



STATE OF MAINE
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 MAINE EMERGENCY MEDICAL SERVICES
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Dear Providers:

The Medical Direction and Practices Board [MDPB] recognizes the need to create a “living” document to better communicate our thought process and discussions surrounding commonly asked questions pertaining to our protocols. This is the first version of the document which provides our unified voice in addressing questions that we have gathered thus far.

Though we always welcome your presence, we understand that not all providers can be present at the MDPB meetings. It can be difficult for us to reach out to all of our providers when a question arises. We hope that this document, and its updated versions, will allow us to reach you more efficiently. The FAQs will be posted on our website and we will send out alerts to you via social media (Facebook, Twitter, MEMS website RSS Feed) and through your service leaders when updates are made.

If you have a question that you feel should be added to the document, please contact your Regional Medical Director.

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Thank You,

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- **What is the maximum dose for acetaminophen (Tylenol)?**
 - a. Maximum dose is 960 mg due to the ability to split the tablets.

- **Regarding Ventricular Fibrillation [VF], what is the difference between recurrent and refractory?**
 - a. **Recurrent** VF refers to the scenario where the rhythm comes and goes. This is when the patient is going in and out of the dysrhythmia and possibly in and out of cardiac arrest. **Refractory** VF refers to the scenario where the patient remains in the VF and never comes out of it.

- **What is the difference between “normal” and “refractory” VF?**
 - a. A VF cardiac arrest becomes **refractory** when you have completed four attempts at defibrillation and have not achieved a rhythm change. If the VF rhythm requires a fifth shock, it is now **refractory**.

- **Do we have to continue resuscitation efforts for the entire time recommended for each specific rhythm?**
 - a. It is recommended to continue resuscitation for the described amount of time in each of the clinical conditions listed. For instance, in patients found in wide, slow PEA or asystole, the suggested resuscitation timeframe would be 20 minutes. For patients in fast, narrow PEA, the suggested time frame would be 45 minutes. Finally, for patients in refractory VF, the suggested timeframe for resuscitation is 60 minutes. These numbers are built on the MDPB’s current interpretation of the medical literature and in consensus with the New England Protocol group. As of 2018, we believe that prolonging resuscitative efforts for fast/narrow PEA and for refractory VF is important and will lead to increased patient survival with some literature from population studies supporting this belief.

- **How long do we resuscitate a patient who goes in and out of multiple different rhythms?**
 - a. These are the cases where early contact with OLMC is encouraged. OLMC can help you manage these resuscitations. Trying to figure out and treat the most likely underlying cause of the arrest is key along with high-performance CPR in maximizing the patient’s chance of survival. There has been the question of, “Do I need to re-set the clock each time the rhythm changes?”. Theoretically, yes. Again, discussion of the circumstances surrounding the arrest, interventions performed, availability of personnel may dictate this timeframe along with consultation with OLMC.

- **Is there a role for mechanical chest compression devices in Maine EMS?**
 - a. We are reviewing the literature on mechanical chest compression devices in order to make an evidenced based decision on what role these devices will play in Maine.

- **Are there any cardiac arrest patients that would benefit from transport to the emergency department while continuing resuscitation?**
 - a. These are extremely rare scenarios and we are confident that for most cardiac arrest situations, resuscitation attempts on scene are almost always the safest and most beneficial approach. If you believe there are resources at the hospital that are so beneficial that they outweigh the risks of transport, **call OLMC early to discuss**. Remember, evidence demonstrates that chest compressions are far less effective in a moving ambulance with an up to 30% reduction in important metrics (hands on time, depth, rate, recoil, etc.). We also know that traveling unrestrained in the back of an ambulance is dangerous. Examples where transport may be considered:
 - i. Severe accidental hypothermia in which the benefits of invasive rewarming at the hospital may outweigh the risks of transport.
 - 1. The classic patient example here is a quick submersion into cold water.
 - ii. Penetrating trauma to the chest with a less than 15-minute transport time
 - 1. Benefits of emergent surgical procedures may outweigh the risks of transport.
 - iii. Pregnant with fundus palpable above the umbilicus with less than 15-minute transport time.
 - 1. Benefits of emergent surgical procedures may outweigh the risks of transport.
 - iv. Cardiac arrest due to specific medication overdoses where the ED may have treatment options.
- **In the case of hemorrhagic shock secondary to extremity bleeding controlled with a tourniquet, should we consider giving tranexamic acid (TXA)?**
 - a. Yes. After controlling hemorrhage, consider giving TXA in this scenario so long as they meet criteria (i.e. are in shock) and there are no contraindications. Please see Trauma protocol, Green 13 “Hypovolemic Shock”.
- **Why has the MDPB not approved ketorolac for EMS use?**
 - a. The MDPB has looked at the provision of ketorolac during both the 2015 and 2018 protocol revisions. We feel at this time that there are adequate alternative pain control options and that the risks of the medication outweigh the benefits. The following info is a synopsis of the review.
- **What is Ketorolac and has the MDPB considered this for pain management?**
 - a. Ketorolac is a non-steroidal anti-inflammatory drug (NSAID) that falls in the same category as ibuprofen, naproxen, aspirin, and celecoxib. It works by inhibiting prostaglandin synthesis. Prostaglandins are hormone-like substances that participate in a wide range of physiologic functions. Primarily, they promote inflammation that is necessary for healing, but this inflammation further results in pain and fever. Prostaglandins also support blood clotting functions of platelets and protect the lining of

the stomach from the damaging effects of acid. Since ketorolac inhibits the synthesis of prostaglandins, it is used to relieve pain associated with inflammation and can be used as an antipyretic agent all while not affecting the CNS. Onset of action is 30-60 minutes with peak effect at 45-60 minutes and half-life of 4-6 hours.

Due to dose and duration related potential adverse effects, ketorolac is only used for short-term treatment (maximum 5 days) for moderately severe acute pain that otherwise would be treated with opioids. The major risks associated with ketorolac are acute kidney injury/renal failure, liver failure, GI bleed due to gastric ulcers, as well as increased risk of bleeding. Due to these risks, ketorolac should be avoided in the following patients:

- renal disease or kidney transplant
- bleeding or blood clotting disorder
- closed head injury or intracerebral hemorrhage
- stomach ulcer or a history of GI bleed
- patient needing surgery
- surgical candidate with open fracture or fracture deformities
- pregnancy
- breast feeding
- allergy to ASA or NSAIDs or on blood thinning/anticoagulant medication
- concurrent use of anticoagulant medication or NSAID

It should not be used in the setting of hypotension or with other nephrotoxic medications as this increases the likelihood of acute kidney injury.

Is it being used in the prehospital setting?

Yes. There are states that have incorporated ketorolac into their prehospital protocols. Some require consultation with OLMC, others have limited indications (renal colic, non-operative pain) with restrictions.

Ketorolac References

Thomas SH, Shewakramani S et al. Prehospital trauma analgesia. *The Journal of Emerg Med* July 2008; 35(1)47-57

Roche Laboratories. Ketorolac (Toradol). Reference ID 3281582, https://www.accessdata.fda.gov/drugsatfda_docs/label/2013/019645s019lbl.pdf

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McManus JG, Sallee DR. Pain management in the prehospital environment. *Emerg Med Clin N Am.* May 2005, 23:415-31.