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Emergency Department Management of the Agitated Pediatric Patient

Identifying and managing agitated pediatric patients in the emergency department (ED) can be stressful and challenging for patients, families, and providers. ED visits for psychiatric or behavioral complaints constitute approximately 3-4% of the more than 30 million annual pediatric ED visits.¹ Encounters likely will rise as the availability of community mental health resources remains low or even decreases, insurance providers limit reimbursement for mental health services, and recognition of mental health disorders increases in the general population. In a study evaluating psychiatric-related visits to the ED, children with psychiatric-related complaints used disproportionately more hospital resources. These patients had higher rates of recidivism, longer ED stays, and higher probability of admission or transfer compared to their counterparts with non-psychiatric-related complaints.² Yet, many providers may be uncomfortable with treating agitation in the pediatric population. Often, ED providers have less experience using antipsychotics and benzodiazepines in children and adolescents as compared to adults, and have less data to rely on for the efficacy and safety of these agents in the pediatric population.

— Ann M. Dietrich, MD, Editor

Introduction

Understanding the agitated pediatric patient in the ED requires looking beyond simply psychiatric chief complaints. While agitation can be a manifestation of psychiatric disease, agitation may be a symptom of other disorders and even a byproduct of the ED environment itself. It is the ED physician's task to recognize patients at risk for agitation or violence, to treat or to exclude reversible etiologies, and finally, if possible, to de-escalate or to institute measures along a continuum to manage agitation when it arises.

Predicting Risk and Assessing Agitation

Agitation may be part of the initial presentation, occur as a natural progression of an underlying condition, or occur as a reaction to the ED experience itself. Manifestations of agitation may be wide-ranging in pediatric patients, and ED physicians must have a high index of suspicion for at-risk patients in order to intervene early.

Agitation is "a state of behavioral dyscontrol that will likely result in harm to the patient or health care workers without intervention."³ In children, agitation often progresses in a stepwise fashion, providing clues and opportunities for early intervention. First is the verbal stage, in which the child will use general threats and/or abusive language. In the second stage, the motor stage, children will remain in near constant motion, such as pacing. In the third, or property damage stage, the patient becomes destructive, attempting to break nearby objects.

Executive Summary

- Agitation may be part of the initial presentation, occur as a natural progression of an underlying condition, or occur as a reaction to the ED experience itself. Manifestations of agitation may be wide-ranging in pediatric patients, and ED physicians must have a high index of suspicion for at-risk patients in order to intervene early.
- Some of these conditions are easily reversible and should be considered early. The “GOT IVS” mnemonic is a helpful reminder of commonly encountered conditions, including hypoglycemia, hypoxia, infection, and trauma.
- Primary psychiatric disorders, such as major depression or bipolar disorder, should only be diagnosed after other causes of agitation have been excluded.
- If a provider encounters agitation, a state that will likely result in harm without further intervention, interventions should progress from least restrictive to most restrictive.
- Calming interventions and space modifications should occur first. If pharmacologic intervention is needed, appropriate symptom-focused treatment should be used. Only if necessary, medications such as benzodiazepines and antipsychotics may be used as chemical restraints. Additionally, for patient and staff safety, physical restraints may also be indicated. If restraints are necessary, providers must be familiar with The Joint Commission and hospital-specific requirements and protocols.

Finally in the attack stage, children may attempt to harm themselves or others. Although each individual’s course may be different, it remains imperative that providers recognize the early signs and states of agitation in order to avert or de-escalate the behavior.⁴

While it is an important diagnosis on the differential, agitation is not confined to those children with a primary psychiatric disorder. Children must be thoroughly evaluated, including a detailed history and physical exam, to determine if there is any underlying condition that either may be causing agitation or exacerbating a chronic condition. Medical conditions such as head injuries, intracranial infections such as meningitis, metabolic abnormalities, and ingestions may cause psychosis or put patients at greater risk for agitation. Some of these conditions are easily reversible and should be considered early. The “GOT IVS” mnemonic is a helpful reminder of commonly encountered conditions, including hypoglycemia, hypoxia, infection, and trauma.⁵ (See Table 1.) Primary psychiatric disorders, such as major depression or bipolar disorder, should only be diagnosed after other causes of agitation have been excluded.

