



Chemical Restraint

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Lecture Objectives

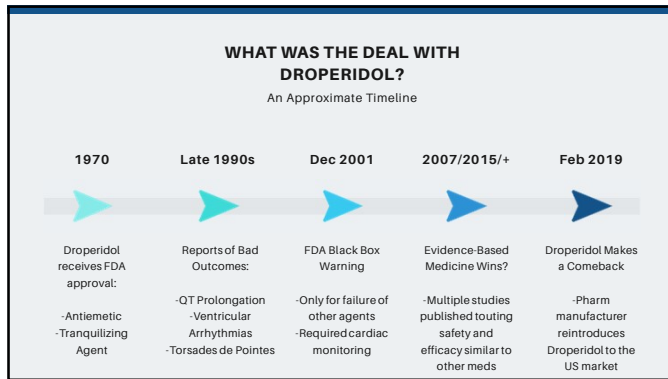
1	PREPARATION	Describe the basic elements of non-coercive de-escalation
2	PHARMACOLOGIC OPTIONS	List IM medications commonly used in chemical restraint
3	LITERATURE	Synthesize the available literature on chemical restraint agents
4	SPECIAL POPULATIONS	Describe special considerations in special populations
5	OTHER CONSIDERATIONS	Discuss the legal, ethical, and psychological effects of restraint

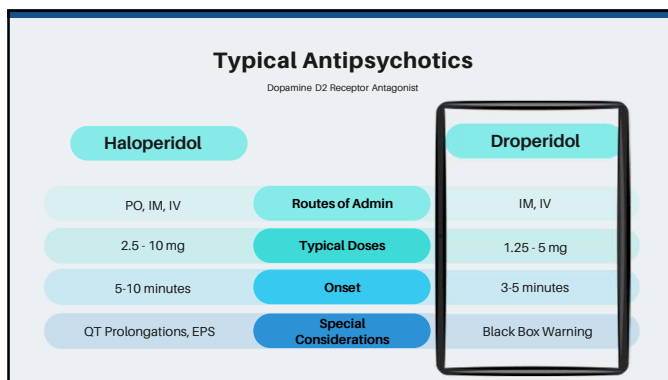


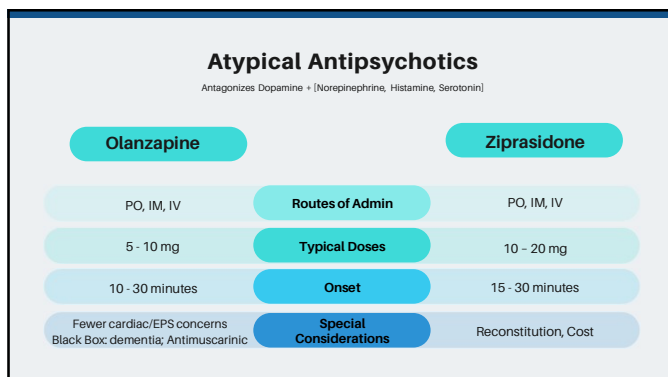
Pharmacologic Options				
IM Route				
TYPICAL ANTIPSYCHOTICS	ATYPICAL ANTIPSYCHOTICS	BENZODIAZEPINES	NEW AGENTS	ADJUNCTS
Haloperidol	Ziprasidone	Lorazepam	Ketamine	Diphenhydramine
Droperidol	Olanzapine	Midazolam	Dexmetomidine* (SL)	

Typical Antipsychotics			
Dopamine D2 Receptor Antagonist			
Haloperidol	Droperidol		
PO, IM, IV	Routes of Admin		
2.5 - 10 mg	Typical Doses		
5-10 minutes	Onset		
QT Prolongations, EPS	Special Considerations		

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Benzodiazepines			
Gamma-amino butyric acid (GABA) receptor agonist			
Lorazepam	Routes of Admin		Midazolam
PO, IM, IV	Typical Doses	PO, IM, IV	
2 - 10 mg	Onset	2.5 - 5 mg	
15 minutes	Special Considerations	2 - 5 minutes	
Shortages, Caution in Elderly		Shortages, Caution in Elderly	

New Agents			
All The Rage			
Ketamine	Routes of Admin		Dexmedetomidine
NMDA receptor antagonist	Typical Doses	SL (IV)	
IM, IV	Onset	120-180 ug	
4-5 mg/kg IM; 1 mg/kg IV	Special Considerations	20 minutes	
5-10 minutes		Hypotension, dizziness, dry mouth	
Procedural Sedation?			









