

POSITION PAPER

NATIONAL ASSOCIATION OF EMS PHYSICIANS

PATIENT RESTRAINT IN EMERGENCY MEDICAL SERVICES SYSTEMS

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POSITION

The National Association of EMS Physicians (NAEMSP) recognizes that emergency medical services (EMS) personnel encounter agitated and combative patients, and these patients frequently require medical treatment and transportation. To minimize the possibility of injury to patients and EMS personnel, NAEMSP believes that all EMS systems should develop specific protocols for dealing with the violent or combative patient. Protocols may have input from EMS system administrators, providers, legal counsel, and law enforcement representatives, but review and approval by the EMS system medical director are essential.

In addition, the EMS service must assure that all EMS personnel are knowledgeable about the medical conditions that are associated with agitated or combative behavior and are trained to apply the principles of the system's prehospital patient restraint (PPR) protocol during patient care. Use of the

PPR protocol should undergo quality improvement review with specific filters for the appropriateness of restraint for the patient, the type of restraint utilized, and the care provided to the patient during transport.

The NAEMSP believes that the following principles should be incorporated in an EMS system PPR protocol:

1. The safety of EMS personnel is the paramount factor during PPR, followed by the importance of protecting patients from injuring themselves or others.
2. Every EMS service should have a PPR protocol that is applicable to all violent or combative patients.
3. The protocol should outline the indications for patient restraint. The policy should be consistent with state laws and local EMS protocols regarding patient refusal of care and the EMS system's responsibility to care for patients with psychiatric or behavioral emergencies.
4. Patient dignity should be maintained during restraint, and the method of restraint should be individualized to use the least restrictive method of restraint that protects the patient and EMS personnel from harm.
5. The protocol must include a patient assessment to identify

and manage medical conditions that contribute to a patient's violent behavior. Such conditions include, but are not limited to, hypoxia, hypoglycemia, alcohol or drug intoxication, stroke, and brain trauma.

6. The protocol must address the types of restraint devices that will be used (verbal, physical, or chemical), when each will be used, who can apply them, and when direct medical oversight must be involved.
7. Direct medical oversight may be required for combative patients who refuse treatment, for orders to restrain a patient (before or immediately after restraint), or for orders for chemical restraint (before or after medication is administered).
8. The PPR protocols should address the type of physical restraints that are permissible. Any restraint used should allow for rapid removal if the patient vomits or develops respiratory distress. Patients should never be transported while hobbled, "hog-tied," or restrained in a prone position with hands and feet behind the back. Patients should never be transported while "sandwiched" between backboards or mattresses. Restraint techniques should never constrict the neck or compromise the airway.

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Approved by the NAEMSP Board of Directors February 25, 2002. Received February 28, 2002; accepted for publication February 28, 2002.

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9. Hard restraints, such as handcuffs, are generally not acceptable for EMS use. If patients are restrained in devices that require a key, the key must accompany the patient during treatment and transportation.
10. Continued patient struggling after restraint application can lead to hyperkalemia, rhabdomyolysis, and cardiac arrest. Chemical restraint may be necessary to prevent continued forceful struggling by the patient.
11. Chemical restraint, usually with a butyrophenone, a benzodiazepine, or both, is an effective method of protecting the violent or combative patient. Paralytic agents are not an acceptable alternative for PPR unless they are also clinically indicated to treat an underlying medical or traumatic condition.
12. After patient restraint, there must be regular and frequent evaluation of the neurovascular status of all restrained extremities and the respiratory and hemodynamic condition of the patient.
13. Documentation of patient assessment, reason for restraint, restraint procedure, frequency of reassessment, and care during transportation should occur for all patients who require restraint. These components should be evaluated during system continuous quality improvement processes. Systems should consider reviewing every case of patient restraint for compliance with the PPR protocol.
14. Local law enforcement policies may differ from the EMS restraint policies, but both agencies should recognize their roles and work cooperatively and proactively to assure the safe restraint of EMS patients when necessary.
15. Law enforcement officers should be involved in all cases when a patient poses a threat to EMS personnel or others. If law enforcement is not immediately available, EMS personnel should retreat to a safe place and await the arrival of law enforcement. If there is no option for retreat, EMS personnel may use reasonable force to defend themselves against an attack.
16. It is not appropriate for EMS personnel to use weapons as adjuncts in the restraint of a patient.
17. In rare situations, it may be necessary for law enforcement to apply restraint techniques to EMS patients that are not sanctioned by EMS policies. In these cases, a law enforcement officer must accompany the patient during transportation, and EMS personnel must assure that the patient is medically assessed, treated, and reassessed based upon the PPR protocol.