In addition, certain neurodevelopmental conditions may place children at a greater risk for agitation in an unfamiliar, unstructured,

and sometimes chaotic environment. More vulnerable populations include children with intellectual disabilities, attention deficit hyperactivity disorder, and autism spectrum disorders (ASD). Beyond the difficulty these populations may have with the new and uncertain environment of an ED, comorbid psychiatric disorders exist at higher rates; as high as 80% of children with ASD may have a comorbid psychiatric disorder such as bipolar disorder.⁶ A recent study found that 13% of ED visits among children with ASD were due to psychiatric emergencies as opposed to 2% in the general population.⁷ In part, this may be due to a lack of access to mental health services, a paucity of mental health professionals trained for these special populations, and poor insurance coverage of mental health services for individuals with an ASD diagnosis.⁷

Finally, intoxication or ingestion, intentional or accidental, may present as a behavioral emergency. (See Table 2.) A review of data from National Hospital Ambulatory Medical Care Survey from 1993-1999 shows that substance-related disorder was the most common diagnosis for ED mental health visits at almost 25%.⁸ The differential of substances that can cause agitation is broad. Common classes include alcohol, anticholinergics, sympathomimetics, hallucinogens, cannabis and

Table 1. GOT IVS

G	Glucose: hypoglycemia
O	Oxygen: hypoxia
T	Trauma: head injury
	Temperature: hyper- or hypothermia
I	Infection: meningitis, encephalitis, brain abscess or sepsis
V	Vascular: stroke, subarachnoid hemorrhage
S	Seizure: postictal or status epilepticus

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its derivatives, and new agents are constantly emerging. Anticholinergic ingestion may present as new-onset psychosis. Other signs and symptoms include urinary retention, hyperthermia, hypertension, tachycardia, diaphoresis, and quiet or absent bowel sounds.⁹ Agents responsible for anticholinergic syndrome include diphenhydramine, scopolamine, and jimson weed. Sympathomimetics may exacerbate underlying psychiatric disorders or place patients in a heightened state of irritability.⁵ Offending agents include over-the-counter medications such as pseudoephedrine, dextroamphetamine, as well as drugs of abuse such as

MDMA, methamphetamine, and cocaine. Patients using hallucinogens such as phencyclidine (PCP), dextromethorphan, and ketamine may present in a dissociative state. But the most commonly used drug in the United States is marijuana. Activation of cannabinoid receptors can cause panic and anxiety.¹⁰ Another increasingly popular drug among adolescents is salvia divinorum. Salvia has the hallmark of dysphoria, synesthesia, and visual hallucinations.¹¹ As the universe of potential intoxications and ingestions grows, ED providers should have a low threshold to consult their toxicologist or Poison Control in behavioral emergencies.

Agitation Management

As with many ED protocols, the ED provider must remember that agitation interventions progress from the least restrictive (environmental alterations) to most restrictive (chemical or physical restraints), unless safety is immediately at risk. (See Figure 1.) Evaluation for possible reversible etiologies and appropriate treatment based on these diagnostics should continue as soon as it is safe for the patient and staff.

Optimizing the Environment

First, the ED staff may simply begin with the room. If space provides, your ED can designate a room to be a “safe room.” This room will have less equipment, fewer breakable items, and provide a quiet space. However, any room can be adjusted quickly to provide greater safety. Staff can remove objects that are distracting or agitating (e.g., monitors, computers), that create a risk to the patient (e.g., tubing or wires), or that clutter the space (e.g., unnecessary stands or chairs). Less stimulation in the form of objects, people, noise, and even light may be helpful. If family or friends are heightening rather than alleviating agitation and anxiety, then the ED provider should ask them to leave temporarily. In the end, creating a safe space may provide a greater sense of control. For

Table 2. Ingestions and Toxidromes

Ingestion	Presentation
Sympathomimetics	Hyperthermia, tachycardia, mydriasis, diaphoretic, hyperalert, hallucinations, paranoia
Anticholinergics	Hyperthermia, tachycardia, mydriasis, dry skin, visual hallucinations, psychosis, delirium, urinary retention, decreased bowel sounds
Opioids	Hypothermia, bradycardia, miosis, depressed mental status, confusion, hyporeflexia
Hallucinogens	Tachycardia, nystagmus, hallucinations, depersonalization, euphoria
Ethanol	Hypothermia, bradycardia, altered mental status, ataxia, slurred speech
Serotonin syndrome	Hyperthermia, tachycardia, mydriasis, diaphoretic, confusion, agitation, or coma, tremor, hyperreflexia, clonus

example, allowing the patient room to pace can alleviate anxiety or psychomotor agitation.

