

## CONTROLLED SUBSTANCES AND SEDATIVES (PART I)

### MIDAZOLAM (Versed)

Class: short-acting benzodiazepine, sedative, hypnotic, antianxiety; schedule iv controlled substance

Action: depresses subcortical levels in CNS

Clinical uses: procedural sedation, medication facilitated intubation, seizures/status epilepticus, conscious sedation

Dosage/Routes:

Medication facilitated intubation (III.B)

1-5 mg IV/IO/IN-repeat PRN (max total 5mg) –MCO

Procedural sedation (III.F)

1-5 mg IV/IO/IN–MCO

Post Resuscitation/ROSC (III.P)

1-5 mg IV/IO (for shivering) –MCO

Seizures/Status Epilepticus (III.U)

1-5 mg IV/IO/IM/IN **standing orders** with repeats under MCO

Behavioral Emergency/agitation (III.W)

1-5 mg IV/IO/IM/IN–MCO

Poisoning/OD/Toxic Exposure (III.X)

*Cocaine, amphetamines, sympathomimetics, ETOH withdrawal*

**1-2 mg** IV/IO/IM–MCO

Pediatric Stat Ep (P9)

0.2 mg/kg IM/IN (max 5 kg)–MCO for CC

*IN route preferred, give only if seizures persist and BGL is normal*

Side Effects: amnesia, hypotension, respiratory depression, bronchospasm, laryngospasm, N/V

Contraindications: shock, use with other CNS depressants, glaucoma

Pharmacokinetics:

Onset: IV/IN 1-3 min; IM 15-30 min

Peak effect: variable

Half-life: 2-6 hours

## DIAZEPAM (Valium)

Class: Benzodiazepine; schedule IV controlled substance

Action: decreases muscle activity, emotional responses, and level of consciousness.

*Acts on the subcortical levels within the brain and limbic system, blocks spinal cord neuronal transmission, relaxing skeletal muscle; causes CNS depression*

Clinical uses: sedation prior to cardioversion/pacing, management of grand-mal seizures/stat ep/eclampsia, sedation in acute behavioral emergencies, medication facilitated intubation

Dosage/Routes:

Medication facilitated intubation (III.B)

5-10 mg IV/IO with repeat dose (maxtotal 20 mg)–MCO

\* after intubation: 5 mg IV/IO for continued sedation

Procedural sedation (III.F)

5-10 mg IV/IO–MCO

Post resuscitation/ROSC (III.P)

5 mg IV–MCO

Seizures/stat ep (III.U)

5 mg with repeat dose of 5 mg IV/IO/IM/PR–**Standing orders and MCO**

Behavioral emergencies (III.W)

2-10 mg IV/IO/IM–MCO

Poisoning/OD/toxic exposure (III.X)

*OD of cocaine, amphetamines, sympathomimetics, ETOH withdrawal*

2-10 mg IV/IO–MCO

*Organophosphate, nerve agent exposure*

2-10 mg IV/IO/IN/PR (max total dose 20 mg)–MCO

Eclampsia (III.Y)

5 mg IV/IM (refractory seizures)–MCO

Pediatric Stat Ep (P9)

1. mg/kg IV/IO (slowly over 2 min)–MCO

\* repeat doses may be given if seizures persist

IF NO IV/IO

0.1 mg/kg PR–MCO

NO DIAZEPAM ADMINISTRATION IF SEIZURES HAVE STOPPED

Contraindications: hypersensitivity/allergy, pre-existing CNS depression, shock/hypotension

Pharmacokinetics:

IV: onset 1-5 min, duration 15-60 min

IM: onset 15-30 min with longer duration

LORAZEPAM (Ativan)

Class: Benzodiazepine, anticonvulsant, sedative/hypnotic; schedule IV controlled substance

Action: binds to gamma-aminobutyric acid (GABA) A sites within the brain.