INTRODUCTION

The role of providing emergency medical care in the relatively uncontrolled prehospital environment frequently places EMS personnel in harm's way. Agitation or confusion related to medical problems and violence from psychiatric disorders are frequently encountered by EMS personnel. A convenience sample of registrants at an NAEMSP meeting found that about half of the EMS systems sampled did not have protocols for the management of violent patients.¹

Prehospital patient restraint provides verbal, physical, and/or chemical restraint to allow for the safe transportation and treatment of the violent, combative, or agitated patient by EMS personnel. Properly applied PPR may reduce the possibility of patient injury, reduce the potential for injury to

EMS providers, and allow for timely and appropriate treatment and transportation of a patient to a medical or psychiatric facility.

There are hazards to improperly applied restraint. Severe and potentially life-threatening complications have been reported in individuals who were restrained by law enforcement, health care, and EMS personnel. The American College of Emergency Physicians endorses restraint principles,² and the recommendations in this position paper are consistent with these principles.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires restraint policies and procedures within hospitals in an effort to minimize adverse events.³ EMS services that are owned or operated by hospitals should consult with their hospital administration during the development of the PPR protocol to assure that the protocol is consistent with applicable JCAHO requirements.

The purpose of this position paper is to provide guidance to EMS providers and medical directors in developing PPR policies and protocols for use in their systems. This is an overview of the current literature and assessment of the methods that are currently in use throughout the United States by EMS systems.

DISCUSSION

Medical Issues

Conditions such as hypoxia, hypoglycemia, acute drug or alcohol intoxication, stroke, and brain trauma may present as confusion, combativeness, or agitation. EMS personnel must assess every agitated patient for these disorders. Some of these medical conditions are reversible and may be treated before completely restraining the patient.⁴ In one metropolitan EMS system, 9% of violent patients encountered by EMS were suffering from hypoglycemia.¹ Oxygen,

dextrose, and naloxone should be used to treat the underlying condition when appropriate.

Agitated delirium,⁵ drug overdose or intoxication, comorbid medical conditions, recent extreme exertion, fighting against restraints, and inappropriately applied restraints can contribute to adverse medical conditions. These conditions include positional asphyxia, aspiration, severe acidosis, rhabdomyolysis, and sudden cardiac death.^{6,7}

Restraint in the hobble, or hog-tied, position is particularly dangerous and has been the suggested cause of several deaths during both police and EMS transport.^{8,9} Hobble restraint is the technique of restraining an individual's wrists and ankles together behind the back. In an Austrian study, healthy volunteers were restrained in the hobble position, and physiologic parameters were measured in the upright and prone positions. During hobble restraint in the prone positions, the mean forced vital capacity (FVC) decreased by 40%, the mean end-tidal carbon dioxide increased by 15%, and the mean cardiac output decreased by 37%.⁹ A similar study by Chan et al. had less dramatic results. In this study, the restraint position was associated with a 13% decrease in FVC and no evidence of hypoxia or hypercapnea.¹⁰

The method of patient restraint must allow for continuous patient assessment and for medical interventions during transport. If a patient vomits, becomes unstable, or develops cardiopulmonary arrest, prompt treatment is needed.

Many EMS training programs do not include education about agitated delirium and its associated acidosis, hyperthermia, and psychotic behavior. EMS systems should assure that their personnel have been trained to recognize, evaluate, and treat the medical conditions that may cause or be related to agitation.