Second, the ED staff must be mindful of their own reaction to the situation. Listening, empathizing, and being mindful of your own responses to the child’s actions are key. Both the content and style of language are important to creating a calm environment. Using a calm, soft voice at a slow pace will be reassuring. ED providers can minimize uncertainty by clearly introducing themselves and explaining procedures and time course to patients and to their families. Reassure the patient that your goal is to keep him or her safe. Further, clarify the patient’s goals as well. Understanding the patient’s concerns and goals will help you connect these to actions, rewards, and an improved sense of control. ED providers must not take the patient’s anger personally. Other calming interventions may include:

- offering a warm blanket, food, or drink if possible;
- offering discrete choices, such as choosing to have lights on or off, choosing to have parents in or out of the room, choosing what type of juice or snack to have;
- offering toys or similar items that may distract the patient from uncomfortable procedures;

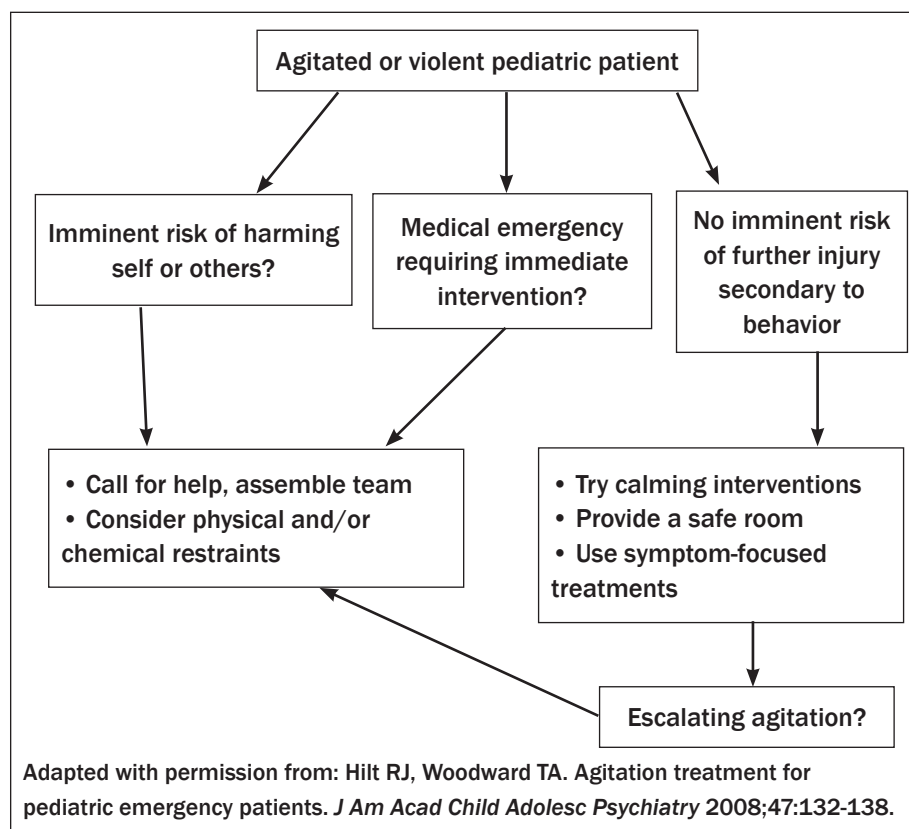
- engaging consultants, such as social work, psychiatry, child life, and security as needed.¹²

Psychopharmacology: Symptom-Focused Treatment versus Restraint

If the de-escalation efforts described fail to work, ED providers will need to turn to pharmacologic interventions. The same classes of medications are used to prevent further agitation as well as to restrain. As described by the Centers for Medicare and Medicaid Services, a drug or a medication becomes a restraint “when it is used as a restriction to manage the patient’s behavior or restrict the patient’s freedom of movement and is not a standard treatment or dosage for the patient’s condition.”¹³ Use of these medications short of this would be considered symptom-focused treatment.

