

REVIEW ARTICLE

Injury Prevention

Improving the management of acutely agitated patients in the emergency department through implementation of Project BETA (Best Practices in the Evaluation and Treatment of Agitation)

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Abstract

Agitated patients presenting to the emergency department (ED) can escalate to aggressive and violent behaviors with the potential for injury to themselves, ED staff, and others. Agitation is a nonspecific symptom that may be caused by or result in a life-threatening condition. Project BETA (Best Practices in the Evaluation and Treatment of Agitation) is a compilation of the best evidence and consensus recommendations developed by emergency medicine and psychiatry experts in behavioral emergencies to improve our approach to the acutely agitated patient. These recommendations focus on verbal de-escalation as a first-line treatment for agitation; pharmacotherapy that treats the most likely etiology of the agitation; appropriate psychiatric evaluation and treatment of associated medical conditions; and minimization of physical restraint/seclusion. Implementation of Project BETA in the ED can improve our ability to manage a patient's agitation and reduce the number of physical assaults on ED staff. This article summarizes the BETA guidelines and recent supporting literature for managing the acutely agitated patient in the ED followed by a discussion of how a large county hospital integrated these recommendations into daily practice.

KEYWORDS

agitation, physical assault, Project BETA, workplace violence

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1 | OVERVIEW AND OBJECTIVES

The emergency department is one of the most vulnerable hospital environments for workplace violence due to the high percentage of acutely agitated patients who have the potential to escalate into acts of violence such as verbal or physical assaults on ED staff.¹⁻⁸ A recent national poll in 2018 by the American College of Emergency Physicians (ACEP) of >3500 emergency physicians reported that nearly half had been physically assaulted while at work, with 60% occurring within the past year.⁸ A survey of 119 emergency medicine residents in 2016 reported that 66% had been physically assaulted by patients and only 16.8% confirmed prior training in violence prevention.⁷

Until recently, these violent behaviors by agitated patients in the ED were considered to be “part of the job” with seemingly one solution—to “restrain and medicate,” referring to the simultaneous use of physical restraints and chemical sedatives to control the patient’s behavior. In 2012, the American Association of Emergency Psychiatry (AAEP) published Project BETA (Best Practices in the Evaluation and Treatment of Agitation).⁹⁻¹⁴ These guidelines detail methods for a noncoercive, collaborative approach to managing acutely agitated patients based on both the best available evidence and expert consensus recommendations. The purpose of this article is to review these guidelines and discuss their implementation in the ED of a large county hospital.

2 | OVERVIEW OF BETA GUIDELINES

2.1 | General approach

Project BETA was an interdisciplinary effort in 2012 led by the AAEP that brought together experts in psychiatry, emergency medicine, nursing, psychology, and social work.⁹ The 5 workgroups articulated the following principles: verbal de-escalation as a first-line treatment for agitation; pharmacotherapy that treats the most likely etiology of the agitation; appropriate psychiatric evaluation; appropriate treatment of associated medical conditions; and minimization of physical restraint/seclusion.⁹⁻¹⁴ Given that most physical assaults occur during the containment process, this approach can avert some violent acts against ED staff.¹⁵ The critical steps discussed in Project BETA are briefly summarized below.

2.2 | De-escalation

De-escalation can be defined as a combination of both verbal and non-verbal strategies intended to assist the patient with calming down to cooperate with their ED evaluation and treatment.¹² Patients who are able to make eye contact and engage in any form of conversation are more likely able to be de-escalated. De-escalation is a powerful tool to reduce a patient’s agitation, build trust with caregivers and mitigate violent acts but requires an empathetic attitude, patience, and sincere interest in helping the agitated patient regardless of their history or clinical presentation. Prompt de-escalation tactics may effectively reduce aggressive behavior¹⁶ and are described elsewhere.¹²

TABLE 1 Life-threatening causes for acute agitation in the emergency department^{4,14,17,18}