**Comparisons of Single Agents:
Antipsychotics**

The Best of the Best for IM Administration in the ED

Droperidol versus haloperidol for chemical restraint of agitated and combative patients

MD, FACEP Harold Thomas Jr, MD, FACEP Earl Schwartz, MD, FACEP Robert Pettilli

STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Thomas et al. 1992	Prospective Randomized	Droperidol 5mg IM/IV Haloperidol 5mg IM/IV	IM Droperidol: more rapid control	Small: N = 68 No Difference with IV Comparison

**Comparisons of Single Agents:
Antipsychotics**

The Best of the Best for IM Administration in the ED

Olanzapine v haloperidol: treating delirium in a critical care setting

Double-blind, placebo-controlled, randomized trial of olanzapine and haloperidol in the treatment of acute agitation in schizophrenia

Yoanna K Skrobik¹, Nicolas Bergeron, Marc Dumont, Stewart B Gottfried

P Wright¹, M Birkett, S R David, K Meehan, I Ferchland, K J Alaka, J C Saunders, J Krueger, P Bradley, I San, M Bernardo, M Reinstein, A Breier

STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Wright et al. 2003	Randomized	Haloperidol 5mg IM/IV	more rapid control	Small: N = 68 No Difference with IV Comparison

**Comparisons of Single Agents:
Antipsychotics**

The Best of the Best for IM Administration in the ED

Droperidol v haloperidol for sedation of aggressive behaviour in acute mental health: Randomised controlled trial

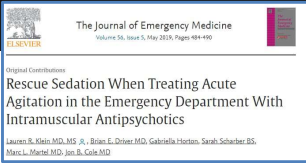
Published online by Cambridge University Press: 02 January 2018

Leonie Calver, Vincent Drinkwater, Rahul Gupta, Colin B. Page and Geoffrey K. Hobbister

STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Calver et al. 2015	RCT	Droperidol 10mg IM Haloperidol 10mg IM	Droperidol: Less need for additional sedation	Droperidol: more adverse effects

**Comparisons of Single Agents:
Antipsychotics**

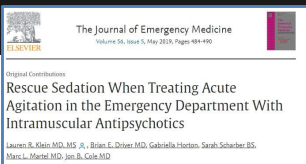
The Best of the Best for IM Administration in the ED



STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Klein et al. 2019	Retrospective	Droperidol 5-10mg IM Haloperidol 5-10mg IM Olanzapine 10 mg IM	Droperidol and Olanzapine: Less Need for Rescue Meds	Retrospective N = > 15K

**Comparisons of Single Agents:
Antipsychotics**

The Best of the Best for IM Administration in the ED



STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Cole et al. 2021	Prospective Observational	Droperidol 5 mg IM Olanzapine 10 mg IM	Time to Sedation: It's a Tie	Olanzapine: add'l meds Droperidol: EPS

**Comparisons of Single Agents:
Antipsychotics**

The Best of the Best for IM Administration in the ED



**Droperidol
&
Olanzapine**

Comparisons of Single Agents: Benzos and Antipsychotics The Best of the Best for IM Administration in the ED				
Clinical Trial Acad Emerg Med. 2004 Jul;11(7):744-9. doi: 10.1197/j.aem.2003.06.015. A prospective, double-blind, randomized trial of midazolam versus haloperidol versus lorazepam in the chemical restraint of violent and severely agitated patients Ravia Nobay ³ , Barry C Simon, M Andrew Levitt, Graham M Dresden				
STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Nobay et al. 2004	Randomized Prospective Double-Blind	Haloperidol 5 mg IM vs Lorazepam 2 mg IM vs Midazolam 5 mg IM	Midazolam Fastest on / Fastest off	No Diff in Adverse Events

Comparisons of Single Agents: Benzos and Antipsychotics The Best of the Best for IM Administration in the ED				
Randomized Controlled Trial Acad Emerg Med. 2005 Dec;12(12):1167-72. doi: 10.1197/j.aem.2005.07.017. Epub 2005 Nov 10. Management of acute undifferentiated agitation in the emergency department: a randomized double-blind trial of droperidol, ziprasidone, and midazolam Marc Martel ³ , Ann Sterzinger, James Miner, Joseph Clinton, Michelle Binos				
STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Martel et al. 2005	Randomized Prospective Double-Blind	Droperidol 5 mg IM vs Ziprasidone 20 mg IM vs Midazolam 5 mg IM	Droperidol = Goldilocks Ziprasidone too slow on Midazolam too fast off	No Diff in Adverse Events

Comparisons of Single Agents: Benzos and Antipsychotics The Best of the Best for IM Administration in the ED				
Intramuscular Midazolam, Olanzapine, Ziprasidone, or Haloperidol for Treating Acute Agitation in the Emergency Department Lauren R. Klein, MD, MS ¹ ; Brian E. Driver, MD; James R. Miner, MD; Marc L. Martel, MD; Michelle Hessel, PharmD; Jacob D. Collins, BS; Gabriella B. Horton; Erik Fagerstrom, BS; Rajesh Satpathy, BA; Jon B. Cole, MD				
STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Klein et al. 2018	Prospective Observational	Haloperidol 5 mg IM Haloperidol 10 mg IM Ziprasidone 20 mg IM Olanzapine 10 mg IM Midazolam 5 mg IM	Midazolam: Fastest Antipsychotic Race: Olanzapine wins	No Diff in Adverse Events