Therefore, when possible ED providers should start with symptom-focused treatment. It is imperative to know as much as possible about the patient’s other medical conditions, current medications, allergies or other adverse reactions, and any possible ingestions (medication, alcohol, or otherwise).¹ There are at least three scenarios in which an

Figure 1. Management of an Agitated Patient



ED provider should use symptom-focused treatment. First, the patient may have missed doses of his usual medications because he had to come to the ED. If so, providing a patient with his usual medication regimen is an appropriate first step, unless there is a concern for overdose or other complicating ingestion. Second, even if the patient has not missed a dose but is taking an antipsychotic or a benzodiazepine for anxiety, one-quarter to one-half of his daily dose in between scheduled doses may help to treat agitation or anxiety.¹² Third, patients without an underlying psychiatric diagnosis may benefit from symptom-specific treatment for anxiety, agitation, or psychosis to prevent escalation. Oral medications are preferred to intramuscular administration, and while not as rapid in onset, are as effective.¹⁴ In this setting, the ED provider should use doses in the lower therapeutic range to achieve symptom-focused treatment rather than a level of sedation that restricts the patient's freedom of movement.

Table 3 provides recommendations based on symptoms.¹²

Ultimately, chemical restraints may be necessary for the safety of the patient and the staff. According to The Joint Commission, restraints may be used only when clinically justified or if the patient's behavior may endanger the patient or staff.¹⁵ Thus, the same medications used for symptom-focused treatment become chemical restraints when used specifically to prevent imminent injury to the patient and others, and when the medication is not part of the patient's usual or expected treatment plan. Clinical justifications for restraints must be documented and may include decreasing a patient's anxiety and, thus, preventing an escalation of behavior, minimizing disruptive behavior, or providing urgent medical aid. Restraints must not be used as a form of punishment or for convenience. The Joint Commission requires that hospitals have written policies and procedures guiding the use of restraints.¹⁵

Providers must be familiar with their hospital's policies, including requirements regarding initiation and application of restraints, patient monitoring while restrained, reassessment of necessity, documentation, and reporting complications.

Medications

Due to the lack of studies in pediatric patients, ED providers must be familiar with a range of medications that can be used to treat varying levels of agitation, taking into consideration patient characteristics and the particular features of his or her agitation. (See Table 4.)

Antihistamines.

Diphenhydramine is commonly used in the pediatric ED for other chief complaints; thus, providers and even families are well familiar with its sedating properties. It is most appropriate for milder agitation as symptom-focused treatment.¹ Some patients, particularly children with intellectual disabilities or developmental disorders, may have a paradoxical reaction to diphenhydramine, leading to disinhibition and possibly worsened agitation.³ As with any antihistamine, there is a risk of anticholinergic side effects such as dry mouth, tachycardia, dizziness, constipation, urinary retention, delirium, and seizures or arrhythmias. If this occurs, most patients need only supportive care; the use of physostigmine is controversial.¹⁶

Benzodiazepines.

Benzodiazepines are an appropriate pharmacologic intervention for several etiologies causing agitation, including panic disorders, anxiety, alcohol withdrawal, and cocaine use.¹ Further, they are often the drugs of choice for sedation because of their rapid onset and variety of available routes of delivery. While there are no data in children showing superiority of any particular benzodiazepine, lorazepam is frequently used for its rapid onset, short half-life, multiple routes of administration (sublingual, IM, rectal, oral, IV), and lack of active metabolites.¹⁷ In a study by Dorfman, 82% of emergency medicine residencies and 82% of pediatric

emergency medicine fellowships used benzodiazepines for chemical restraint of children age 12 years old and younger, with lorazepam being the most commonly cited.¹⁸ The rates of benzodiazepine use were similarly high in children age 13 years or older.

