

Magnesium Toxicity During Cesarean Section

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Background: Magnesium sulfate (MgSO_4) is a high-risk medication with the potential for overdose and even death. Prompt recognition and treatment of MgSO_4 overdose is a pillar of obstetric anesthesia.





Case: We describe a 27-year-old G2P0010 at 37w4d admitted for IOL due to GHTN that progressed to preeclampsia with severe features by blood pressure criteria, and MgSO₄ treatment was initiated per protocol. After a failed IOL a primary LTCS was recommended. Her labor epidural was converted for surgical anesthesia.

After arrival to the OR, the patient voiced concerns of **hot flushing, difficulty breathing, nausea, and muscle weakness**. She passed an Allis test and surgery began. Her symptoms progressed to increased **somnolence** and **respiratory depression**. She remained hemodynamically stable but required an OPA and NRB mask to support ventilation. Ongoing discussions between the operating and anesthesia teams included a *differential diagnosis of high spinal, LAST, opioid overdose, and AFE*. A nursing staff member came to the head of the bed and noted that the MgSO₄ infusion had been taken off the pump and was running wide open. The MgSO₄ bag (**40g in 1L**) was approximately half empty and had been recently changed.

The IV line was immediately closed and **1g calcium gluconate** and **20mg of IV furosemide** were administered. On initial laboratory evaluation the magnesium concentration was undetectably high. At the end of the case, the patient remained responsive to painful stimuli with sternal rubs, while maintaining appropriate oxygen saturation on 10L NRB. After an **additional 1g of calcium chloride**, the patient showed improvement in symptoms and was weaned to room air. **ECG showed no evidence of arrhythmia or cardiac dysfunction**. CXR showed no evidence of pulmonary edema. The patient remained stable during her overnight stay in the ICU and was discharged on POD3.



- **Discussion:** This case outlines a rare adverse event with a significant amount of learning points. Magnesium toxicity is recognized by:
 - *Early signs* such as loss of DTRs, flushing, nausea, and muscle weakness
 - *Late signs* including somnolence, respiratory failure, paralysis, and cardiac arrest
 - Treatment includes IV calcium, diuretics, and supportive care
- **Key elements of safe care practices for the use of MgSO₄ include:¹**
 - Pharmacy-supplied medications
 - Decreasing maintenance bags from 40g in 1L to 20g in 500mL
 - Using color-coded tags on the lines
 - During care team transfers, it is recommended a bedside assessment between both parties be completed including patient status, review of dosage and pump settings, and review of written physician orders.
- These recommendations were implemented at our institution as part of an intradepartmental revamp of practices, which also included *multidisciplinary simulation, monthly resident education, and modifications to our OR time out processes*. We hope giving this rare but life-threatening complication attention will urge other institutions to review their practices and prevent this outcome.

References: 1. Simpson, K. R. (2006). Minimizing Risk of Magnesium Sulfate Overdose in Obstetrics. MCN: The American Journal of Maternal/Child Nursing, 31(5), 340.