

2008 Maine EMS Protocol Revision- Medication Fact Sheet

(Updated July 15, 2008)

Aspirin

Classification: Nonsteroidal anti-inflammatory, analgesic, antipyretic

Mechanism of Action: Antipyretic through peripheral vasodilation, anti-inflammatory through inhibition of cyclo-oxygenase inhibition and subsequent decrease in prostaglandin and mediation of platelet aggregation.

MEMS Use: platelet aggregation inhibition in cardiac chest pain

How Supplied: 81 mg chewable "baby aspirin"

Contraindications: No absolute in emergent chest pain patients. Relative contraindications include: allergy, bleeding/anticoagulant history, or ulcer disease (contact OLMC for guidance)

Precautions: Use with caution (consult OLMC) in patients with bleeding/anticoagulant history, or ulcer disease.

Side Effects: Dyspepsia, heartburn, GI bleeding

Dose: 324 mg po

Levalbuterol hydrochloride (Xopenex®)

Classification: Sympathomimetic, bronchodilator

Mechanism of Action: Sympathomimetic Beta 2 adrenergic receptor selective isomer of albuterol

MEMS Use: Treatment of bronchospasm as an option to Albuterol Sulfate

How Supplied: Solution for inhalation 0.31mg/3ml, 0.63mg/3ml & 1.25mg/3ml. MDI 45mcg/puff

Contraindications: Tachycardia due to dysrhythmias, heart block caused by Digitalis toxicity

Precautions: Use with caution in patients with ischemic heart disease, coronary insufficiency and CAD.

Side Effects: Tachycardia, palpitations, hypertension, anxiety, general CNS stimulation

Dose: Adults and adolescents >12 years old- 1.25 mg nebulizer or if >4 years- Levalbuterol tartrate inhaler 5 puffs with spacer.

Notes:

- Levalbuterol is quite similar in mechanism of action and effect to Albuterol. Providers should note that Levalbuterol should be used as an optional substitute for Albuterol.

Ipratropium Bromide and Albuterol Sulfate (Duo-Neb®)

Classification: Anticholinergic and sympathomimetic bronchodilator

Mechanism of Action: Antagonism of cholinergic receptors

MEMS Use: Treatment of bronchospasm as an option to Albuterol Sulfate

How Supplied: 3ml solution for nebulization

Precautions: Use with caution in patients with coronary insufficiency, cardiac dysrhythmias and CAD.

Side Effects: Tachycardia, palpitations, hypertension, anxiety, ECG changes including flattening of the T-wave and ST segment depression

Dose:

- Pt's > 1 year of age- 3 mg nebulizer. May repeat one time if more significant respiratory distress; or

Notes:

- Note: Duo-Neb is the nebulized solution variation of Ipratropium Bromide and Albuterol Sulfate. Combivent® is the same medication only in an inhaler form.
- Duo-Neb can be used refractory to Albuterol or as a substitute for Albuterol alone in more severe respiratory distress patients.
- Duo-Neb® does not share the same peanut/soy allergy contraindication as Combivent®
- Ipratropium Bromide is a paramedic level drug only

Ipratropium Bromide and Albuterol Sulfate (Combivent®)

Classification: Anticholinergic and sympathomimetic bronchodilator

Mechanism of Action: Antagonism of cholinergic receptors

MEMS Use: Treatment of bronchospasm as an option to Albuterol Sulfate

How Supplied: Metered dose inhaler

Contraindications: Soybean or peanut allergy (soya lecithin/ground nut hypersensitivity)

Precautions: Use with caution in patients with coronary insufficiency, cardiac dysrhythmias and CAD.

Side Effects: Tachycardia, palpitations, hypertension, anxiety, ECG changes including flattening of the T-wave and ST segment depression

Dose:

- Pt's > 1 year of age- Inhaler 2 puffs. May repeat one time in those with more significant respiratory distress

Notes:

- Note: Duo-Neb is the nebulized solution variation of Ipratropium Bromide and Albuterol Sulfate. Combivent® is the same medication only in an inhaler form.
- Combivent can be used refractory to Albuterol or as a substitute for Albuterol alone in more severe respiratory distress patients.
- Soybean/Peanut allergies are a very important contradiction to emphasize.
- Ipratropium Bromide is a paramedic level drug only

Nitroglycerine Topical Ointment (Nitro-Bid®)

Classification: Nitrate, Anti-anginal coronary vasodilator

Mechanism of Action: Relaxation of vascular smooth muscle

MEMS Use: Treatment of acute pulmonary edema following administration of sub-lingual nitroglycerine.

How Supplied: 2% ointment 15, 30, 60 mg tube (generally with applicator patches)

Contraindications: Hypotension (SPB<95mmHg), patient use of erectile dysfunction medications w/in 72 hours.

Side Effects: Hypotension, head ache

Dose: After initiation of SL nitroglycerin, may place 1 inch of nitropaste to the chest wall if B/P > 115 mm Hg and remove nitropaste if B/P < 95 mm Hg

Notes:

- 1 inch of NTG paste = approximately 15 mg of NTG.
- Onset of action = 20-60 minutes
- Duration of action = 2-12 hours
- Ointment should be applied directly to skin of the chest wall (avoid distal extremities or areas where the skin may not be intact) and then covered by patch or other plastic type dressing.