The most common complication of benzodiazepines is respiratory depression, which underscores the need for close respiratory monitoring. Benzodiazepines may also cause confusion, ataxia, and nausea. Similar to diphenhydramine, some patients may have a paradoxical response to the medication and become increasingly agitated. In particular, patients with developmental delay or organic brain disorders may be at increased risk for this side effect.¹⁷

Neuroleptics. The use of neuroleptics in the ED relies less on their antipsychotic effects and more so on their sedative properties. Typical antipsychotics such as haloperidol are dopamine receptor antagonists. Atypical antipsychotics, such as risperidone, olanzapine, and ziprasidone, are serotonin-dopamine receptor antagonists. Most ED providers are familiar with using haloperidol across a range of agitation presentations. However, risperidone has been studied in pediatric patients, specifically with autism or pervasive developmental disorders, demonstrating effectiveness at controlling aggression and self-injury.³ Ziprasidone may be best for patients with underlying schizophrenia, and is used routinely in patients with Tourette syndrome.¹⁷ Olanzapine is recommended for patients with underlying schizophrenia, bipolar mania, and dementia.

Of note, the use of droperidol remains controversial. In 1995, the Food and Drug Administration issued a black box warning for droperidol for QT prolongation. In one retrospective chart review, 79 pediatric ED patients ages 13 to 21 years old who were given droperidol reported no cardiac arrhythmias while on continuous monitoring.¹⁹ Similarly, a review of 2,468 ED patients ages 20 months to 98 years

Table 3. Symptom-based Treatments

Symptom	Medication
Anxiety	Lorazepam, diazepam, or diphenhydramine
Psychosis or mania	Risperidone, olanzapine, ziprasidone or haloperidol
Impulsivity, maladaptive aggression	Risperidone or olanzapine

who receive droperidol showed only one case of cardiac arrest.²⁰ The cardiac arrest occurred 11 hours after administration in a cocaine-intoxicated patient. At this time, the use of droperidol remains controversial.

Unlike their newer counterparts, typical antipsychotics have a greater risk of complications. In addition to oversedation, side effects include extrapyramidal symptoms (EPS), neuroleptic malignant syndrome (NMS), lowering of seizure threshold, and QT prolongation.³ EPS may manifest as akathisia or dystonic reactions such as oculogyric crisis, torticollis, or opisthotonos. The incidence of EPS is low, approximately 1%.¹⁷ The treatment of EPS is diphenhydramine IV or IM, or benztropine IV or IM.²¹ NMS is a potentially fatal side effect that may occur at any point with antipsychotic treatment. It manifests as autonomic instability with hyperthermia, altered mental status, and muscle rigidity. There have been no reports in the literature of pediatric fatalities from NMS since 1986.³ If NMS is suspected, however, stop the offending agent and provide supportive care, including hydration and fever control. Benzodiazepines can be given to treat muscle rigidity and prevent rhabdomyolysis. Consider bromocriptine, a dopamine agonist, as a reversal agent in critically ill patients only.²²

QT prolongation may occur with both typical and atypical antipsychotics, which may lead to torsades de pointes. Of the atypical antipsychotics, ziprasidone causes the most significant QT prolongation.²³ Patients should be assessed for signs or symptoms that signal that the patient is at increased risk of developing torsades,

such as known long QT interval, syncope, palpitations, congenital deafness, or early sudden death in the family. Ziprasidone poses the most significant risk of QT prolongation, but there have been no reported cases of QT prolongation with olanzapine.¹⁷

Combination Therapy. There are no studies comparing a single agent to combination therapy in children. In adults, haloperidol and lorazepam are a common combination, as both can be delivered in the same syringe. A double-blind, randomized, prospective study in adults demonstrated more rapid improvement in agitation and less EPS with haloperidol given with lorazepam as compared to haloperidol alone.²⁴