	Condition
Trauma	Burns
	Head injury
Infection	Syphilis
	Meningitis, encephalitis
	Sepsis from other infections
Toxicologic	Adverse drug reaction (including serotonin syndrome, neuroleptic malignant syndrome, and steroid-induced psychosis)
	Overdose or intoxication
	Sedative-hypnotic agent withdrawal
Respiratory	Hypoxia
	Hypercarbia
Cardiovascular	Shock
	Hypertensive encephalopathy
Thermoregulation	Hypothermia
	Hyperthermia
Metabolic/endocrine	Acidosis
	Hyper- or hypo-glycemia
	Electrolyte abnormalities
	Hyper- or hypo-cortisolism
	Hepatic or uremic encephalopathy
	Nutritional deficiency (eg, Wernicke’s encephalopathy)
Nervous system	Thyroid disorders (eg, thyroid storm, myxedema coma)
	Stroke
	Tumor
	Seizure
	Vasculitis
	Hemorrhage
	Hydrocephalus
	Dementia or other chronic cognitive impairment
Psychiatric	Psychosis
	Schizophrenia
	Paranoid delusions
	Personality disorder

Adapted from Gottlieb et al¹⁸ with permission.

2.3 | Medical evaluation

The medical evaluation begins during the initial assessment and evaluates the patient for “red flags” (eg, abnormal vital signs, trauma, and abnormal neurologic exam) concerning life-threatening issues that need immediate attention. A more thorough evaluation is performed once the patient is calmer and is safe to do so. Collateral information

