Accidental Intravenous Infusion of Expressed Breast Milk in a Neonate
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ABSTRACT

Previous reports have described complications resulting from inadvertent intravenous administration of breast milk: hyperosmolarity, microembolism, hypersensitivity and septicemia. We present the case of a premature infant who was accidentally given expressed breast milk (EBM) intravenously. The non-fatal outcome of the patient in the first month of the incident may have been related to pulmonary embolism and supportive treatment, which was started from the first instance of the milk administration. The fatal outcome of the patient was related to severe septicemia in the second month of the administration. Particular care must be taken in the case of the patient who is receiving synchronous enteral and intravenous infusion therapy. Caregivers as well as healthcare professionals should be enlightened on the importance of this subject matter.

Keywords: Breast milk, infant, intravenous infusion, medical errors

INTRODUCTION

Medication errors occur in as many as 4% of inpatients in the general medical wards. Of adverse drug events, 28% were due to errors, making the rate of serious medication errors (that is, preventable adverse drug events plus potential adverse drug events) 7.3% (1). Although greater monitoring intensity and higher nurse-patient ratios in the intensive care unit (ICU) may reduce the incidence of medication errors, an increasing number of interventions dramatically increase the incidence of such error. In one study, drug errors were found seven times more likely to occur in the ICU than anywhere else.
among paediatric patients admitted to a British university hospital (2).

Mistakes may be more common when the clinician is inexperienced and when new techniques are introduced (1). Wilson et al found that more errors occurred in a paediatric intensive care unit when new doctors joined the rotation (2).

In the literature, medical errors caused by colleagues is not much reported. Here a premature infant who had been given 25 mL of expressed breast milk (EBM) intravenously by his mother in the newborn period, accidentally, is reported and discussed in light of the literature.

CASE REPORT
A male child was born at 28 weeks of gestation with a birthweight of 1700 g. He was ventilated for two days for hyaline membrane disease. He had resection of the ileum and end-to-end anastomosis of ileum and caecum for meconium cyst from intrauterine ileal perforation on the third day of life. On the 18th day of life, primary su-

turing was done due to NEC perforation. Finally, an ileostomy was created 45 cm from the ligament of Treitz turing was done due to NEC perforation. Finally, an ileostomy was created 45 cm from the ligament of Treitz on the 39th day of life due to multiple perforations in the jejunum and ileum. After the third operation, he de-
volved short bowel syndrome, and he received a combination of continuous nasogastric feeding of evidence-based medicine (EBM) and intravenous parenteral nutrition (containing lipid). When he was two months old, his mother misconnected his nasogastric tube and intra-

venous line after changing him and did not notify the nurse. It was estimated that the infant had received an infusion of 25 mL of EBM over a two-hour period via a peripheral venous cannula while parenteral nutrition was given via the nasogastric tube. On morning rounds, the patient had tachypnoea and tachycardia and moaning. One-hour after the visit, the patient’s mother confessed to the incident.

Clinically, the infant’s colour was grey pale and vital signs including arterial blood pressure, were normal. Because of the potentially devastating effects of this adverse incident, the infant was electively oxygenated by hood, a new intravenous catheter was inserted, and broad-spectrum antibiotics (vancomycin, meropenem) were started. Urinary output and urinalysis were normal after bolus infusion of saline. He had mild leukocytosis (white blood cell count: 15.8 × 10^9/L), transient throm-
bocytopenia (lowest platelet count: 86 × 10^9/L) and a metabolic acidosis (base excess: −8 mmol/L). Chest ra-
diography revealed evidence of parenchymal infiltration and diaphragmatic elevation on the right-side. Cranial ul-
trasound was normal. In the fundus, examination for probable signs of milk embolism were revealed. Blood cultures revealed group G Streptococcus and Staphylo-
coccus epidermidis. A similar strain of group G Streptococcus and a few unidentified anaerobes were isolated from the EBM culture. The cerebrospinal fluid was ster-
ile. The infant’s parents were informed of the incident and potential complications without delay and psycho-
logical support was provided to the mother.

Evidence of infiltration and diaphragmatic elevation on the right-side on the chest radiography disappeared on the 10th day of the event. He was clinically well, with a normal neurologic and general physical ex-
amination in the first month after the milk administra-
tion. His enteral and total parenteral nutrition programme continued due to the short bowel syndrome, but he died with septicaemia two months after administration of EBM intravenously.

DISCUSSION
There have been a number of previously published re-
ports in the literature of inadvertent intravenous admin-
istration of infant formula resulting in complications such as hyperosmolarity, microembolism, hypersensitiv-
ity, septicaemia and death (4, 5). Oral medications also have been inadvertently administered intravenously to neonates (6). The infant in this case developed septi-
caemia due to bacterial contamination of the EBM.

Although the incidence of such errors is unknown, they have occurred in a wide variety of settings including adult ICUs (5–9). The message from the current report is that some infants and children can survive after these iatrogenic catastrophes with early recognition and app-
propriate support. Previously, eight infants were reported from around the world with adverse events similar to our index case. Three of these eight infants died after acci-
dental administration of intravenous milk. Five of the infants received EBM, whereas the remainder received infant formula. Clinical effects reported in these infants included: apnoea, septicaemia, neutrophilia and multiple organ failure with subsequent cardiac arrest. Management included: supportive treatment, steroids, and broad-
spectrum antibiotics, and/or exchange transfusion. The patient died, despite two months of intensive antibi-
therapy, because of septicaemia. Non-fatal outcome in the first month might have been related to mild mi-
croembolism of pulmonary system and continuous sup-
portive treatment from the first moment of the milk administration. Blood cultures were not negative inspite
of the intensive antibiotherapy.

Nevertheless, the main strategy in such cases must be prevention. The intravenous administration of EBM or formula can be avoided by the use of colour-coded enteral-administration sets and feeding tubes with Luer connections that are not compatible with intravenous cannulas (1, 5). The addition of methylene blue to the tube-feeding formula or use of colour-coded distal connecting tubing may prevent accidental intravenous administration of tube-feeding formulae. In the absence of evidence in favour of either method, bolus enteral feeds may be preferable to continuous gastric feeding in stable premature infants, with less risk of interchanging the continuous intravenous infusion with an intermittent bolus gastric feed.

Attention must be given to this potential complication, and especially to the prevention of these accidents, by adopting different connections for enteral feeding and parenteral solutions or making it easy to recognize catheters by means of different colours or other types of signals (2, 5, 7).

In conclusion, particular care should be given to the patient receiving synchronous enteral and intravenous infusion therapy. The caregivers and healthcare professionals should be enlightened about the importance of the subject, as much as healthcare professionals.

REFERENCES