**Comparisons of Combinations:
Benzos + Antipsychotics**
Combinations Are Optimal

**Comparisons of Combinations:
Benzos + Antipsychotics**
The Best of the Best for IM Administration in the ED

STUDY	STUDY TYPE	COMPARISON	WINNER?	THE FINE PRINT
Thiemann et al. 2022	Prospective Unblinded Observational Single Site	Haloperidol 5 mg IM + Lorazepam 2 mg IM vs Droperidol 5 mg IM + Midazolam 5 mg IM	Droperidol/Midazolam Better at 10 min mark	Droperidol/Midazolam needed more supp oxygen

**Comparisons of Combinations:
Benzos + Antipsychotics**
The Best of the Best for IM Administration in the ED

Any Combo

[illegible][illegible]

Comparisons with Ketamine

A Wonder Drug?



So... What Do You Want Doc?

An Summary of Imperfect Data

Typical Antipsychotic?

Droperidol: more rapid

Atypical Antipsychotic?

Olanzapine: front runner

Benzodiazepine?

Midazolam: faster on, faster off

Should I Do A Combo?

Yes: decreases time to sedation

Ketamine?

Go For It: monitoring needed



What About the B in B52?

Study of the Classic "B52" vs "52"

Efficacy of Combination Haloperidol, Lorazepam, and Diphenhydramine vs. Combination Haloperidol and Lorazepam in the Treatment of Acute Agitation: A Multicenter Retrospective Cohort Study

Trevor Jeffers • Brenna Darling • Christopher Edwards • Nina Vadiei

With Diphenhydramine:

- More oxygen desaturation
- More hypotension
- More physical restraint use
- Longer length of stay

Special Populations

Unique Considerations



Pediatrics

- Avoid combinations
- Based on etiology, select:
 - Olanzapine (less cardiac/EPS risk)
 - Benzos (but not w/i 1 hr Olanzapine)
- Beware Paradoxical Disinhibition
 - Delirium + Diphenhydramine/Benzos
- No good data for ketamine

Journal of Clinical Pharmacy and Therapeutics, 2019, 44, 459–474
Published online 2019, doi: 10.1111/jcpt.12300

PMCID: PMC6540720
PMID: 30811555

Best Practices for Evaluation and Treatment of Agitated Children and Adolescents (BETA) in the Emergency Department: Consensus Statement of the American Association for Emergency Psychiatry

Pregnancy

- Avoid physical restraints
- Benefit > Risk
- There is no antipsychotic or benzodiazepine that is absolutely contraindicated
- Haloperidol + Benzo
- Atypical Antipsychotics also okay



Geriatrics

- American Geriatrics Society Beers Criteria
 - Benzodiazepines
 - Antipsychotics
- FDA Black Box
 - Dementia + Atypical Antipsychotics
- Start with a lower dose
- Benzos: paradoxical reaction
- Avoid diphenhydramine: anticholinergic



Additional considerations

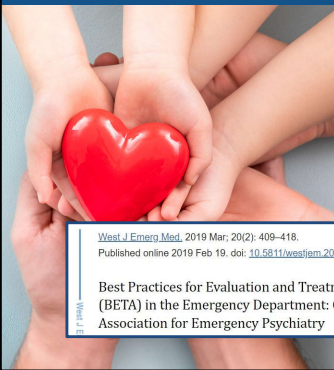
Convey a great number of information in an effective manner

DOCUMENTATION	LEGAL	ETHICAL	PSYCHOLOGICAL
 Use of these medications = Restraint Face to Face < 1 hr Renewal q4 hr	 Justify reasoning	 Never punitive Always respecting patient autonomy when possible	 High rates of long term psychological distress after utilization of common interventions

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Step 1: Verbally Engage the Patient	Step 2: Establish a Collaborative Relationship	Step 3: Verbally De-Escalate the Patient
Respect Personal Space	Be Concise	Set Clear Limits
Do Not Be Provocative	Establish Wants and Feelings	Offer Choices and Optimism
Establish Verbal Contact	Listen Closely	Debrief the Patient
	Agree or Agree to Disagree	

[illegible]



Pediatrics

West J Emerg Med. 2019 Mar; 20(2): 409-418. PMID: PMC6404720
Published online 2019 Feb 19. doi: [10.5811/westjem.2019.1.41344](https://doi.org/10.5811/westjem.2019.1.41344) PMID: [30881565](https://pubmed.ncbi.nlm.nih.gov/30881565/)

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