Accidental Intravenous Infusion of Expressed Breast Milk in a Neonate

AC Celayir[1], S Cansaran[1], C Özmen[1], O Bosnali[1], S Moralıoğlu[1], T Gürsoy[2], G Karatekin[2], S Topçuoğlu[2]

ABSTRACT

Previous reports have described complications resulting from inadvertent intravenous administration of breast milk: hyperosmolarity, microembolism, hypersensitivity and septicaemia. 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 septicaemia 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

Infusión Intravenosa Accidental de Leche Materna Extraída en un Neonato

AC Celayir[1], S Cansaran[1], C Özmen[1], O Bosnali[1], S Moralıoğlu[1], T Gürsoy[2], G Karatekin[2], S Topçuoğlu[2]

RESUMEN

Reportes previos han descrito las complicaciones que resultan de la administración intravenosa inadvertida de la leche materna: hiperosmolaridad, microembolismo, hipersensibilidad, y septicemia. Presentamos el caso de un niño prematuro al que accidentalmente se le dio leche materna extraída (LME) por vía intravenosa. El resultado no fatal del paciente en el primer mes de incidente puede haber estado relacionado con la embolia pulmonar y el tratamiento de apoyo, que se inició desde el primer momento de la administración de la leche. El resultado fatal del paciente está relacionado con una grave septicemia en el segundo mes de la administración. Debe tenerse especial cuidado en el caso de un paciente que haya recibido sincrónicamente terapia de infusión intravenosa y enteral. Los encargados de cuidar al paciente, así como los profesionales de la salud, deben estar bien informados sobre la importancia de este tema.

Palabras claves: Leche materna, lactantes, infusión intravenosa, errores médicos

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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

From: [1]Department of Paediatric Surgery and [2]Department of Neonatology, Zeynep Kamil Maternity and Children's Training and Research Hospital Istanbul, Türkiye.

Correspondence: Dr S Moralıoğlu, Arakiyeci Hacı Mehmet Mah. Op. Dr Burhanettin Üstünel Cad. No:10, 34668 Üsküdar, İstanbul, Turkey. email: serdarmoralioglu@gmail.com

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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 suturing 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 developed 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 intravenous 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: 15.8×10^3/L), transient thrombocytopaenia (lowest platelet count: 86×10^3/L) and a metabolic acidosis (base excess: − 8 mmol/L). Chest radiography revealed evidence of parenchymal infiltration and diaphragmatic elevation on the right-side. Cranial ultrasound was normal. In the fundus, examination for probable signs of milk embolism were revealed. Blood cultures revealed group G Streptococcus and *Staphylococcus epidermidis*. A similar strain of group G Streptococcus and a few unidentified anaerobes were isolated from the EBM culture. The cerebrospinal fluid was sterile. The infant's parents were informed of the incident and potential complications without delay and psychological 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 examination in the first month after the milk administration. 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 reports in the literature of inadvertent intravenous administration of infant formula resulting in complications such as hyperosmolarity, microembolism, hypersensitivity, septicaemia and death (4, 5). Oral medications also have been inadvertently administered intravenously to neonates (6). The infant in this case developed septicaemia 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 appropriate 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 accidental 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 antibioctherapy, because of septicaemia. Non-fatal outcome in the first month might have been related to mild microembolism of pulmonary system and continuous supportive 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.

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