

# Acute seizure crisis after an unexpected sudden hypomagnesemia

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## SUMMARY

Hypomagnesemia, one of the most common underdiagnosed metabolic disorders in patients admitted to Postoperative Intensive Care. It is associated with presence of hypocalcemia, hypokalemia, and alkalosis. Severe magnesium deficiency can trigger life-threatening cardiac and neurological disorders however those clinical effects have not been reported immediately after surgery or magnesium infusion cessation.

We present a case of women who had several switch-off episodes and generalized sudden seizures secondary to hypomagnesemia without any metabolic disturbances, even

after replenishing magnesium levels.

It underlines the importance, of continuous patient's motorization who undergoes intestinal elective surgery and gene screening.

Although this side effect has been reported, evidence not showed the immediacy of our case and different course than expected due to concomitant electrolytes disturbances were not found. Magnesium deficiency should be taken in patients undergoing elective bowel surgery with greater resection than 50 centimeters. This deficiency may occur as single electrolyte disturbance with sudden onset.

Key words: **Hypomagnesemia, seizures, intensive care.**

## *Crisis convulsiva aguda después de una hipomagnesemia repentina inesperada*

### RESUMEN

La hipomagnesemia es uno de los trastornos metabólicos infradiagnosticados más frecuentemente en pacientes ingresados en cuidados intensivos postoperatorios. Se asocia con la presencia de hipocalcemia, hipopotasemia y alcalosis. La deficiencia severa de magnesio puede desencadenar trastornos cardíacos y neurológicos potencialmente mortales, sin embargo, esos efectos clínicos no

han sido identificados de una manera inmediata tras la cirugía o el cese de la infusión de magnesio.

Presentamos el caso de una mujer que tuvo varios episodios de desconexión y crisis comiciales repentinas generalizadas secundarias a hipomagnesemia, sin alteraciones metabólicas, incluso después de reponer los niveles de magnesio.

Casos como el que presentamos, destaca la importancia de la motorización

continua del paciente sometido a cirugía intestinal electiva y un cribado genético. Aunque este efecto secundario ha sido reportado, la evidencia no mostró la inmediatez de nuestro caso y no se encontró un curso diferente al esperado debido a alteraciones electrolíticas concomitantes. La deficiencia de magnesio debe tomarse en serio en pacientes sometidos a cirugía intestinal electiva con resección mayor de 50 centímetros. Esta deficiencia puede ocurrir como una alteración electrolítica única con inicio repentino.

Palabras clave: **Hipomagnisemia, crisis comiciales, cuidados intensivos.**

## INTRODUCTION

Hypomagnesemia is a rare biochemical alteration in outpatients, however up to 12%<sup>1</sup> of hospitalized patients can be detected, being is one of the most commonly underdiagnosed metabolic disorders in patients admitted to Postoperative Intensive Care Units. Hypomagnesemia symptoms usually start with serum concentration below 1.2 mg/dL. Frequently it is associated with the presence of hypocalcemia, hypoka-

lemia, and metabolic alkalosis. Total parenteral and enteral nutrition, diuretics and nephrotoxic drugs, diarrhea and hypoalbuminemia play an important role on its onset. Recently, different authors have described several cases of symptomatic hypomagnesemia associated with the prolonged use of proton pump inhibitors (PPIs)<sup>2</sup>. A severe magnesium deficiency can trigger life-threatening cardiac and neurological disorders<sup>3</sup>.

We present a case of acute seizure crisis in women who underwent resection of the small bowel secondary to umbilical hernia. After two months of admission, she presented several switch-off episodes and generalized seizures. Imaging tests did not show structural damage. Laboratory tests highlighted severe hypomagnesemia.

During admission, she had difficult-controlled diarrhea, probably malabsorption related. Despite metabolic and nutritional complication secondary to bowel resection usually appear months after post-surgery, it is rare come across with severe electrolytes disorders due to the reduction of the intestinal absorptive surface during the immediate postoperative period.

