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Intravenous Medication Administration: Potential for Harm

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Background on ECRI Institute

- For 50 years, ECRI Institute, a nonprofit organization, has been dedicated to bringing the discipline of applied scientific research to discover which medical procedures, devices, drugs, and processes are best, all to enable you to improve patient care.

  We firmly believe that seeking and finding the best ways to improve patient care require "The Discipline of Science" and "The Integrity of Independence.“

- ECRI Institute has very strict conflict of interest policies, so I have no conflicts to disclose

IV Administration: Potential for Harm

A. ECRI Institute continues to learn about and investigate incidents of infusion errors – many leading to significant injuries or death

B. ECRI Institute's IV pump experts advise the following:

1. Know what you are administering
2. SW controls and Smart Pumps – use them more
3. **Always use simple physical actions as adjunct**

C. **Must do basics even as moving toward Smart Pumps**

How often does ECRI hear of infusion problems? Are there common themes?

- ECRI investigates a few dozen per year
  - Often these are hard to diagnose, hence we are asked to investigate – common themes: broken, cracked, misloaded pumps – errors reported with all models of pumps
  - Obvious misprogramming or wrong drug selection cases are not typically referred to ECRI
  - We think there are many more problems than we know of….
- Type of drug and patient status factor heavily into whether harm occurs
  - Overdose is generally more dangerous than underdose
  - Certainly if an underdose is of a life sustaining drug, then harm could occur

Technology Background (1)

- While most infusion pumps incorporate effective safety features, users must recognize the limitations of such features. For example:
- **Infusion pumps cannot detect uncontrolled flow.**

1. Although some infusion pumps can alarm for a potential gravity-flow condition, this alarm does not result from a determination of uncontrolled flow….

2. Rather, the alarm indicates only that an anti-free-flow mechanism is not appropriately engaged.

Technology Background (2)

1. **Infusion pump manufacturers specify that the roller clamp is the primary method of ensuring that no flow is going to the patient.** A pump's anti-free-flow mechanism should be considered a secondary protective measure.

2. Damage to or failure of a crucial component of the pump can affect the functioning of a pump's safety features—for example, a damaged component could prevent an anti-free-flow clamp from engaging.

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Infusion Errors
Can Be Deadly
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1 Infusion Errors Can Be Deadly If Simple Safety Steps Are Overlooked

The Problem

- Safety mechanisms on large-volume infusion pumps are effective—but:
  - They cannot eliminate all potential errors
  - They can fail or be unknowingly defeated
- Causes:
  - Incorrect loading of the administration set
  - Damaged pump or set components
  - Failure of the anti-free-flow mechanism to engage
  - Misprogramming of dose, flow rate, or concentration
- Risks include:
  - Free flow of medication to the patient
  - Over- or under-delivery of medication

1 Infusion Errors Can Be Deadly If Simple Safety Steps Are Overlooked

Key Recommendations

- Don’t use pumps that show signs of damage
  - A damaged component could prevent an anti-free-flow clamp from engaging
  - Look for bent or cracked components, a door that won't close, etc.
- Close the roller clamp at appropriate times
  - For example: Before opening the pump door when removing the set from the pump
  - This step can minimize the risk of uncontrolled medication flow to the patient
- Observe flow in the drip chamber
  - Verify that medication is flowing from the correct bag
  - Assess the drip rate for any gross inconsistency

Wrap-up

1. Don’t implicitly trust that pump technology will be perfect, still use simple safety practices – don’t overlook them!

Questions?

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Thank You

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