To: Contra Costa Paramedic Service Providers

From: Joseph Barger, MD
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Subj: Alternatives for administration of Epinephrine 1:10,000 and Dextrose (D50)

As most are aware, the availability of pre-load syringes for both Epinephrine 1:10,000 and Dextrose 50% has become an issue because of backorder from the single source now producing these medications. It is estimated that availability will improve beginning in mid-July. As of yet, we are not aware of any agencies that have run out of the pre-load syringes. However, the potential to run out does exist, and anticipated time frames for availability of new stock may change and make that potential even more likely. With that in mind, I want to outline alternative approaches that may be necessary if a provider does run out of pre-load syringes.

To substitute for Epinephrine 1:10,000 pre-load:

- Paramedics should dilute 1 ml (1 mg) of epinephrine 1:1000 from a 1 ml ampul with 9 ml normal saline to administer IV;
- Because an ampul will be accessed, a filter needle will be necessary to draw up the epinephrine;
- Gently mix the contents of the syringe to assure the medication is properly diluted;
- Optimally, “pre-packaging” of a 10 ml normal saline preload, filter needle, epinephrine ampul, gauze (to protect during ampul opening) and the appropriate adapter for IV administration could be done to facilitate the process;
- For those who do not have normal saline pre-loads, a 10 ml syringe can be used to draw 9 ml of saline from an IV bag;
- During cardiac arrest, the full 10 ml (1 mg) would be given to adult patients after dilution, and appropriate pediatric dosages should be administered accordingly;
- For treatment of anaphylactic shock, the 1:10,000 dilution is given IV or IO in 1 ml (0.1 mg) increments;
- As a reminder, undiluted 1:1000 from ampuls should never be administered intravenously due to patient safety concerns.

An alternative that I do not want employed is the use of 30 ml vials of epinephrine 1:1000. Use of 30 ml vials of epinephrine has been associated with serious medication errors and pose risks to patient safety.

It is clear that the need to dilute epinephrine on scene with the use of ampuls may have the potential to delay medication administration. I believe the benefits of 1:10,000 epinephrine given rapidly in cardiac arrest settings are outweighed by the risk of medication error with this drug should the epinephrine 1:1000 30 ml vial be used for dilution. Continuous CPR and timely defibrillation are as always the most important factors in most resuscitations.

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To substitute for Dextrose 50%: To replace pre-load syringes, vials of Dextrose 50% are becoming available (time frame for availability is late this week according to the latest information Bound Tree received yesterday). This will mean drawing up the medication in an appropriately sized syringe to administer.

In the absence of pre-loads or vials of Dextrose 50%, alternative methods can be used:
- As always, patients who are able to take oral glucose paste should be given this first;
- If IV access is not immediately available or is very tenuous (small vein), administer glucagon early;
- If an IV with good flow is in place administer 250 ml of D10 (now used for pediatric hypoglycemia), which is equivalent to one pre-loaded syringe of D50 (25 g). Because this may take longer via “gravity flow,” use of a stopcock and large syringe (e.g. 50 ml) may facilitate administration. In this situation, small veins with poor flow would not likely tolerate the large volume given in a short period of time;
- Using both medications (glucagon and D10) is also an acceptable approach, especially if there is any question about the IV allowing adequate flow;
- For patients with short transport times to the hospital, administration of glucagon and transport is also an alternative.

It is important to remember that while symptomatic hypoglycemia is an emergency, treatment within several minutes is adequate. Patients are treated with glucagon at home without EMS and the time of onset of effects is often 15 minutes. So spending a few more minutes to administer D10 is likely going to be as successful, if not more successful, than administering glucagon.

If D50 becomes unavailable in pre-load or vial form, it is likely that temporarily we will transport more patients with hypoglycemia, as glucagon at times does not suffice, and administration of D10 may take a fair amount of time.

Hopefully these shortages will be addressed before our local medication supplies become exhausted. Most provider agencies have been in close contact with Bound Tree or other suppliers, but I will forward to you any new information that I may receive.

Please do not hesitate to contact me if you have any questions.