*GABA is a main inhibitory neurotransmitter of the CNS*

Clinical uses: major motor seizures, stat ep, procedural sedation, acute agitation/anxiety

Dosage/Routes:

Medication facilitated intubation (III.B)

2-4 mg IV/IO/IN; repeat PRN (max dose 4 mg)–MCO

Procedural sedation (III.F)

2-4 mg IV/IO/IN–MCO

Seizures/Stat Ep (III.U)

2-4 mg IV/IO/IM–**Standing orders and MCO**

Behavioral emergency/agitation (III.W)

1-2 mg IV/IO/IM/IN–MCO

Poisoning/OD/toxic exposure (III.X)

*Cocaine, amphetamines, sympathomimetics, ETOH withdrawal*

1-2 mg IV/IO/IM–MCO

Pediatric Stat Ep (P9)

0.05 mg/kg IV/IN/IO (slowly over 2 min) with repeat doses if seizures persist–MCO

Side effects: hypotension, CNS depression, respiratory depression, N/V

Contraindications: hypersensitivity/allergic reaction, caution with prior CNS depression

Pharmacokinetics:

IV: onset 1-5 min, peak 15-20 min

IM: onset 15-30 min, peak 2 hours

Duration: 6-8 hours

Half-life: 10-20 hours

### FENTANYL CITRATE (Sublimaze)

Class: Narcotic analgesic/opioid; schedule II controlled substance

Action: 50-100 times more potent than morphine with a shorter duration of action than other narcotic analgesics

*Used primarily for analgesia and sedation*

Dosage/Routes:

Pain management (III.E)

Procedural sedation (III.F)

Acute coronary syndrome/chest pain (III.M)

1 mcg/kg IV/IO/IM/IN (max 100 mcg)–MCO

Post Resuscitation/ROSC (III.P)

1 mcg/kg IV/IO (max 100 mcg)

Side Effects: respiratory depression, apnea, muscle rigidity, bradycardia, enhanced effect with CNS depressants, potentiation by MAOI's (avoid use with 14 days of taking MAOI's)

Contraindications: shock, hypersensitivity, severe hemorrhage

Precautions: may cause bradycardia, liver and renal patients may have decreased ability to metabolize and excrete drug, **monitor vital signs frequently**

Pharmacokinetics:

Onset: immediate

Peak effects: 3-5 min

Duration: 30-60 min

Half-life: 6-8 hours

## MORPHINE SULPHATE

Class: narcotic analgesic, opioid; schedule II controlled substance

Action: powerful CNS depressant, relieves pain, decreases systemic vascular resistance/venous return, produces vasodilatory effects

Clinical Uses: pain management associated with burns, isolated extremity fx/dislocations/long transport times or disentanglement times, acute coronary syndromes/chest pain

Dosage/Routes:

Non-cardiac Pain Management (III.E)

2-10 mg (0.1 mg/kg) IV/IM (max 20 mg total)–MCO for CC

Procedural Sedation (III.F)

Acute coronary syndrome/Chest pain (III.M)

2-10 mg (0.1 mg/kg) IV/IO–MCO

Side effects: hypotension, respiratory distress, dizziness, altered level of consciousness, additive CNS depression when used with similar drugs, N/V

Contraindications: hypersensitivity, severe hypotension/shock, respiratory depression, head injury

ETOMIDATE (Amidate)

*\* great for short procedures such as intubation and cardioversion*

Class: short acting sedative/hypnotic

Action: rapid induction of anesthesia with minimal respiratory and cardiovascular effects; useful in RSI for hypotensive patients; produces no histamine release; yields no analgesic effects

Dosage/Routes:

Medication facilitate intubation (III.B)

3. mg/kg rapid IV/IO push (max dose 20 mg)–MCO

Procedural sedation (III.F)

0.15 mg/kg IV/IO (max dose 10 mg)–MCO

Side effects: apnea, laryngospasm, myoclonic skeletal muscle movement, N/V, arrhythmias