Medicolegal Issues

Emergency medical services systems and medical directors must be aware of the laws of their state. Local legislation related to an individual's rights, the processes for involuntarily restraining or holding patients with mental health disorders, an individual's right to refuse treatment, and other related laws must be considered when devising a PPR protocol. In general, legislation attempts to assure the safety of individuals who are an immediate threat to themselves or others.¹¹ It may be necessary to involve law enforcement or a mental health official to restrain a competent individual against his or her will.

When possible, systems should assure that patients are accompanied by personnel of the same gender as the patient during treatment and transportation. This is of particular importance when pharmacologic agents are used for chemical restraint.

The application of physical and chemical restraints to a patient must be performed with the understanding that overstepping the boundaries of restraint may be perceived as battery, assault, or false imprisonment. Restraint of an individual could even lead to serious allegations of civil rights violations. For this reason, the EMS service should always review PPR policies with legal counsel.

Types of Restraints

If a patient or individual is known to be violent, EMS personnel should assure that law enforcement secures the scene before EMS enters. Obviously, this is not always possible, and EMS providers should always be alert for unexpectedly agitated patients or escalating emotions. The safety of the EMS personnel is paramount, and it is appropriate for EMS to withdraw from a violent situation until law enforcement or additional assistance arrives.

Emergency medical services should anticipate the potential for exposure to blood and body fluids. Restraint procedures can expose EMS providers to blood, spit, urine, or feces. Based upon the situation, appropriate barrier protection should be worn during patient restraint activities.

The methods of restraint include verbal deescalation, physical restraint, and chemical restraint. The chosen method of restraint should be the least restrictive method that assures the safety of the patient and the EMS personnel. These methods of restraint may be applied in a stepwise fashion in many cases, but in extremely violent individuals, immediate physical restraint may be indicated to assure the safety of the patient and personnel.

Verbal Deescalation

The application of verbal techniques to calm the patient is usually the first methods that EMS personnel should employ. This method is safest because it does not require any physical contact with the patient. The conversation must be honest and straightforward with a friendly tone. Providers should avoid direct eye contact and encroachment upon the patient's personal space, as this may provoke stress and anxiety. EMS personnel should always attempt to have equally open escape routes for both the EMS personnel and the patient. Providers should assess the patient for suicidal and/or homicidal ideation. Verbal intervention sometimes diffuses the situation, can prevent further escalation, and may avoid the need for further restraint tactics.¹²

Physical Restraint

When physically restraining a patient, EMS personnel must make every effort to avoid injuring the patient, and PPR policies must choose restraint devices that are associated with the least chance of injury. Physical restraint is accom-

plished with materials and techniques that allow for the restriction of movement of a person who is considered a danger to himself/herself or others. Examples include soft restraints (sheets, wristlets, and chest posey) and hard restraints (plastic ties, handcuffs, and leathers).

In general, EMS protocols should avoid the use of hard restraints. If a system chooses to use hard restraints, all personnel should be trained in their use, and the patient's extremities should be evaluated frequently for injury or neurovascular compromise.

A minimum of five people should ideally be present to safely apply physical restraint to a violent patient. This allows for control of the head and each limb. This personnel requirement may be difficult for some EMS systems. There should be a plan and a team leader who directs the restraining process.¹²

Four-point restraints (restraining both arms and both legs) are preferred over two-point restraints. It is often helpful to tether the hips, thighs, and chest. Tethering the thighs, just above the knees, often prevents kicking, more than restraint of the ankles does. Contrary to the Emergency Medical Technician National Standard Curriculum (U.S. Department of Transportation, 1994), patients should not be transported while restrained in a prone position. This has been associated with asphyxia. Nothing should be placed over the face, head, or neck of the patient. A surgical mask placed loosely on the patient may prevent spitting. In addition, a hard cervical collar may limit the mobility of the patient's neck and may decrease the patient's range of motion in attempting to bite.