Physical Restraints

Finally, physical restraints may be necessary with some adolescent patients. Physical restraints ultimately are needed to limit mobility to administer chemical restraints, initiate treatment for reversible etiologies, and/or to keep the patient safe as the medication begins to take effect. If an ED provider decides physical restraints are necessary, a team approach should be used, with one person to restrain each limb and one person to protect the patient's head. Only devices approved as restraints should be used, with the least restrictive means used at all times. A patient should be restrained in the supine position, with arms at the side, and the restraints tied to the gurney frame, rather than the side rails. The prone position should be avoided, as it may put the patient at greater risk for asphyxiation. Once restrained, patients will continue to require close monitoring, including

Table 4. Chemical Restraints

Medication	Dose	Route	Max	Onset	Half-life
Diphenhydramine	1 mg/kg/dose	PO/IM/IV	50 mg	15-30 min	2-8 h
Diazepam	0.04-0.2 mg/kg/dose	PO/IM/IV	0.6 mg/kg/8 h IM/IV	1-2 h PO 20-30 min IM	30-60 h
Lorazepam	0.05 mg/kg/dose	PO/IM/IV	2 mg/dose	16 h PO 20-30 min IM 5-20 min IV	14 h
Midazolam	0.025-0.05 mg/kg/dose if 6-12 years	IV/IM	10 mg	3-5 min IV 15 min IM	2-6 h
	0.5 mg/kg/dose	PO	20 mg	20-30 min	
Haloperidol	0.025-0.075 mg/kg/dose	IM	5 mg/dose	2-6 h PO 30-60 min IM/IV	12-18 h
Risperidone	0.25 mg (school age) to 0.5 mg (late adolescent)	PO	—	30-60 min	20 h
Olanzapine	2.5 mg (school age) to 10 mg (late adolescent)	PO	—	5-8 h PO	20-50 h
Ziprasidone	10 mg if 12-16 Y 10-20 mg if > 16 Y	IM	—	4-5 h PO 60 min IM	14 h PO 4-10 h IM

vital signs and reassessment to determine the earliest possible removal of restraints. Once the patient no longer poses a danger to him- or herself or to staff, then restraints may be released. Depending on the patient's improvement, a provider may be able to release all restraints at once or in a stepwise fashion.

Physical restraints pose certain risks. In addition to monitoring a patient's mental and respiratory status, it is important to look for signs of skin breakdown or even neurovascular damage if a restraint is too tight.¹⁸ If a patient's agitation is not well controlled, the patient may be at risk of developing rhabdomyolysis while constantly fighting against the restraint. Again, as soon as is safe for the patient and staff, restraints should be removed.

Conclusions

Pediatric behavioral emergencies are increasingly common in the ED. Providers must complete a thorough history and physical exam to quickly identify reversible causes of agitation or conditions that are the etiology for or that may exacerbate

underlying disorders leading to behavioral disinhibition. If a provider encounters agitation, a state that will likely result in harm without further intervention, interventions should progress from least restrictive to most restrictive. Calming interventions and space modifications should occur first. If pharmacologic intervention is needed, appropriate symptom-focused treatment should be used. Only if necessary, medications such as benzodiazepines and antipsychotics may be used as chemical restraints. Additionally, for patient and staff safety, physical restraints may also be indicated. If restraints are necessary, providers must be familiar with The Joint Commission and hospital-specific requirements and protocols. The selection of medication will depend on patient history, exam, and presentation. At the earliest point possible based on treatment efficacy and patient safety, physical restraints should be removed. Finally, providers should be mindful that successful handling of behavioral emergencies requires a team approach involving different levels of staff, patients, and families.