*Use with verapamil may cause respiratory depression/apnea*

Precautions: significant hypotension, sever asthma patients, sever cardiovascular disease, arrhythmias, caution in use with elderly

Pharmacokinetics:

Onset: 10-20 sec

Peak effects: < 1 min

Duration: 3-5 min

Half-life: 30-70 min

HALOPERIDOL (Haldol)

Class: typical antipsychotic, dopamine receptor antagonist

Action: blocks the effects of dopamine in the CNS, mild anticholinergic effects

*Decreases the signs and symptoms of psychoses*

Dosage/Routes:

Behavioral emergencies (III.W)

2-5 mg IM–MCO

Side effects: sedation, decreased level of consciousness, respiratory depression, hypotension, tachycardia, dry mouth, constipation, extrapyramidal dystonic reactions

Contraindications: hypersensitivity, CNS depression, circulatory compromise

Precautions: may lower seizure threshold in patients with seizure hx, may exacerbate effects of antihypertensive & vasodilator meds, push slowly, monitor for lengthening QT interval, v-tach, torsades

Pharmacokinetics:

Onset: within 20 min

Peak effect: 20 min IM  
Duration 2-6 hours  
Half-life: 21 days

## CARDIOVASCULAR MEDICATIONS

### AMNIODARONE (Cordarone)

Class: class 3 antiarrhythmic; cardiac ion channel blocker

Action: blocks potassium, sodium, and calcium channels along with adrenergic b-receptors; prolongs cardiac repolarization; increases refractory periods; slows heart rate; increases QT and PR intervals

*\* multi channel blocker, therefore it is good for a wide array of cardiac arrhythmias*

Dosage/Routes:

Cardiac arrest-VF/Pulseless VT (III.N)

300 mg IV/IO (diluted in 20-30 ml D5W)–**Standing Order**

150 mg IV/IO (diluted in 10 ml D5W)–MCO

Wide complex tachycardia w/pulse (III.Q)

150 mg (in 100 ml in D5W) IV/IO over 10 min–MCO

Narrow complex tachycardia (III.R)

150 mg IV/IO over 10 min (diluted in 100 ml D5W)–MCO

Pediatric non-traumatic cardiac arrest (P5)

5 mg/kg in VF/VT (max 300 mg)–MCO

Side effects: hypotension, bradycardia, potentiates effects of Coumadin, may worsen digitalis toxicity

Contraindications: bradycardia, AV blocks, pregnancy, caution in patients with decreased lung function, may cause pulmonary fibrosis

Pharmacokinetics:

Onset: within minutes

Half-life: 58 days

DILTIAZEM (Cardizem)

Class: calcium channel blocker, class IV antiarrhythmic

Action: inhibits calcium movement across cardiac and smooth muscle membranes causing dilation of coronary arteries, peripheral arteries and arterioles

*Prolongs the conduction of electrical impulses through the AV node*

Dosage/Routes:

Narrow complex tachycardia (III.R)???

0.25 mg/kg slow IV (over 2 min) for: rapid a-fib, rapid a-flutter–MCO



Side effects: flushing, HA, bradycardia, hypotension, heart block, myocardial depression, severe AV block; in high doses, cardiac arrest

Contraindications: acute MI, CHF, hypersensitivity to diltiazem or other calcium channel blockers, second/third degree AV blocks (unless in the presence of a pacemaker), severe hypotension (< 90 mmHg), sick sinus syndrome

Precautions: renal/hepatic impairment, patients taking beta blocking medications (may potentiate effects of both medications)

Pharmacokinetics:

Onset: 3 minutes

Peak effect: N/A

Duration N/A

Half-life: 3-8 hours

## MAGNESIUM SULFATE

Class: electrolyte, tocolytic, mineral

Action: required for normal physiologic functioning; is a cofactor in neurochemical transmission and muscular excitability; controls seizures by blocking peripheral neuromuscular transmission; also acts as a peripheral vasodilator and inhibitor of platelet function