While gaining initial control of the patient during restraint, it may be acceptable to temporarily restrain the patient in a prone position or sandwich the patient with a mattress, but personnel must be

extremely vigilant for respiratory compromise. Gaining initial control of the patient in the prone position limits the patient's visual awareness of the environment and decreases the range of motion of the extremities. As soon as the team has control of the patient's movement, the team should work to move the patient into a supine four-point restrained position. Again, a patient should never be hobbled or "hog-tied" with the arms and legs tied together behind the back. During transport, a patient should never be restrained to a stretcher in the prone position or sandwiched between backboards or mattresses.

Once the patient has been restrained, he or she should never be left unattended. Also, providers should perform and document frequent neurovascular assessments of the extremities that are restrained to assure adequate circulation. A patient who has undergone physical restraint should not be allowed to continue to struggle against the restraints. This may lead to severe acidosis and fatal arrhythmia. In general, for the safety of EMS personnel, physical restraints applied in the field should not be removed until the patient is reevaluated upon arrival at the receiving facility.

Weapons used by law enforcement officers, including but not limited to pepper spray, mace defensive spray, stun guns, air tasers, stun batons, and telescoping steel batons, are not appropriate choices for PPR by EMS. They should be avoided since they may exacerbate the patient's agitation and increase the risk of injury or death. While appropriately trained law enforcement officers may use these weapons, the use of these weapons should be excluded from routine EMS protocols.

Chemical Restraint

Chemical restraint is defined as the addition of specific pharmacologi-

cal agents to decrease agitation and increase the cooperation of patients who require medical care and transportation. EMS systems may use a variety of agents for chemical restraint of the agitated or combative patient. The goal of chemical restraint is to subdue excessive agitation and struggling against physical restraints. Ideally, this pharmacologic sedation will change the patient's behavior without reaching the point of amnesia or altering the patient's level of consciousness.

Butyrophenones and/or benzodiazepines are the most commonly used medications for chemical restraint in emergency departments and in the out-of-hospital arena. Some other historical, but less advisable, medications include the barbiturates (pentothal), opioids (morphine), and phenothiazines (chlorpromazine).¹³

Chemical restraint protocols often include a butyrophenone, a benzodiazepine, or a combination of both. Lorazepam and midazolam are the benzodiazepines that are most commonly used for PPR. Droperidol and haloperidol are the butyrophenones that are commonly used for PPR.^{14,15} All four of these medications can be given intramuscularly or intravenously.

A few studies, summarized below, have evaluated the appropriate dose, route, and combination of medications administered for PPR. This limited prehospital literature supports the effectiveness of droperidol in decreasing the agitation of combative patients in the prehospital setting. Haloperidol and benzodiazepines have been shown to be effective in the emergency department setting,^{14,15} and these are probably also effective in the prehospital environment.

A placebo-controlled trial by Rosen et al. reported the effectiveness of prehospital droperidol.¹⁶ Hick et al. recently examined the safety and efficacy of droperidol (5 mg intramuscular) for prehospital

sedation of combative patients. In this one-year study of 53 EMS patients, droperidol quickly and effectively sedated 87% of the patients without any serious adverse events.¹⁷ In comparing lorazepam with droperidol for chemical restraint in the emergency department, Richards et al. concluded that droperidol produced a more rapid and better sedation than lorazepam.¹⁸

Benzodiazepines may be the drug of choice for patients who are agitated from the effects of toxicologic syndromes or drug overdoses. The most common adverse effects of benzodiazepines are hypotension and respiratory depression that may lead to hypoxia or hypoventilation.

Extrapyramidal symptoms and orthostatic hypotension are the most common side effect of butyrophenones. Prolonged QT interval and torsades de pointes are recognized adverse effects of both droperidol and haloperidol. In the past, the majority of these adverse effects were reported in critically ill patients or those receiving more than 50 mg/day of the butyrophenone.¹⁹

The Food and Drug Administration (FDA) recently reported "100 unique spontaneous cardiovascular adverse events following droperidol administration."²⁰ Twenty of these cases had torsades de pointes or QT interval prolongation. Eighteen deaths were reported, and six of these were associated with torsades or QT interval prolongation. Five of the deaths occurred in patients who received 2.5 mg or less.²⁰ These adverse events associated with droperidol have occurred in the context of the widespread use of droperidol for many years.