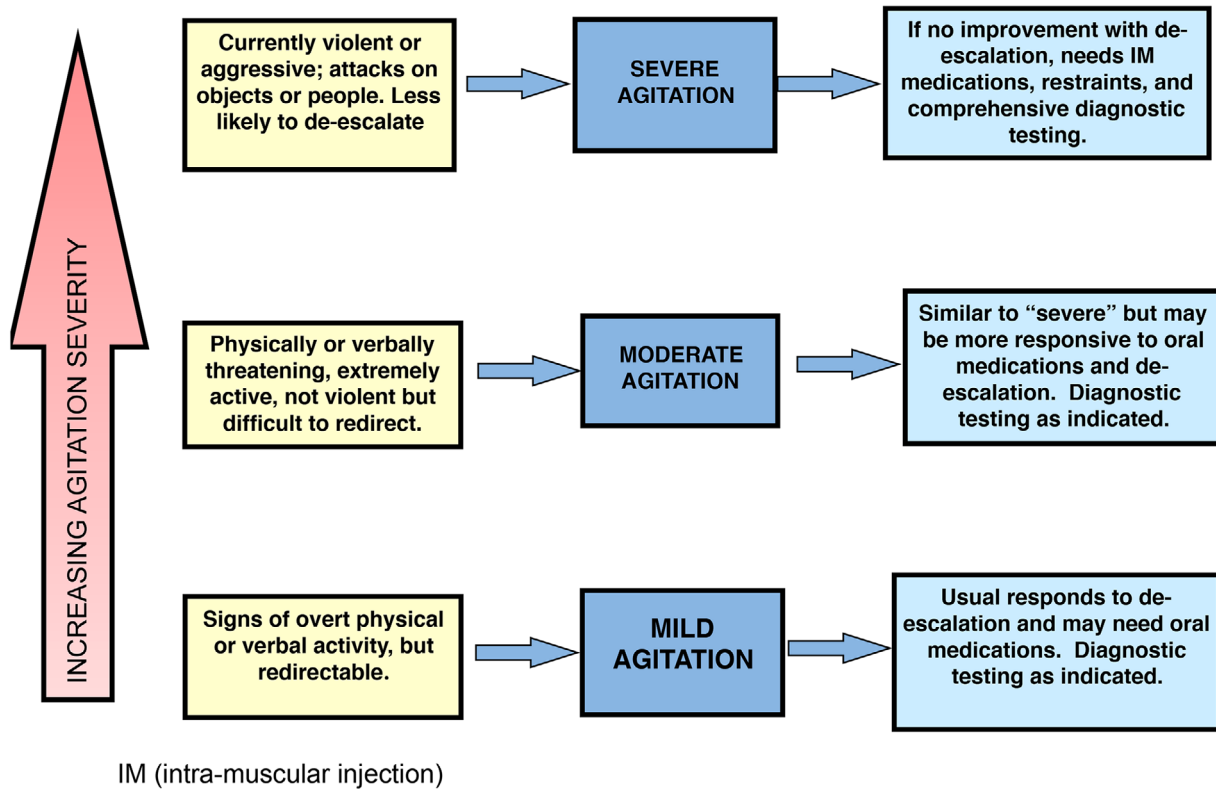


FIGURE 1 Violence/agitation severity leveling and initial course of action. IM, intra-muscular injection

from out-of-hospital providers, bystanders, or significant others are invaluable to determining the etiology of the patient's agitation. The most common life-threatening etiologies for acute agitation are listed in Table 1.^{17,18} Agitation severity and violence risk must also be determined ideally with one of the validated tools available to quantify this assessment.^{19,20} The patient's response to de-escalation and level of agitation will determine the next step (Figure 1).

Diagnostic studies may be indicated to evaluate for medical causes of the patient's agitation or sequelae of the patient's agitated state such as dehydration, rhabdomyolysis, renal insufficiency, and respiratory compromise (Table 2). A medical etiology must also be considered in patients with known psychiatric disease but whose presentation is inconsistent with prior psychiatric presentations, are older than 45 years old with no previous psychiatry history, or are immunocompromised.^{14,21,22}

2.4 | Psychiatric evaluation

The focus of the initial psychiatric evaluation is not to make a definitive psychiatric diagnosis but to assist in determining the likely cause of the patient's agitation in order to guide preliminary interventions.¹³ A complete psychiatric evaluation can be obtained if indicated once the patient is calm but is beyond the scope of Project BETA. The presence of psychotic symptoms (eg, hallucinations, delusions, disorganized thoughts) will influence medication choices if required for agitation symptoms.

2.5 | Pharmacotherapy

Although multiple pharmacological options have been proposed for the treatment of agitation, some general principles guide therapy. Medications may help agitation symptoms if non-pharmacologic measures are not successful,¹¹ Medications are intended to "calm" the patient without over sedation,²⁸ which is a significant concern in higher risk patients (eg, elderly).²⁹ Thus, the lowest possible dose is recommended in these individuals.^{29,30}

When possible, the patient needs to be involved in deciding the type and route of administration.¹¹ Oral medications are less expensive, more humane, and usually as effective as intramuscular medications.^{31,32} The oral route is preferred over the intramuscular route if the patient can cooperate and tolerate their administration. Sometimes offering the patient food or other supportive measure can facilitate their cooperation with taking medication.

Medications are necessary whenever physical restraint of the patient is required to prevent injuries and complications associated with resisting restraint.³³ Sedating a patient requiring physical restraint may also reduce the negative consequences in wellbeing reported by individuals who have been physically restrained due to their sedative and sometimes amnestic effects.³⁴

The medications most commonly used in the ED for acute agitation are antipsychotics and benzodiazepines. Ketamine was recently added to this list for severely agitated patients.³⁵⁻³⁷ The most likely etiology for the patient's agitation influences medication choices (Figure 2).¹¹ In general, antipsychotics are used for patients with psychosis and

TABLE 2 Diagnostic studies that may be indicated in the evaluation of the agitated patient