*Tocolytic reduces the uterine contractions in childbirth*

Dosage/Routes:

Asthma/bronchospasm (III.I)

1 gm IV/IO (in 100 ml NaCl) over 10-20 min–MCO

Cardiac arrest-VF/Pulseless VT (III.N)

1-2 gm IV/IO–MCO

Wide complex tachycardia w/pulse (III.Q)

1-2 gm IV/IO (in 100 ml NaCl) over 10 min–MCO

Seizures/stat ep (III.U)

2 gm IV/IO (in 100 ml NaCl) over 10 min–MCO

Obstetric/pregnancy related (III.Y)

2 gm IV/IO (in 100 ml NaCl) over 10 min for seizures (may repeat)–MCO

Pediatric non-traumatic cardiac arrest (P5)

25-50 mg/kg (max 2 gm) IV/IO-for torsades–MCO

Side effects: magnesium toxicity (signs include flushing, diaphoresis, hypotension, muscle paralysis, weakness, hypothermia, and cardiac, CNS or respiratory depression; prolonged PR interval; widening of the QRS

Contraindications: AV block, GI obstruction

Precautions: renal insufficiency

Pharmacokinetics:

Onset: immediate

Peak effect: unknown

Duration: 30-60 minutes

Half-life: N/A

NOREPINEPHRINE (Levophed)

Class: sympathomimetic vasopressor

Action: stimulates beta1 and alpha adrenergic receptors, increases peripheral resistance through vasoconstriction, enhances contractile myocardial force, increases cardiac output

Dosage/Routes:

Hypoperfusion/shock (III.D)

Acute pulmonary edema (III.K)

Anaphylaxis (III.M)

Post resuscitation/ROSC (III.P)

2-4 mcg/min IV/IO-initial dose (max dose 30 mcg/min)–MCO

*access large vein if possible (AC, EJ, IO); med administration via IV infusion pump is highly recommended*

Side effects: anxiety, tremors, HA, dizziness, N/V, reflex bradycardia, palpitations, increased myocardial oxygen demand (leading to anginal pain, dyspnea)

Contraindications: hypovolemic states, mesenteric/peripheral vascular thrombus, profound hypoxia

Precautions: severe cardiac disease, hypothyroidism, patients taking MAOIs

Pharmacokinetics:

Onset: rapid

Peak effect: 1-2 min

Duration: N/A

Half-life: short (1-2 min)

RACEMIC EPINEPHRINE (MicroNefrin, S2, VapoNefrin)

Class: bronchodilator; adrenergic agent

*Equivalent to 1:100 epinephrine*

Action: stimulates both alpha and beta receptors, causing vasoconstriction, reduced mucosal edema and bronchodilation

Dosage/Routes:

Pediatric respiratory distress (P4)

0.05 mg/kg in 3 ml NS (max 5 ml) via nebulizer for suspected croup/epiglottitis–MCO

Side effects: increased heart rate, N, anxiety, heart palpitations and HA

Contraindications: epiglottitis, known sensitivity to sulfites

Precautions; tachycardia and arrhythmias

Pharmacokinetics:

Onset: 3-5 minutes

Peak effect: 20 minutes

Duration: 1-3 hours

Half-life: 2 minutes

## MISCELLANEOUS MEDICATIONS

### HYDROCORTISONE (Solu-Cortef)

Class: adrenal corticosteroid

Action: inhibits accumulation of inflammatory cells at inflammation sites  
*As a steroid, it replaces the steroids that are lacking in adrenal insufficiency*

Dosage/Routes:

Hypoperfusion/shock (III.D)

2 mg/kg IV/IO (maximum dose: 100 mg)

*should only be used in adrenal cortical insufficiency (Addison's)/hyperplasia must be CONFIRMED*

Side effects: insomnia, heartburn, anxiety, abdominal distention, diaphoresis, acne, mood swings, increased appetite, facial flushing, delayed wound healing, increased susceptibility to sepsis, diarrhea or constipation, leukocytosis, hyperglycemia