Fentanyl Citrate

Classification: Narcotic Analgesic

Mechanism of Action: opiate receptor agonism

MEMS Use: Analgesia, anxiolysis in acute pulmonary edema

How Supplied: Generally 50 micrograms/ml

Contraindications: no absolute contraindications

Precautions:

- OLMC should be consulted before using Fentanyl on any patient with multiple trauma or isolated trauma involving head, spine, or torso. Use caution administering Fentanyl to pediatric patients or patients with hypotension, bradypnea, or coincident drug use (including alcohol).
- Use with caution in patients with increasing ICP

Side Effects: Respiratory depression, bradycardia, sedation, nausea, bronchoconstriction

Dose:

- For APE: Fentanyl 1 microgram/kg IV to a maximum dose of 100 micrograms
- For isolated extremity trauma in a stable patient: consider the use of Fentanyl 1 microgram/kg IV initially then 25-75 micrograms IV every 5-10 minutes titrated to effect with a maximum dose of 400 micrograms.

Notes: Fentanyl is not a new drug to the protocols. The change that needs to be emphasized is the new dose.

Amiodarone Hydrochloride (Cordarone®)

Classification: Class III Antidysrhythmic agent

Mechanism of Action: Blocks sodium channels at rapid pacing frequency, causing an increase in the duration of the myocardial cell action potential and refractory period, as well as alpha- and beta-adrenergic blockade.

MEMS Use: Anti-ventricular dysrhythmic for use in V-Fib/V-Tach cardiac arrest, wide complex tachycardia and symptomatic premature ventricular contractions

How Supplied: 50 mg/ml as 150mg/3ml vial.

Contraindications: Bradycardia, high level heart block, hypotension, cardiogenic shock

Side Effects: Hypotension, dyspnea, cough, bradycardia/AV block, nausea, photophobia, blurred vision, dizziness

Dose:

- As a primary anti-ventricular dysrhythmic in V-Fib/V-Tach cardiac arrest: 300 mg IV/IO push once then consider additional 150 mg IV/IO once. If successful conversion occurs, providers should contact OLMC for dosing information for additional bolus or infusion.
- For wide complex tachycardia (probable V-Tach)- BP>100, contact OLMC for option of Amiodarone 150 mg mixed with 50 ml D5W infused over 10 minutes.
- For symptomatic premature ventricular ectopy- If patient is hypotensive (blood pressure less than 90 mm Hg), with OLMC may consider Amiodarone 150 mg mixed with 50 ml D5W infused over 10 minutes along with a 500 ml NS IV fluid challenge.

Notes:

- Amiodarone has replaced lidocaine as the single anti-ventricular dysrhythmic.
- Provider should refer to the MEMS V-Fib/V-Tach cardiac arrest algorithm
- Provider should refer to the MEMS Wide Complex Tachycardia (probable V-Tach) algorithm
- Amiodarone is only one aspect of the symptomatic premature ventricular ectopy protocol. Providers should refer to all aspects of this protocol before treating.

Metoprolol Tartrate (Lopressor®)

Classification: Beta-adrenergic blocking agent

Mechanism of Action: Combines with beta-adrenergic receptors to block the response to sympathetic nerve impulses. Acts as an anti-ischemic by combining with beta-adrenergic receptors to block the response to sympathetic nerve impulses resulting in reduced heart rate, blood pressure, and contractile force.

MEMS Use: Cardiac Chest Pain with HR > 100. Rate control for narrow complex tachycardia (A-Fib/A-Flutter) or as a treatment option for symptomatic premature ventricular contractions.

How Supplied: Generally 1 mg/ml

Contraindications: Sinus bradycardia, second and third degree AV blocks, cardiogenic shock, CHF unless secondary to tachydysrhythmia, severe COPD or bronchospasm

Side Effects: Bradycardia, hypotension

Dose:

- If no CHF and BP greater than 140 systolic and HR greater than 100 beats/min, then Metoprolol (Lopressor) 5 mg IV over 5 minutes x1 for target HR 70-80 beats/min.
 - Call OLMC for op_on of repea_ing this once or twice more.
- For symptomatic PVC's- If patient **without** bradycardia (pulse rate less than 60 bpm) nor hypotension (blood pressure less than 90 mm Hg), with OLMC may consider lopressor 5 mg IV over five minutes. DO NOT USE LOPRESSOR IF ANY EVIDENCE OF SHOCK!

Notes:

- Lopressor is a paramedic level drug only
- Onset = 15 minutes

Midazolam Hydrochloride (Versed®)

Classification: Benzodiazepine

Mechanism of Action: Short acting benzodiazepine with sedative-general anesthetic properties

MEMS Use: Treatment of active seizures, premedication for cardioversion, combative patients

How Supplied: 1 mg/ml or 5 mg/ml

Contraindications: Hypotension, severe alcohol intoxication

Precautions: Respiratory depression and sedation may be caused with doses as small as 1 mg. Careful monitoring of patient is essential in Midazolam administration. When possible, patients should have a running IV of NS or LR prior to administration of Midazolam.