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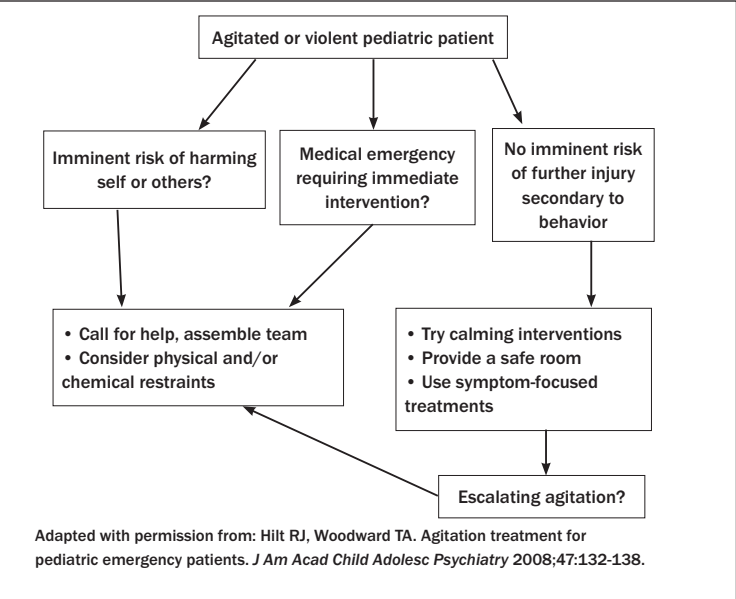
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 - at 10 mph. His past medical history is notable for insulin-dependent diabetes mellitus. Further review of the history is negative for ingestions. He is confused and combative. Which of the following are possible causes for his agitation?
 - hypoglycemia
 - hypoxia
 - head injury
 - all of the above
 - It is imperative that providers recognize the early stages of agitation. Which of the following most accurately describes the progression of agitation?
 - property damage stage, motor stage, verbal stage, attack stage
 - motor stage, verbal stage, attack stage, property damage stage
 - verbal stage, motor stage, property damage stage, attack stage
 - motor stage, property damage stage, verbal stage, attack stage
 - A 6-year-old female with Down syndrome presents for a URI; pulse oximetry is 98% in room air and vital signs are within normal limits. She is becoming agitated. Which of the following are appropriate calming interventions?
 - Offer a choice of snacks or juice.
 - Turn off all monitors, remove O2 saturation probe.
 - Provide distractions, if available, including movies, toys, or books.
 - Include parents in physical exam process and explain each part to parent and patient.
 - All of the above.
 - A 15-year-old male is brought in by his brother who reports he has been drinking alcohol and smoked "something." He is combative and confused. Other than tachycardia, vital signs are within normal limits. The patient is yelling at staff, beginning to throw objects, and threatening to harm himself. Despite your best efforts at calming him, the patient remains violent, and you must initiate restraints. According to The Joint Commission, all of the following must be in place *except*:
 - an order initiating restraints
 - patient consent
 - monitoring and documentation while the patient is in restraints
 - institution-specific written procedures and policies for the use of restraints
 - Your team is able to successfully place the above patient in physical restraints and he is given haloperidol and lorazepam IM. He is now sleeping. In addition to cardiac and respiratory monitoring, what else should nursing monitor while the patient is in restraints?
 - skin breakdown
 - neurovascular exam in extremities restrained
 - serial abdominal exams
 - A and B
 - none of the above
 - A 16-year-old female with a history of bipolar disorder presents with mania. She is pacing around the room and is difficult to redirect as she becomes increasingly agitated. Vital signs are stable and she weighs 55 kg. Per her parents, she normally takes lithium and olanzapine. Which of the following is the most appropriate first pharmacologic intervention?
 - haloperidol 5 mg IM x 1
 - lorazepam 0.5 mg PO x 1
 - olanzapine 2.5 mg PO
 - diphenhydramine 25 mg PO x 1
 - You have just given a 13 year-old male patient haloperidol 2.5 mg IM x 1. Initially he appeared more sedate, but the nurse has called you to the bedside and you note that he has a temperature of 38.9°C, blood pressure of 162/90, a pulse of 110, and a respiratory rate of 18. On exam, he is confused, with increased tone throughout. What is the next best treatment?
 - supportive measures including fluid bolus and anti-pyretic
 - Benadryl 50 mg IV x 1
 - dantrolene 0.5 mg/kg/dose
 - A and C
 - none of the above
 - You have just given a 17-year-old female patient, who presented with combativeness and hallucinations, haloperidol 5 mg IM x 1. Her agitation improves, but she is complaining of neck pain and is now holding her head turned to the right. On arrival and now, vital signs have been within normal limits; she has suffered no trauma. What might this be an example of?
 - malinger
 - extrapyramidal symptoms
 - paradoxical response
 - neuroleptic malignant syndrome
 - A 7-year-old female patient with a history of autism and attention deficit hyperactivity disorder presents with urticaria after eating strawberries, a known allergen for her. You give her Benadryl, and she begins running around the room, is difficult to control, and is becoming increasingly agitated. What is this an example of?
 - extrapyramidal symptoms
 - paradoxical response
 - intoxication
 - neuroleptic malignant syndrome
 - A 15-year-old female presents to your ED with psychosis. She has a history of bipolar disorder with psychotic features. According to her parents, the patient syncope last month and was told her ECG was abnormal, but they cannot recall why. If the patient requires treatment for her agitation, which of the following would be the safest?
 - ziprasidone
 - olanzapine
 - droperidol
 - haloperidol