Name of test	Indication or example pathology causing or resulting from agitation
Point-of-care glucose	Hyperglycemia or hypoglycemia; obtain immediately on anyone with an alteration in mental status
Complete blood count (CBC)	Anemia, leukemia, infection, low or high platelets
Basic metabolic profile including calcium, magnesium and phosphorus	Electrolyte abnormalities and renal function, normal or anion gap acidosis, dehydration
Liver function tests including albumin	Hepato-biliary disease including liver failure, malnutrition (low albumin)
Lipase	Pancreatitis
Ammonia	Hepatic encephalopathy ²³
Troponin	Cardiac structural abnormality
Creatine phosphokinase	Rhabdomyolysis, myopathy, other muscle damage or inflammation
Lactate dehydrogenase	Cell damage or destruction; in setting of low platelets, concerning for thrombotic thrombocytopenic purpura (TTP)
Thyroid stimulating hormone	Hypo or hyperthyroidism
Lactate	Tissue hypoxia; sepsis ²⁴
Urine toxicology screen	Evaluate for ingestion, explain alteration in mental status or association with persistent tachycardia or severe hypertension. Many limitations with false-positive and false-negative results ²⁵
Acetaminophen level	To evaluate for overdose, a 4-h level of 140–150 $\mu\text{g/mL}$ at 4 h requires treatment with N-acetylcysteine (NAC). ²⁶
Salicylate level	To evaluate for overdose, severity depends on clinical presentation, severity of acidosis and plasma salicylate concentration that may not be reliable and needs repeating ²⁷
Urinalysis	Infection, hydration status, ketosis
Pregnancy test	For all women of reproductive age
Blood culture	To evaluate for infection in sepsis workup
Urine culture	To evaluate for infection in sepsis workup
Prottime with INR	To evaluate for coagulopathy or screening for lumbar puncture
Partial thromboplastin time	To evaluate for coagulopathy or screening for lumbar puncture
Cerebrospinal fluid	Encephalitis or meningitis, syphilis, cerebritis
Electrocardiogram (ECG)	To evaluate for changes associated with electrolyte abnormalities, overdose or drug side effects (eg, QTc prolongation), cardiac disease
Head CT scan	To evaluate for mass lesion, bleed, stroke, large ventricles

benzodiazepines are added if agitation symptoms persist after the initial dose of antipsychotic. Second generation antipsychotics (SGA) have less extrapyramidal symptoms (EPS) than the first generation antipsychotics. Benzodiazepines or antihistamines are often co-administered with first generation antipsychotics to counteract these effects. Benzodiazepines are given for agitation symptoms due to intoxication, especially stimulants but antipsychotics are preferred for intoxications due to central nervous system depressants such as alcohol. Patients with agitation due to alcohol or benzodiazepine withdrawal are treated with benzodiazepines. Benzodiazepines are also recommended for patients with undifferentiated agitation; however, antipsychotics may help if psychotic symptoms are present. Low-dose antipsychotics are also the drug of choice in agitated patients with delirium if symptoms persist despite attempts to treat the underlying etiology and nonpharmacological interventions are insufficient.¹¹ Table 3 summarizes medications most commonly used for agitation in the ED.

2.6 | Restraint and seclusion

Project BETA strongly opposes the practice of restraint and seclusion. Seclusion is less commonly used in the ED setting.¹⁰ Although restraints are thought to be an effective method to temporarily halt violent behaviors, restraints carry an elevated risk of injury to patients and staff,^{15,33,53} are experienced as coercion or aggression, and can lead to psychological trauma.³⁴ For these reasons, the Center for Medicare & Medicaid Services (CMS) established guidelines regarding restraint and seclusion for healthcare professionals emphasizing that patients cannot be restrained only for refusal of care or as punishment.⁵⁴

The patients' privacy and dignity need to be maintained during restraint application.⁵⁵ If possible, five trained individuals need to apply the physical restraints with one person at each extremity and one person at the head of the bed, being careful to avoid bodily injury due to excessive use of force or compromise the patient's

