

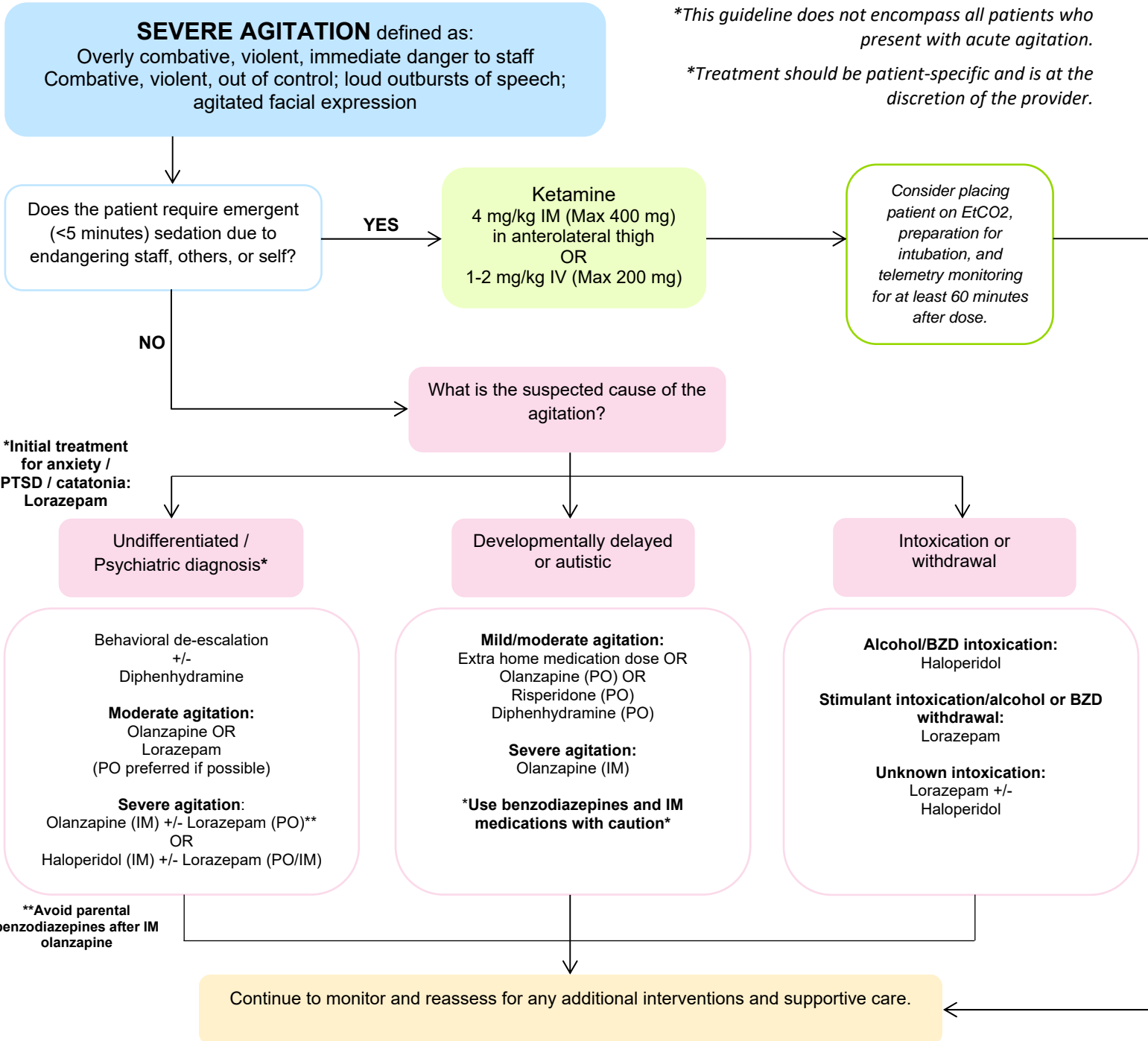
Clinical Guideline

Pediatric Agitation Reference

Pediatric Emergency Medicine



This guideline serves as a guide and does not replace clinical judgment.



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GENERAL CONSIDERATIONS

- Verbal de-escalation should be considered first-line prior to medical or physical restraints.
- Adequate sedation helps facilitate medical evaluation of patients and facilitates the avoidance of prolonged physical restraints.
- Adequate sedation helps improve the safety of staff and others around the patient.
- IV route is preferred over IM administration to minimize variability in pharmacokinetics and increased agitation.