### DEXAMETHASONE (Decadron)

Class: corticosteroid

Action: reduces inflammation and immune responses by inhibiting the synthesis of pro-inflammatory enzymes; intermediate to long acting steroid

Dosage/Routes:

Asthma/bronchospasm (III.I)

COPD (III.J)

12 mg IV/IO/IM–MCO

Anaphylaxis (III.L)

12 mg IV/IO/IM–**Standing orders and MCO**

Pediatric respiratory distress (P4)

0.6 mg/kg IV/IO–MCO

Side effects: N/V, water retention (edema), hypertension, hyperglycemia, immunosuppression

Contraindications: fungal infections, hypersensitivity

Precautions: respiratory TB, untreated systemic infections, hyperthyroidism, cirrhosis, ulcerative colitis, hypertension, CHF, seizure disorder, peptic ulcer disease, diabetes

Pharmacokinetics:

Onset: 1 hour

Peak effect: 1 hour

Duration: variable

Half-life: 3-4.5 hours

METHYLPREDNISOLONE (Solumedrol)

Class: adrenal corticosteroid

Action: reduces inflammation by multiple mechanisms, inhibits the synthesis of pro-inflammatory enzymes; intermediate acting steroid

Dosage/Routes:

Asthma/bronchospasm (III.I)

125 mg IV/IO/IM–MCO

COPD (III.J)

125 mg IV/IO–MCO

Anaphylaxis (III.L)

125 mg IV/IO–**Standing orders and MCO**

Pediatric respiratory distress (P4)

Pediatric anaphylactic reaction (P7)

2 mg/kg IV/IO (max dose 60 mg)–MCO

Side effects: depression, euphoria, HA, restlessness, hypertension, bradycardia, N/V, swelling, diarrhea, weakness, fluid retention (edema), paresthesias

Contraindications: cushing's syndrome, fungal infection, measles, varicella, known sensitivity (sulfites)

Precautions: active infections, renal disease, penetrating spinal cord injury, hypertension, seizures, CHF

Pharmacokinetics:

Onset: immediate

Peak effect: 30 min

Duration: 8-24 hours

Half-life: 3-3.5 hours

## ONDANSETRON (Zofran)

Class: selective receptor (serotonin type 3) antagonist, antinausea, antiemetic

Action: blocks serotonin, both peripherally on vagal ner terminals and centrally in the chemoreceptor trigger zone

Dosage/Routes:

Procedural sedation (III.F)

4 mg IV/IO, may be repeated–MCO

Severe Nausea/vomiting (III.G)

4 mg IV/IO, over 2 minutes (may be repeated)–MCO

Side effects: HA, dizziness, malaise, drowsiness, fatigue, weakness, extrapyramidal reactions, chest pain, hypotension, constipation, diarrhea, abdominal pain, dry mouth, urinary retention, bronchospasm, rash, shivering, anaphylaxis

Contraindications: hypersensitivity

Precautions: hepatic disease, not recommended for children under 12 years of age

Pharmacokinetics:

Onset: immediate

Peak effect: 15-30 min

Duration: 4-8 hours

Half-life: 4 hours

## TETRACAINE (Pontoaine)

Class: topical anesthetic-ocular

Action: blocks both the initiation and conduction of nerve impulses by decreasing the neuronal membrane's permeability to sodium ions. This reversibly stabilizes the membrane and inhibits depolarization, resulting in the failure of a propagated action potential and subsequent conduction blockade

*A sodium channel blocker*

Dosage/Routes:

Poisoning/OD/toxic exposure (III.X)

Eye injury-2 drops in the affected eye(s) before irrigation–MCO

Side effects: minor initial burning, redness and irritation

Contraindications: known hypersensitivity to other ester-type local anesthetics (lido, benzocaine, etc)

Pharmacokinetics

Onset: immediate

Peak effect: N/A

Duration: 15-30 min

Half-life: 30-60 seconds



