

Safety Alert

IV Magnesium Sulphate in Obstetrics

Issue

Magnesium sulphate is indicated in the management of pre-eclampsia and also for fetal neuroprotection if there is a risk of preterm delivery. Intravenous magnesium has been repeatedly associated with medication errors internationally and locally. One US report described 52 cases of accidental IV magnesium overdose (1). IV magnesium errors may result in serious patient harm or death. Such errors are well understood and effective preventative strategies are available.

Examples of Errors (1, 2)

- A 20g/500ml bag of IV magnesium was used to administer a 4g bolus followed by a 1g/hr infusion. The midwife was not familiar with the smart pump which was preset to give the bolus and subsequent maintenance infusion. The pump was programmed manually to give the loading dose over 30 minutes. The rate was not reduced after the 30 minutes and the woman received 350ml (14g) over approximately 100 minutes before the error was noticed. The woman was unharmed.
- On transfer from the Labour Ward, a patient's IV fluids were being replaced when a midwife selected an unlabelled bag of magnesium (40g/1000ml) that was being prepared for another patient instead of Hartmann's solution. The patient had already received a separate magnesium infusion. The second bag was run at 300ml/hr. Respiratory arrest occurred. The woman remains in a persistent vegetative state.
- Labels for a bag of Hartmann's solution and IV magnesium (40g/1000ml) were mixed up. The woman received 12g magnesium per hour for 3 hours. She died as a consequence of respiratory depression.

How to reduce the risk (1, 3)

Conditions that make IV magnesium errors more likely include: patient transfer/handover, inadequate staffing, unfamiliarity with IV magnesium or infusion pumps, chaotic environment, differing protocols between institutions, assumptions/miscommunications, preparing solutions in clinical areas, inadequate labelling, poor observation of the woman's clinical status and assuming the woman is stable or tired (1).

- **Implement standardised protocols** which address: prescribing, pump programming, second person checking of the selected infusion bag and pump settings, frequency of observation, handover precautions and the availability of IV calcium for treatment of magnesium overdose.
- **Ensure appropriate monitoring of patients on magnesium sulphate:** indicators of magnesium levels include maternal respiratory rate, oxygen saturation, deep tendon reflexes and state of consciousness. Clear protocols should be in place for assessments during magnesium administration.
- **Use ready-mixed IV magnesium infusion bags when possible.** If product shortages occur, ensure that clear guidance is available for preparing these solutions from concentrated magnesium vials.
- **Only use 4g and 20g infusion bags.** Use the 4g infusion bag solely for the delivery of a bolus dose and the 20g infusion bag solely for the delivery of the maintenance infusion (3).
- **Label IV lines** near the IV pump. When infusions are started or the rate is adjusted, trace the tubing by hand from the IV bag, to the pump, and then to the patient for verification.
- **Emergency preparedness:** ensure magnesium toxicity is addressed in emergency training.
- **All healthcare professionals involved in obstetric care must understand the risk posed by intravenous magnesium and the signs of magnesium toxicity:** respiratory depression, loss of tendon reflexes, loss of consciousness, hypotension, heart block and cardiac arrest.
- **Report any medication errors or adverse drug reactions** via local incident reporting, to the Health Products Regulatory Agency (www.hpra.ie) and the State Claims Agency.

1. Simpson KR, Knox GE. Obstetrical accidents involving intravenous magnesium sulfate: recommendations to promote patient safety. MCN: The American Journal of Maternal/Child Nursing. 2004;29(3):161.
2. Irish Medication Safety Network Member Information. 2015.
3. Institute for Safe Medication Practices. Preventing magnesium toxicity in obstetrics. ISMP Medication Safety Alert! 2005; URL: <http://www.ismp.org/newsletters/acutecare/articles/20051020.asp>. Accessed: 2nd March 2015. (Archived by WebCite® at <http://www.webcitation.org/6WixOphed>).

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