PHARMACOKINETICS

	Starting Dose	Sedation	Duration	Maximum Daily Dose	Considerations
Diphenhydramine (PO)	1 mg/kg (Max 50 mg)	1-2 hours	4-6 hours	Age 2-6: 50 mg/day	Avoid with delirium, QTc prolongation, Contraindicated with anticholinergic/TCA use
Diphenhydramine (IM)		5-15 min		Age >6 and <12: 100 mg/day	
Haloperidol (PO)	0.5-1 mg (<22 kg)	45-60 min	2-3 hours (mean)	Age 3-6: 2 mg/day	EPS symptoms QTc prolongation
Haloperidol (IM)	2.5 mg (>=22 kg to <45 kg)	20-30 min		Age >6 and <12: 5 mg/day	
Haloperidol (IV)		5-10 min		Age >=12: 15 mg/day	
Ketamine (IV)	1-2 mg/kg (Max 200 mg)	1 min	30 – 45 min	Not applicable; should be limited to single dose	Hypertension, Tachycardia, Hypersalivation Laryngospasm, Emergence reaction Respiratory depression (rare)
Ketamine (IM)	4 mg/kg (Max 400 mg)	3 – 4 min	15 – 25 min		

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Lorazepam (PO)	0.5 mg (<45 kg)	20-30 min	6-8 hours	Age >6 and <12: 2 mg/day	Respiratory depression Hypotension with larger doses and rapid administration, Paradoxical agitation
Lorazepam (IM)	1 mg (>=45 kg)	15 min	6-8 hours	Age >=12: 6 mg/day	
Lorazepam (IV)		5-10 min	2 hours		
Midazolam (IN)	0.4 mg/kg (Max 10mg)	5-10 min	20-30 min	Age >6 and <12: 5 mg/day	
Midazolam (IM)	0.1 mg/kg (Max 5 mg)	15 min	1 – 2 hours	Age >=12: 10 mg/day	
Midazolam (IV)	0.05 mg/kg (Max 2 mg)	10-15 min	1 hours		
Olanzapine (PO)	2.5-5 mg (<45 kg) 5-10 mg (>=45 kg)	20-30 min	4-6 hours	Age >6 and <12: 10 mg/day Age >=12: 20 mg/day	QTc prolongation, Orthostatic hypotension, EPS symptoms
Olanzapine (IM)	1.25-2.5 mg (<45 kg) 5-10 mg (>= 45 kg)	15 min	2-4 min		
Risperidone (PO)	0.25 mg (<22 kg) 0.25-0.5 mg (>=22 kg to <45 kg) 0.5-1 mg (>=45 kg)	30-60 min	24 hours	Age 3-4: 1 mg/day Age >6 and <12: 3 mg/day Age >=12: 6 mg/day	QTc prolongation, Hypertension, Tachycardia EPS symptoms

ADVERSE EFFECTS

- ❖ Laryngospasms associated with ketamine: Conservative management is recommended with application of pressure at the Larson's notch (behind the earlobe and Mandible's Ramus, in front of the mastoid process) and bag-valve mask ventilations. If laryngospasms are not resolved, prepare for RSI.
- ❖ Hypersalivation associated with ketamine: Consider glycopyrrolate or atropine, in addition to suction.
- ❖ Extrapyramidal side effects: Consider treatment with diphenhydramine or benztropine.
- ❖ QT interval prolongation and Torsade de Pointes: If possible, obtain an ECG within 60 minutes of adequate sedation. Consider telemetry monitoring for at least 60 minutes after their last antipsychotic dose.
- ❖ Respiratory depression: Treatment with sedative agents is associated with respiratory depression. Consider EtCO2 monitoring for at least 60 minutes after the patient's last sedative dose.

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PHARMACOLOGIC TREATMENT DISCUSSION

Acute agitation for pediatric and adolescent patients in emergency departments is increasingly common and its treatment can be challenging. Patients can be a danger to themselves and to staff if their acute agitation is left untreated or is inadequately managed. Guidance is predominantly driven by consensus and expert opinion due to the lack of randomized controlled trials. The twofold goal of medication therapy is to both treat the cause of agitation and adequately sedate the patient for assessment and further management. Utilization of an agitation care pathway based on available consensus recommendations has been shown to standardize medication choice and reduce time spent in physical restraints for children and adolescents in the emergency department.¹⁻⁶

Ketamine, an NMDA receptor antagonist, should be utilized for patients that require immediate sedation (<2 minutes) due to the risk of causing harm to self or others due to its rapid time to sedation, reliable degree of sedation, and safety profile. Intramuscular administration is well tolerated and reasonable for patients without immediate intravascular access. Data available from adult literature show a more rapid time to goal sedation and the limited data available within pediatrics shows a greater proportion of patients achieving clinician-reported improvement of severe agitation. Providers must be aware of rare but serious adverse events with ketamine that may affect airway patency – namely laryngospasm and hypersalivation.⁷⁻¹⁰

Executive Summary

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