**How fast is too fast for IV push medications?**

**PROBLEM:** IV errors can seriously harm patients. In fact, with very few exceptions, high-alert medications that are known to cause patient harm are administered via the IV route. One aspect of potentially harmful IV errors that may go unnoticed, though, is administering an IV medication too quickly.

We've received several reports of such errors. Sometimes they are minor, such as the rapid administration of IV ampicillin. In other cases, the results have been more serious, such as the rapid administration of IV vancomycin, which can lead to severe hypotension and flushing of the upper body (Red Neck Syndrome). Other examples include the rapid administration of potassium chloride solution, especially when prescribers use the term "bolus," or the rapid administration of IV VERSED (midazolam), which should be given slowly while the drug's effects on the patient are carefully monitored.

We've also heard about a case that led to a patient's death. An ED physician prescribed labetalol 20 mg IV push for a patient experiencing a hypertensive crisis. A nurse retrieved the drug quickly, but the patient was in the process of being transported to radiology. On the way, the nurse administered the medication in a matter of seconds. The patient immediately arrested and was unable to be resuscitated. Later, staff discovered several other cases where rapid IV push of labetalol may have contributed to patient harm.

According to a study in the United Kingdom, (Taxis K, Barber N. Ethnographic study of incidence and severity of intravenous drug errors. *BMJ* 2003;326:684), too rapid administration of IV medications occurs frequently. The authors uncovered errors in 49% of all IV medications administered. Seventy-three percent of these occurred when giving IV push doses, and in 95% of those cases, the dose was given faster than recommended. More than half of these errors were of potentially moderate severity.

**SAFE PRACTICE RECOMMENDATION:** To reduce patient harm from rapid injection of IV medications, practitioners need ready access to information about the maximum rate of administration (mg per minute) for medications that have a high risk of adverse effects when given too fast. This information should be provided as an alert on pharmacy-applied product labels, and as a special notation on computer-generated medication administration records. Warnings could also appear on automated dispensing cabinet screens, if applicable. A list of these drugs and administration guidelines should be posted in medication use areas, or as some hospitals have done, provided on a hospital intranet, PDA devices, or in a small pocket guide.

A less concentrated solution could also help avoid administering medications too rapidly. For example, use the 1 mg/mL, not the 5 mg/mL strength of Versed so staff can titrate the dose slowly during administration. Medications that carry a risk of adverse effects if administered too quickly should be diluted and administered as a piggyback or via an infusion pump. A syringe pump should be used to infuse small-volume IV medications.

Finally, avoid using terms such as "IV push," "IVP," or "bolus" with drugs that require administration over 1 minute or longer. Use more descriptive terms such as "IV over 5 minutes." Perhaps manufacturers should design a syringe that would allow only the slow IV administration of drugs (e.g., no faster than 5 to 15 minutes, depending on volume).