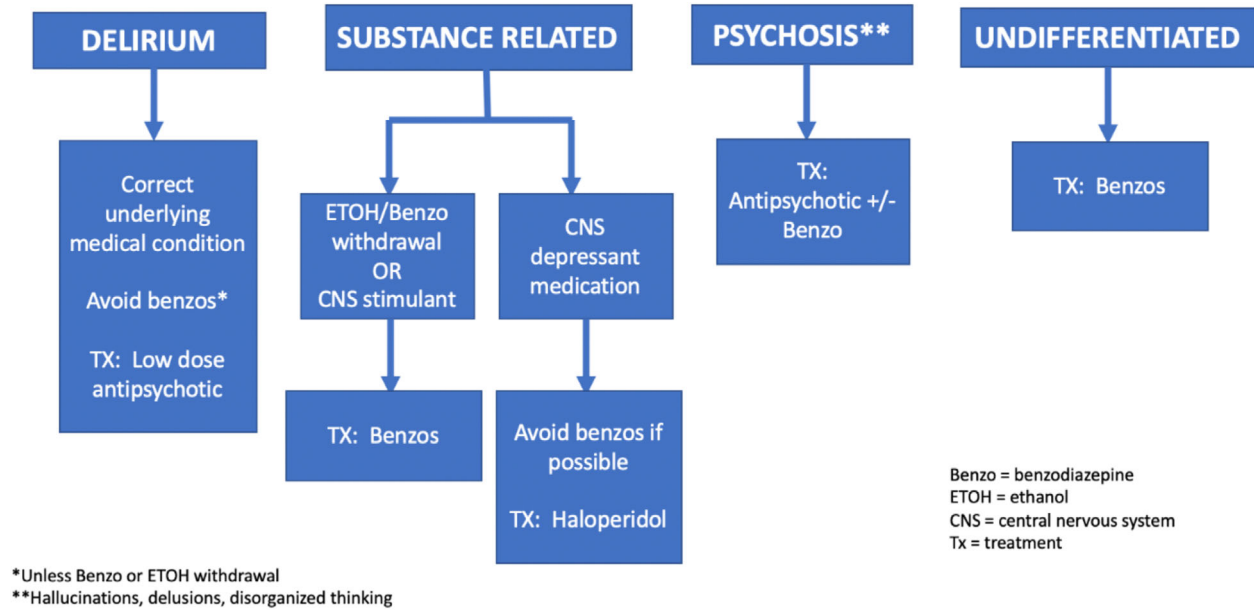


FIGURE 2 Pharmacology algorithm: medication recommendations depend on most likely etiology of the patient's agitation^{11,56}

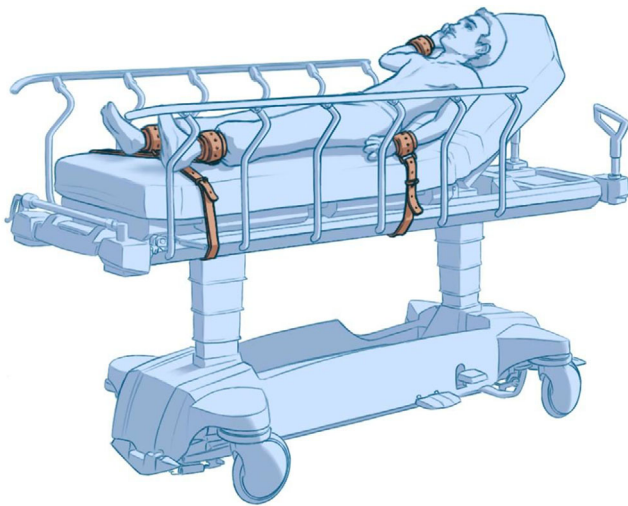


FIGURE 3 Correct application of restraints for severely agitated patients. Original image by Skylar Burchatz with permission

ability to breathe.^{56,57,58} Once the patient is calmer, they can be placed in a supine position with the head of the bed elevated and extremity restraints tethered to the side of the bed and not the side rails preferably with one arm upward and the other downward. The legs need to be tied to the opposite side of the bed to minimize the patient's ability to kick ED staff (see Figure 3).^{58,59} All care providers need to wear appropriate personal protective equipment especially if the patient is spitting or trying to bite ED staff. If this occurs, also consider placing an oxygen mask over the face if institutional laws do not restrict this practice.