Side Effects: Respiratory depression, sedation, hypotension

Dose:

- Premedication for cardioversion- 3 mg IV bolus.
- Combative patient-Contact OLMC for OPTION of 4 mg IM for patient safety and comfort. Contact OLMC if dosing adjustment needed.
- Active Seizures (Adult) - 3 mg IV or IO; or
 - (If IV or IO cannot be established) 3-5 mg IM.
- Active Seizures (Pediatric)- 0.02mg/kg IV to a maximum dose of 3 mg; or
 - 0.2 mg/kg IM (if IV cannot be established) to a maximum dose of 5 mg
 - 0.2 mg/kg IM if IV cannot be established to maximum dose of 5 mg, 10 mg per buccal/mucosa, 0.3 mg/kg Rectal to a maximum dose of 10 mg.

Notes:

- IV Onset = 2-2.5 minutes
- Versed is NOT a new drug to the protocols. However, the maximum pediatric doses have changed.
- Versed should be used only for premedication for cardioversion and for actively seizing patients.

Epinephrine 1:1000

Classification: Sympathomimetic

Mechanism of Action: Causes sympathomimetic stimulation of alpha, beta-1 and beta-2 receptors

MEMS Use: Treatment of anaphylaxis, severe bronchospasm and pediatric respiratory distress with inspiratory stridor

How Supplied: 1:1,000 (1 mg/ml) or preloaded auto-injector

Contraindications: None in the critical patient

Precautions: Use with caution in pregnant patients. However, nebulized Epinephrine may be contraindicated in children with a history of congenital heart disease.

Side Effects: Tachycardia, palpitations, hypertension, anxiety.

Dose:

- Anaphylaxis (Adult)- 0.3 ml of 1:1,000 (0.3 mg) IM in anterolateral thigh; or
 - Contact OLMC for repeat options and/or IV dosing of epinephrine for shock or cardiovascular collapse which may typically be dosed the following way: 0.5 to 1 ml of Epinephrine 1:10,000 (0.1 mg) IV every 10 to 20 minutes.
- Anaphylaxis (Pediatric)- 0.01 ml/kg of 1:1,000 (which is 0.01 mg/kg) IM in anterolateral thigh to maximum dose of 0.3 mg
- Pediatric Respiratory Distress with Inspiratory Stridor- Inhalation of nebulized solution of 1 ml 1:000 Epinephrine mixed with 2 ml of normal saline.

Notes:

- Epinephrine is not a new drug to the protocols. However, the IM administration site has changed (anterolateral thigh) and the option of IV epinephrine for extreme anaphylaxis (with OLMC consultation) has been added.
- Providers should note that the concentration for IV epinephrine for anaphylaxis is 1:10,000 and this route should only be used in the most dyer situations.

50% Nitrous Oxide

Classification: Non-narcotic analgesic

Mechanism of Action: Induces change in the basal levels of the thalamic nuclei utilizing direct intraspinal anti-nociceptive action. In the brain stem, responses evoked by pain stimulation are variably depressed.

MEMS Use: Alternative to Fentanyl for pain management

How Supplied: Inhaled gas compound comprised of Nitrous oxide and 50% oxygen

Contraindications: Pneumothorax, increased ICP, COPD, known bowel obstruction, known middle ear infection

Side Effects: High concentrations may cause hypoxia and respiratory depression

Dose: Self administered to effect

Notes:

- Nitronox is optional.
- Nitronox is meant as an option to Fentanyl
- Nitronox is not a change as it has been utilized in certain regions for years. That said the instructor should take time to review the pertinent information.
- Nitrous oxide easily diffuses into air filled spaces in the body. As a result, extreme caution should be taken to avoid patients with potential pressure related problems such as pneumothorax or bowel obstruction.

Ondansetron Hydrochloride (Zofran®)

Classification: Antiemetic

Mechanism of Action: Serotonin receptor antagonist. (Blocks vomiting reflex of serotonin release).

MEMS Use: Treatment of nausea/vomiting

How Supplied: Generally 2mg/ml

Contraindications: None

Precautions: Safety and effectiveness in children <3 is unknown

Side Effects: May cause tachycardia, hypotension

Dose: Adult- 4 mg IV/IO, may repeat in 15 minutes if needed.

Peds: 0.15 mg/kg IV/IO to a maximum dose of 4 mg, and contact OLMC if repeat dosing needed.

Suggested References

Spratto, G., et al. PDR Nurse's Drug Handbook 2007 Ed. Delmar/Thompson Learning Inc. Clifton Park, NY, 2006

Beck, R., et al. Drug Reference for EMS Providers. Delmar/Thompson Learning Inc. Clifton Park, NY, 2002

Lehne, R. Pharmacology for Nursing Care 6th Ed. Elsevier. St Louis, MO, 2007