Droperidol did not previously have a listed indication for the chemical restraint of agitated patients, but the recently reported adverse cardiovascular events led the FDA to remove several of the approved indications, including

tranquilization after surgical or diagnostic procedures. These reports have also led to a decrease in the recommended doses of parenteral droperidol. In the United Kingdom, oral droperidol was discontinued after reports of QT prolongation during chronic use.²⁰

The new "black box" package warning states that all patients receiving droperidol (Inapsine) should undergo a 12-lead electrocardiogram (ECG) to assess for QT interval prolongation prior to administration. "If there is a prolonged QT interval, INAPSINE should NOT be administered. For patients in whom the potential benefit of INAPSINE treatment is felt to outweigh the risks of potentially serious arrhythmias, ECG monitoring should be performed prior to treatment and continued for 2–3 hours after completing treatment to monitor for arrhythmias."²¹ These new warnings will be almost impossible to follow when treating an agitated patient in the field, and the post-administration ECG monitoring recommendation may strain the resources of the receiving emergency facility. Unfortunately, the current wording in these new warnings does not address the possibility that some patients may be too combative for the recommended ECG monitoring, but these patients may still have potential benefit from treatment that outweighs the very small chance of cardiac dysrhythmia.

Neuromuscular-blocking medications with endotracheal intubation are never indicated to paralyze a patient solely for the purpose of restraining violent behavior. One small study reviewed combative trauma patients who were paralyzed and intubated to facilitate their trauma evaluation. While patients with high injury severity may have benefited from paralysis, those with low injury severity had higher costs and required more care if they were paralyzed.²² Patients who have coexisting medical conditions, for example,

severe head injury, may benefit from paralysis and intubation, but the decision to paralyze a patient should be based upon medical indications beyond violent or combative behavior.

Two surveys have addressed the practice of chemical restraint in air medical transport. Although they do not provide much scientific credence to the effectiveness or safety of chemical restraint in air medical transport, they indicate that benzodiazepines are the most commonly used medication for chemical restraint in air medical transport.^{23,24} A combative patient is a potentially higher threat to the safety of an aircraft crew than to a ground EMS crew. For this reason, some would argue that the use of paralysis and intubation is a valid means of restraining a combative air medical patient. This may be appropriate for severe head injury or multisystem trauma when intubation is usually indicated based upon the injury severity. Less restrictive methods of restraint, for example, chemical sedation, should be considered for patients without evidence of high injury severity.

When considering the use of chemical restraint, medical directors must weigh the risks of struggling while physically restrained against the side effect profile of the medications that are considered for sedation of agitated patients. At present, there is no consensus on the best medication or dosage for chemical restraint, and this decision is best deferred to the individual EMS system and its medical director.

CONCLUSION

Emergency medical services providers routinely encounter patients who are violent or combative due to a behavioral illness or a medical condition. Verbal, physical, and chemical restraint techniques provide effective ways of restraining patients who are a threat to themselves or require medical assess-

ment and treatment for a condition associated with combative or agitated behavior. Life-threatening adverse events have occurred in restrained individuals, and adherence to the principles of restraint presented here will minimize the occurrence of these adverse events. EMS systems and their medical directors should assure that their systems are prepared to appropriately treat violent or combative patients by providing training, policies, and protocols to deal with these situations.

The authors thank the members of the Standards and Clinical Practice Committee and the Board of Directors of the National Association of EMS Physicians for their review of this position paper and manuscript. The authors also thank the following individuals for their thoughtful review of the manuscript: W. Ann Maggiore, JD, EMT-P, Clinical Instructor, University of New Mexico School of Medicine; Robert Fonte, RN, Med, Clinical Educator/Crisis Specialist, Western Psychiatric Institute and Clinic, Pittsburgh, PA; David Julian, MEd, Clinical Educator/Crisis Specialist, Western Psychiatric Institute and Clinic, Pittsburgh, PA.

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