Capping Intravenous Tubing and Disinfecting Intravenous Ports Reduce Risks of Infection

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PROBLEM: Although many improvements in patient safety have been made in the nation's health care system, medication errors and health care–associated infections (HAIs) still top the list of problems. These serious incidents have received widespread attention, and rightfully so. In a 2006 report, the Institute of Medicine noted that medication errors were among the most common medical mistakes, harming at least 1.5 million people each year and costing more than $3.5 billion annually for preventable drug-related injuries in hospitals alone.[1] Equally sobering, the Centers for Disease Control and Prevention (CDC) listed HAIs among the top 10 leading causes of death in the U.S. In 2006, HAIs accounted for an estimated 1.7 million infections in hospitals; 99,000 associated deaths; and $4.5 to $5.7 billion in added patient care costs each year.[2–4]

These two risks—medication errors and HAIs—sometimes converge, particularly when staff and health care professionals do not perform basic handwashing in between patient appointments and during medication administration (compliance rates range from only 25% to 50%).[5] The results of a 12-month multicenter collaboration assessing hand hygiene compliance rates in U.S. health care facilities, by measuring product usage and providing feedback, showed compliance at baseline to be 26% for intensive-care units (ICUs) and 36% for non-ICUs.[6] The risk is also elevated when aseptic technique is not maintained during the preparation and administration of injectable drugs and solutions. The Institute for Safe Medication Practices (ISMP) has published reports of hepatitis outbreaks and other infectious diseases caused by the improper use of syringes and multiple-dose vials. However, other unsafe habits are also placing patients in danger of contracting an infection. Two dangerous practices have been especially pervasive:

- failure to place a sterile cap on the end of a reusable intravenous (IV) administration set that has been removed from a primary administration set, saline lock, or IV catheter hub, with the tubing left hanging between uses. *Result:* The tip of the set is exposed to potential contaminants; this can lead to infection if the non-sterile IV set is reconnected to the patient's IV access.
- failure to properly disinfect the injection port when accessing needle-free valves on IV sets. *Result:* The port is exposed to potential contaminants that can be pushed into the patient's IV line after the port has been accessed by tubing or a syringe.

The risk of problems arising from these practices has been compounded by the implementation of needle-less IV systems. Before the introduction of these systems, health care practitioners typically replaced the needle that was used to connect the infusion to the IV tubing with a new sterile, capped needle to prevent contamination when the line was hanging between uses. Now it appears that many practitioners are not considering the risk of contamination; they are not placing a sterile cap on the exposed tubing.

Even though needle-less systems have dramatically reduced the risk of needlestick injuries, the lack of a needle or cannula on a syringe or at the end of the tubing may suggest that protection and disinfection are not required. According to one health care educator, this aspect of infection control is not emphasized at the beginning of employees' professional education. This premise was also supported by a nurse who said that physicians and nurses caring for her hospitalized mother were actually offended when she offered them alcohol swabs to disinfect the IV port when it looked as if they were not going to follow this safety practice.

SAFE PRACTICE RECOMMENDATIONS: At the ISMP, we encourage organizations to ensure that health care practitioners who administer medications are well versed in the use of aseptic technique during the medication-use process and that they are familiar with the conditions under which sterile techniques must be applied. These conditions should include (1) covering the exposed end of IV tubing used for intermittent infusions with a sterile cap between uses and (2) disinfecting the port before connecting tubing or a syringe to the port.

One pharmacist reported that nurses in her facility sometimes attached the exposed end of IV tubing to a port on the same tubing to maintain sterility (sometimes called "looping"), but it was not clear whether the nurses properly disinfected the port prior to attachment. This practice is not among those recommended by the Infusion Nurses Society;[7] it should be brought to the organization's infection control committee for careful deliberation before being endorsed. The Society's standards of practice state that "a compatible sterile covering should be aseptically attached after each intermittent use."

The ISMP has also learned that nursing assistants were disconnecting the IV tubing when an intermittent infusion was completed. The assistants then forgot to attach a sterile cap. This practice should be prohibited; unlicensed staff members should never connect or disconnect any type of medical tubing.

Capping the tubing end and disinfecting the port should be documented in the institution's policies and procedures. The

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capping procedure should emphasize that a new sterile cap must be used each time the tubing is capped. The disinfecting procedure should describe the exact process to be used; this may include using two alcohol swabs and allowing the alcohol to evaporate before accessing the port. Both processes should also be included as specific elements that must be observed during competency assessments related to medication use for new and existing practitioners.

Finally, the ISMP recommends that health care providers and staff conduct regular compliance rounds on all patient-care units to document the extent of the problem and to take measures to track improvements.

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The reports described in this column were received through the ISMP Medication Errors Reporting Program (MERP). Errors, close calls, or hazardous conditions may be reported on the ISMP Web site (www.ismp.org) or communicated directly to ISMP by calling 1-800-FAIL-SAFE or via e-mail at ismpinfo@ismp.org. ■