

ALERT: Reports of Severe Harm after Intravenous Administration of Breast Milk to Infants

The Institute for Safe Medication Practices Canada has received 2 incident reports in which breast milk was inadvertently administered to an infant by the intravenous (IV) route. The search for information about similar incidents in the neonatal setting revealed that hospitals caring for infants may be using parenteral syringe pumps, parenteral syringes, and parenteral tubing for administration of enteral feedings. This safety bulletin is intended to alert staff in all facilities to the need to review, reassess, and address failures with existing enteral systems in neonatal care areas. It is recognized that the risk for IV administration of liquids intended for the enteral route may extend to other patient populations and therefore the learning and recommendations from this alert have broader applicability.

Incident Example

A preterm infant with a nasogastric (NG) tube and an IV line was to receive breast milk via the NG tube and a syringe infusion pump. However, the milk was inadvertently administered through the IV line. Shortly after the infusion of breast milk was initiated, the infant's condition deteriorated. Emergency medical intervention was required, including intubation, fluid resuscitation, and emergency transfer to a tertiary neonatal intensive care unit.

International Reports

The inadvertent IV administration of breast milk has been reported in other countries. Three examples are summarized here:

- An infant had been admitted to hospital and was to receive breast milk through a NG tube. Breast milk was inadvertently administered IV after a syringe containing the milk was connected to the IV line. The infant experienced respiratory distress and seizures but recovered from the incident.¹
- An infant received about 75 mL of breast milk by the IV route when an enteral feeding tube was inadvertently connected to the IV cannula. The infant experienced septic shock and required 1 month of intensive care.²
- A premature infant was receiving continuous feeds of breast milk and parenteral nutrition. The NG and IV lines were disconnected for a period of time and were

inadvertently interchanged when they were reconnected. It was estimated that the infant received about 10 mL of breast milk over a 3.5 hour period. The infant survived, with no apparent long-lasting neurological damage.³ The authors of the report identified 8 additional incidents through online discussions with neonatology practitioners, 3 of which were fatal.³

Background

Incidents involving inadvertent parenteral administration of enteral feeds, medications, or other fluids intended for enteral administration have been identified as one of the most common types of "tube and catheter misconnections" reported to The Joint Commission in the United States (all age groups).^{4,5} It has been suggested that reports of such incidents may greatly underrepresent the actual number of occurrences.^{6,7}

The use of parenteral equipment (pump, syringe and/or tubing) for enteral feeding can allow the inadvertent misconnection of tubing and other equipment and the IV delivery of enteral feeds. The use of parenteral equipment for enteral delivery appears to have developed out of necessity. Enteral pumps designed for use in adults and older pediatric patients do not accommodate the smaller priming and fill volumes needed to provide breast milk to preterm infants, nor do they offer the lower delivery rates and the small rate changes needed for some preterm infants. Enteral syringe pumps designed for use in neonates exist, and for some facilities, use of this equipment may reduce the risk of misconnections (depending on a number of variables, such as current equipment in use and procedures currently in place). However, because enteral feeding pumps cannot eliminate the possibility of a misconnection, a prospective analysis, such as a failure mode and effects analysis is needed to inform consideration of their use.

It has been recognized that a standard is needed for end connectors on feeding sets (i.e., syringe and tubing) and feeding tubes (e.g., NG tubes) to eliminate the possibility of misconnections. Several publications have described incidents involving inadvertent parenteral administration of enteral feeds and have provided useful additional information such as details about the move towards

standardizing enteral connectors so that they are incompatible with parenteral systems.⁶⁻¹⁰

Recommendations to Reduce Risk

The following recommendations include those previously published by safety organizations such as the Institute for Safe Medication Practices (US),⁹⁻¹¹ The Joint Commission (US),^{4,5} the National Patient Safety Agency (UK)¹², and others:⁶⁻⁸