3 | IMPLEMENTATION OF THE BETA GUIDELINES: THE PARKLAND EXPERIENCE

Parkland Hospital is a busy county hospital with an annual ED volume of over 240,000 patient visits and a large emergency medicine residency program. In 2016, as part of a quality improvement (QI) initiative due to an influx of physical assaults by patients on our residents in the Parkland ED, an agitation order set in the electronic medical record was created and an educational curriculum was developed based on the BETA guidelines. The order set includes all physician orders typically needed for agitated patients (Table 4) and was created by a multidisciplinary team, composed of ED administrators, nursing, emergency and psychiatry physicians, pharmacists, and police. The objective of the agitation order set was to make it easier for ED providers to adhere to the BETA recommendations, because order sets have demonstrated effectiveness in regards to improving compliance with guidelines.⁶⁰ The agitation educational curriculum includes verbal de-escalation and self-defense training for incoming interns, as well as annual teaching of the BETA guidelines and Parkland's agitation protocol through lectures and simulation. An unpublished survey just prior to implementation found that 28% of the 50 emergency medicine residents who responded had been physically assaulted by an ED patient during residency.

Several new policies and protocols were developed concurrently by the Parkland ED administration to improve safety and the care provided to agitated patients. These and some pre-existing related practices are summarized below that further support the BETA initiatives.

1. Parkland's "zero tolerance" for violence policy is posted at hospital entrances.

TABLE 3 Pharmacology for the agitated patients^{11,35,38–52}

Category	Generic name	Trade name	Dose	Time of onset(min)	Comments
First generation antipsychotic	Haloperidol	Haldol	Mild: 2.5 mg PO	30	<ul style="list-style-type: none"> • Highest risk of EPS; administer with benztropine, diphenhydramine, lorazepam, OR promethazine can decrease risk and need for repeated doses. Avoid 3 drug therapy. • Increased risk for QTc prolongation with IV route. • May lower seizure threshold • May repeat in 0.5–4 h. MAX: 30 mg/day
			Moderate: 5 mg PO	30	
			Severe: 5 mg IM	30	
	Droperidol	Inapsine	Severe: 5 mg IM or IV	15	<ul style="list-style-type: none"> • Increased risk for EPS and QTc prolongation • Administer with 5 mg of midazolam. MAX: 10–20 mg/day
Second generation antipsychotic	Olanzapine	Zyprexa	Mild: 5 mg ODT	≤60	<ul style="list-style-type: none"> • Avoid concomitantly use of benzodiazepines within 1 h • MAX: 20 mg/day
			Moderate: 5–10 mg ODT	≤60	
			Severe: 10 mg IM	15–45	
	Risperidone	Risperdal	Mild: 1 mg ODT	≤60	<ul style="list-style-type: none"> • Works best in patients with undifferentiated agitation or substance use related agitation (except for CNS depressant intoxication). • Highest risk for EPS of SGAs. Can cause orthostatic hypotension. • May repeat every 4–6 h. MAX not established but caution above 10 mg/d.
			Moderate: 2 mg ODT	≤60	
	Ziprasidone	Geodon	Severe: 10–20 mg IM	15–30	<ul style="list-style-type: none"> • Highest risk of QTc prolongation of SGA, likely exceeds haloperidol. Avoid use in patients with cardiac disease or pre-existing QTc prolongation. • Needs to be reconstituted • May repeat dose in 4 hours. MAX: 40 mg/d
Benzodiazepines	Lorazepam	Ativan	Mild: 2 mg PO	20–30	<ul style="list-style-type: none"> • Slowest onset and longest duration of all benzos. • Used for undifferentiated agitation but use with caution in patients with CNS depression (eg, ethanol intoxication). • For severe agitation, can give midazolam 5 mg IM with haloperidol or droperidol 5 mg IM.
			Midazolam	Versed	
			Moderate: 5 mg IM or 2.5 mg IV	15 (IM) 5 (IV)	
			Severe: 10 mg IM or 5 mg IV	15 (IM) 5 (IV)	
Dissociate anesthetic	Ketamine	Ketalar	1–2 mg/kg IV or up to 5 mg/kg IM	1–2 (IV); 3 (IM)	<ul style="list-style-type: none"> • Can cause emergence reaction, bronchorrhea and laryngospasm (rare). May increase intubation rate. • Typically used for severely agitated patients such as excited delirium. Can increase HR, CO, BP

