the combination of cocaine and "restraint stress" produced an increased mortality in rats compared with cocaine exposure alone. The case reviews, the controlled studies, and the animal model point to physical restraint as being one significant factor in this type of death.

It is encouraging that further research is being done in this area, and we hope that additional studies will be conducted.

References

1. Chan TC, Vilke GM, Neuman T. Restraint position and positional asphyxia. *Ann Emerg Med.* 1997;30:578-586
 2. Reay DT, Howard JD, Fligner CL. Effects of positional restraint on oxygen saturation and heart rate following exercise [Special issue]. *Am J Forensic Med Pathol.* 1988;9:16-18
 3. Pudiak CM, Bozarth MA. Cocaine fatalities increased by restraint stress [Special issue]. *Life Sci.* 1994;55:379-382
-