- Assess current equipment and practices to identify and address potential failures that could allow enteral misconnections to occur.
- Enteral feeding equipment (e.g., syringe and tubing) should NOT have end connectors that will allow misconnection with parenteral equipment such as an IV line or IV access device. Enteral systems should be distinct and easily recognizable from equipment used for parenteral administration. Some manufacturers use colour in addition to labelling to help distinguish enteral from parenteral equipment.
- Parenteral syringes should NOT be used to prepare, measure, or administer liquids intended for the oral or enteral route. Ensure that oral and enteral syringes (incompatible with parenteral systems) are readily available in patient care areas.
- Use distinct pumps specifically calibrated for enteral feeding and clearly identified as “for enteral feeding ONLY”.
- When purchasing new catheters and tubing, involve the staff members who will be working with the equipment in testing to determine possible failures and associated risks such as the potential for misconnections. During orientation and training, emphasize the risks associated with tubing misconnections and review safe and required practices. For example, practitioners

must use only the designated pump and supplies for enteral administration, and must always trace every line from its origin to the connection to verify attachments and route of administration before making a connection *and* again before administering any solutions.

Conclusion

The potential clinical consequences of IV administration of breast milk or other products intended for enteral administration include septicemia, embolism, disseminated intravascular coagulation, and multiorgan failure, as well as respiratory and cardiac arrest. It is imperative that all facilities providing enteral feeding to neonates review their enteral feeding systems and practices to reduce the possibility of enteral feeds being given parenterally.

ISMP Canada gratefully acknowledges the expert review of this bulletin by (in alphabetical order):

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We are interested in your thoughts and experiences related to the potential for IV administration of breast milk to an infant.

If you or your organization provides enteral feeding to neonates, please take a few minutes to complete our short survey.

Although compiled data and survey responses may be used in future reports, individual responses will be kept confidential and will not be identifiable.

The link below will take you to the online version of the survey. If you prefer to answer the survey by phone, please call Christine Koczmar RN, at 416-733-3131, ext. 224, or toll-free 1-866-544-7672, ext 224.

Responses will be accepted until September 30, 2011.

<https://app.fluidsurveys.com/surveys/praismp-survey-v1/>

Health Canada's Role in the Management and Prevention of Harmful Medication Incidents

On June 20, 2011, Health Canada updated its website to provide more information to Canadians about the department's role in reducing and preventing harmful medication incidents, particularly those that result from a health product's name, package, or label. Health Canada uses information gathered through the Canadian Medication Incident Reporting and Prevention System to monitor and improve the safety of medications and other health products in Canada.

For more information, visit <http://www.hc-sc.gc.ca/dhp-mps/medeff/cmirms-scdpim-eng.php>

Safe Medication Use in Older Persons

The "Safe Medication Use in Older Persons Information Page" was created by several organizations involved in seniors' care in Ontario. The information presented on this information page is aimed at reducing the incidence of adverse effects in elderly people who are taking medications. It is part of an awareness campaign designed to provide the members of care teams in long-term care homes, hospitals, and the community with information about medications that are poorly tolerated by older persons. The site includes a list of potentially harmful medications, along with links to resources and background information.

The information page is hosted on the ISMP Canada website and is available at www.ismp-canada.org/beers_list

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ISMP Canada is a national voluntary medication incident and 'near miss' reporting program founded for the purpose of sharing the learning experiences from medication errors. Implementation of preventative strategies and system safeguards to decrease the risk for error-induced injury and thereby promote medication safety in healthcare is our collaborative goal.

Medication Incidents (including near misses) can be reported to ISMP Canada:

(i) through the website: http://www.ismp-canada.org/err_report.htm or (ii) by phone: 416-733-3131 or toll free: 1-866-544-7672.

ISMP Canada can also be contacted by e-mail: cmirms@ismp-canada.org. ISMP Canada guarantees confidentiality and security of information received, and respects the wishes of the reporter as to the level of detail to be included in publications.

A Key Partner in the Canadian Medication Incident Reporting and Prevention System