Abbreviations: BP, blood pressure; CO, cardiac output; EPS, extrapyramidal symptoms; HR, heart rate; IM, intramuscular; IV, intravenous; ODT, orally disintegrating tablets.

- All ED nurses receive training in de-escalation and self-defense training.
- The hospital has its own police force with officers at all public entrances to the ED where they screen all patients and visitors with metal detectors. One of the officers on duty is designated to be the LIFE (Law Enforcement Intervention for Environmental/Patient Safety) officer who has advanced training in communication and de-escalation skills. This specially trained officer may familiarize themselves to the potentially violent patient and can easily return if a patient starts to escalate. ED staff can contact the Parkland police by radio, phones, or use of a panic button located in each patient care area. Parkland police aid in physical restraint when indicated, allowing ED staff the ability to safely medicate, evaluate, and treat the patient.
- Cameras are located throughout the ED and worn by police to record events.
- Nurses in triage screen patients with the violence screening tool STAMP (Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling, and Pacing)⁶¹ and document this in the electronic medical record where it is easily visible on the patient tracking board. A special wrist band is placed on the patient, and a sign is placed on their doorway to alert all healthcare workers of the violence risk. Prior history of violent behavior is also highlighted in the electronic medical record.
- Any patient who is a danger to themselves or others is typically assigned a sitter who removes all objects from the patient's room and does continuous observation, usually from the doorway. These patients are dressed in green hospital gowns with

Project BETA summarizes the critical steps in the management of agitated patients based on a growing body of evidence and consensus recommendations. Although there are variations in how these practices are executed, the essential components need to be part of the standard of care delivered to all agitated patients. These practices were a paradigm shift to our approach to these patients as “restrain and medicate” were an almost reflexive response to severely agitated patients before implementing BETA, similar to most other EDs. Our staff adaptation and adherence to these new policies were the result of many factors such as a change in culture with “zero tolerance” for workplace violence, administrative and police support, the collaboration of a multidisciplinary team and the desire by ED staff to change the status quo. There are many methods of training healthcare providers such as simulation, clinical case vignettes, and online videos.^{63–67} A standardized method that can be uniformly taught year round to a large volume of people is probably most effective as is the case with the many certifications required of healthcare providers. De-escalation is easy to learn and there is no evidence to suggest the duration of instruction needed to learn this practice changing technique. Similarly, there are several options available to risk stratify and alert ED staff for potentially violent patients—what is most important is that mechanisms exist.

4 | CONCLUSION

Agitated patients presenting to the ED are at risk for escalation to violent behaviors. Project BETA brings an awareness to these critical steps for managing these patients in a way that is easy to understand and implement by health care providers. These guidelines can be integrated into ED practices to improve the care provided to these patients and reduce violent acts but requires a multidisciplinary team, administrative support, security services, and additional training of staff.

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AUTHOR CONTRIBUTIONS

LR was the lead author, responsible for the overall manuscript and led the task force who developed the “agitation protocol and order set” initially designed for the emergency medicine residents at Parkland Memorial Hospital assisted by DM, FK, RD, JM and TC. DM contributed significantly to the initial draft of this article and designed Figure 1. FK was responsible for the psychiatric evaluation and restraint section and assisted RD with the pharmacology content. AW and MW provided significant contributions in the development of this manuscript and content review.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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