

## Agents for Procedural Sedation and Analgesia

Drug	ROA	Initial Adult Dosage (mg/kg)	Injection time (minutes)	Onset of Action (minutes)	Duration of Action (minutes)	Wait time between Doses (minutes)	Comments
<b>Sedation without analgesia</b>							
Midazolam PCI: 1 mg/ml – 10x 2 ml; 10x5 ml; 10x 10 ml; 5 mg/ml – 10x 1ml; 10x 2ml; 10x 10 ml	IV	0.01-0.03	2-3	(1-2.5 )5	10 (20-60 )80	2-5	Titrate to effect Prolonged effect or delayed recovery in elderly, obese, impaired hepatic function. Reduce dose in combination with other agents Paradoxical CNS stimulation in users with psychiatric disorders.
	IM	0.1-0.15	10-15		60-120		
<b>Diazepam</b> Diazemuls® (PFI:)5 mg/ml 10 x2 ml	IV	0.03-0.1 (3-10 mg)	2-3	2-3	360	2-5	Regular diazepam injection contains propylene glycol → Thrombophlebitis Prolonged duration of action, especially if hepatic insufficiency. <u>DIAZEMULS</u> – less injection pain/phlebitis; Contraindicated if allergy to egg, soybean or lipid emulsions.
<b>Propofol*</b> PMS: 10 mg/ml 100 ml Hospira: 10 mg/ml 5x20 ml	IV	0.5-1	Rapidly	0.5	2-5 after discontinuation	0.5 mg/kg q3-5 min	Respiratory depression, hypotension, pain at injection site. Rapid neurologic recovery. Elderly: reduce dose by 20%; slower administration. <b>ALLERGY ALERT: soybean oil, egg</b>

Etomidate SAP (when others are contraindicated)	IV	0.1-0.2		5-30 seconds	3 (5-15)	0.05 mg/kg q 3-5 min	No or little hypotension. Generally maintains cardiorespiratory stability. Use lower doses in elderly or renal/hepatic insufficiency Myoclonus. Pain at injection site. Nausea/vomiting. May cause adrenal suppression – best avoided in septic/critically ill patients.
<b>Sedative with analgesic action</b>							
Ketamine Sandoz: 10 mg/ml 10x 2ml ERFA: 10 mg/ml x 20 ml; 50 mg/ml x 10 ml	IV	1-2	1-2	0.5	(5-20-60)	0.25-0.5 mg/kg q5-10 minutes	Dissociative sedative. Minimal cardiorespiratory depression. Does not inhibit protective reflexes. Sympathetic stimulation, tachycardia, hypertension (rare). Emergence reactions common in adults. Dreams, confusion. Increased secretions. Nausea/vomiting. Prolonged duration in the elderly.
	IM	3-5		5-10	60-120		
<b>Analgesic With Sedative</b>							
Fentanyl Citrate Sandoz: 50 mcg/ml – 10x2ml, 10x5 ml, 5x 10ml, 5x20 ml	IV	0.5-2 mcg/kg	3	1-3	30-60	0.5 mcg/kg q 2 min	No amnesia. Minimal histamine release and hypotension. Use reduced dose in combination with other agents.
Morphine Sandoz: 5 mg/ml 5x10 ml	IV	2.5-5	3-5	5-10	120-240	5-10	No amnesia. Hypotension. Histamine release. Prolonged duration of action.

Meperidine	IV	25-50	3-5	5	60-180	5-10	No amnesia. Hypotension. Histamine release. Nausea. Prolonged duration of action. Interacts with MAO Inhibitors
<b>Dexmedetomidine</b>  LAST RESORT  Hospira: 100 mcg/ml 25x2ml	IV	1 mcg/kg bolus over 10 min, then drip 0.5-0.75 mcg/kg/h		10-15	2-3 after discontinuation		Consider preprocedural ECG. Profound bradycardia, sinus arrest, heart block, hypotension can occur. Not to those with history of cardiovascular disease, heart block, cardiomyopathy Anticholinergics required to pre-empt adverse cardiac events. (Glycopyrrolate 0.2 mg IV before dexmedetomidine) Do not administer LD in <10 minutes to avoid bradycardia. Monitor continuously.

ROA = route of administration. IV = intravenous IM = intramuscular mg = milligram mcg = microgram kg= kilogram h= hour

\*Some consider propofol to have sedative AND analgesic properties.

**Highlighted drug names** = drugs available March 19, 2012

Table adapted from: Médication intraveineuse pour l'intervention diagnostique ou thérapeutique sous sédation-analgésie chez l'adulte.

[www.vendredipm.ca](http://www.vendredipm.ca) 2012 Mar 02. Accessed 2012 Mar 09.

Depth of Sedation	Options
Minimal	Nitrous oxide; benzodiazepine (oral or IV)
Moderate	Opioid/benzodiazepine eg. Ketamine/midazolam; fentanyl/ midazolam
Deep	Pentobarbital (SAP); propofol; etomidate; dexmedetomidine

References:

1. Humphries RL, Stone C. Chapter 8. Procedural Sedation and Analgesia. In: Humphries RL, Stone C, eds. CURRENT Diagnosis & Treatment Emergency Medicine. 7th ed. New York: McGraw-Hill; 2011. <http://www.accessemergencymedicine.com/content.aspx?aID=55747103>. Accessed March 13, 2012.
2. Baxter AL. Chapter 20. Procedural Sedation and Analgesia. In: Wiebe RA, Ahrens WR, Strange GR, Schafermeyer RW, eds. Pediatric Emergency Medicine. 3rd ed. New York: McGraw-Hill; 2009. <http://www.accessemergencymedicine.com/content.aspx?aID=5328208>. Accessed March 13, 2012.
3. Frank RL. Table: Intravenous procedural sedation and analgesia agents. In: Procedural sedation in adults. UpToDate. Updated 2011 Oct 19. Accessed 2012 Mar 15.

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