CME Questions

- An 11-year-old male presents as a helmeted bicyclist who was struck by a car

Management of an Agitated Patient



Ingestions and Toxidromes

Ingestion	Presentation
Sympathomimetics	Hyperthermia, tachycardia, mydriasis, diaphoretic, hyperalert, hallucinations, paranoia
Anticholinergics	Hyperthermia, tachycardia, mydriasis, dry skin, visual hallucinations, psychosis, delirium, urinary retention, decreased bowel sounds
Opioids	Hypothermia, bradycardia, miosis, depressed mental status, confusion, hyporeflexia
Hallucinogens	Tachycardia, nystagmus, hallucinations, depersonalization, euphoria
Ethanol	Hypothermia, bradycardia, altered mental status, ataxia, slurred speech
Serotonin syndrome	Hyperthermia, tachycardia, mydriasis, diaphoretic, confusion, agitation, or coma, tremor, hyperreflexia, clonus

Symptom-based Treatments

Symptom	Medication
Anxiety	Lorazepam, diazepam, or diphenhydramine
Psychosis or mania	Risperidone, olanzapine, ziprasidone or haloperidol
Impulsivity, maladaptive aggression	Risperidone or olanzapine

GOT IVS

G Glucose: hypoglycemia
O Oxygen: hypoxia
T Trauma: head injury
 Temperature: hyper- or hypothermia
I Infection: meningitis, encephalitis, brain abscess or sepsis
V Vascular: stroke, subarachnoid hemorrhage
S Seizure: postictal or status epilepticus
Used with permission from: Rossi J, Swan MC, Isaacs ED. The violent or agitated patient. *Emerg Med Clin North Am* 2010;28:235-256.

Chemical Restraints

Medication	Dose	Route	Max	Onset	Half-life
Diphenhydramine	1 mg/kg/dose	PO/IM/IV	50 mg	15-30 min	2-8 h
Diazepam	0.04-0.2 mg/kg/dose	PO/IM/IV	0.6 mg/kg/8 h IM/IV	1-2 h PO 20-30 min IM	30-60 h
Lorazepam	0.05 mg/kg/dose	PO/IM/IV	2 mg/dose	16 h PO 20-30 min IM 5-20 min IV	14 h
Midazolam	0.025-0.05 mg/kg/dose if 6-12 years	IV/IM	10 mg	3-5 min IV 15 min IM	2-6 h
	0.5 mg/kg/dose	PO	20 mg	20-30 min	
Haloperidol	0.025-0.075 mg/kg/dose	IM	5 mg/dose	2-6 h PO 30-60 min IM/IV	12-18 h
Risperidone	0.25 mg (school age) to 0.5 mg (late adolescent)	PO	—	30-60 min	20 h
Olanzapine	2.5 mg (school age) to 10 mg (late adolescent)	PO	—	5-8 h PO	20-50 h
Ziprasidone	10 mg if 12-16 Y 10-20 mg if > 16 Y	IM	—	4-5 h PO 60 min IM	14 h PO 4-10 h IM

Common Pediatric Psychiatric and Behavioral Disorders

Type of Disorder	Examples
Mood disorders	Major depression, bipolar disorder, dysthymic disorder
Anxiety disorders	Generalized anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, panic disorder, phobias
Psychosis in childhood	Schizophrenia, psychosis associated with epilepsy
Pervasive developmental disorders	Autism spectrum, Asperger’s syndrome, Rett’s syndrome, childhood disintegrative disorder, pervasive developmental disorder
Disruptive behavioral disorders	Oppositional defiant disorder, conduct disorder

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