### CLINICAL REPORT

46-year-old woman with a history of obesity and stage IIa cervical carcinoma operated in 2012, without current cancer treatment, who on 28 July 2019 was admitted to the General Surgery Service due to symptoms of abdominal pain and hemodynamic instability, classified as an acute abdomen.

She underwent emergency surgery for peritonitis secondary to intestinal ischemia in relation to intestinal obstruction due to left paraumbilical internal hernia, as a consequence of previous gynecological surgery. Ileocecal resection of the ischemic loop and jejunal latero-lateral anastomosis were performed.

The postoperative period was torpid requiring admission in the Critical Care Unit (CCU) for hemodynamic and respiratory support secondary to septic shock.

She remained in the CCU two months, during which time she presented multiple infectious complications, including several episodes of ventilator-associated pneumonia, caused by multiple germs (*Citrobacter freundii*, *Klebsiella varicola*, *Klebsiella pneumoniae*, *Stenotrophomonas maltophilia* and *Acinetobacter baumannii*) receiving multiple antibiotic therapy cycles. In addition, she presented diarrhea in the context of adynamic ileus, related to the prolonged use of opioids, neuromuscular blocking agents, and malabsorption with loss of nutrients as a consequence of jejunal resection. Bacterial origin of diarrhea was ruled out.

Nutritional support was initiated on CCU, initially total parenteral nutrition according with her macronutrients and electrolytes requirements and then enteral nutrition maintaining an optimal hydroelectrolytic and nutritional status.

On 28<sup>th</sup> of September patient was discharge from CCU to general surgery ward, tolerating oral intake and meeting her nutritional requirements. The same day in the afternoon patients had a generalized tonic-clonic seizure episode, requiring benzodiazepines and readmission to CCU. Head CT scan did not show acute injuries. In the blood tests, severe hypomagnesemia stands out after cessation of intravenous magnesium infusion (table 1). Vitamin D, phosphorus, calcium and sodium plasma levels were normal.

Magnesium levels were restored by intravenous magnesium sulphate infusion, with no new seizures. She was discharged again to general surgery ward at 48 hours with magnesium levels in the normal range.

Following days she had watery diarrhea. Clostridium difficile toxine and stool culture were negative. Blood test showed fecal calprotectin elevated in relation with surgery.

On bloods test, magnesium levels showed a progressive decrease probably diarrhea related, prescribing oral supplements.

On October 11<sup>th</sup>, patient had abdominal pain, poor general health, excessive sweating and hemodynamic instability. Abdominal CT scan was performed showing complete bowel obstruction, requiring urgent surgical treatment. Surgical team found intestinal plastron with adhesive closed-loop small bowel obstruction in hepatic flexure and ileum wall ischemia. Wide ileocecal resection and a new latero-lateral anastomosis to right colon were performed.

No incidents were recorded during postoperative evolution until next day (12<sup>th</sup> October) when patient had an absence seizure episode without other neurological foci. Given the history of hypomagnesemia, 12.5 mEq of magnesium were administered. Patient improved immediately her consciousness level. Electrocardiogram did not show any alteration.

After 24 hour of stability, patient was discharged again to surgical ward with magnesium supplements. On 31<sup>th</sup> of October patient was discharged home with magnesium oral supplement and she had not any seizure episode.

Karch y Lasagna and Naranjo Adverse Drug Reaction Probability Scale was conducted<sup>4-5</sup>, obtaining definite as result. In addition, medicines review was performed, including all the medicines prescribed during her admission, ruling out medicines related hypomagnesemia. Medicines may cause magnesium alteration were furosemide<sup>6</sup>, however this drug started 2 days after of magnesium levels abnormalities. Patient was on omeprazole, which one has been reported as a hypomagnesemia cause<sup>1</sup>. However scientific evidence shows this side affects after at least one year treatment and our patient only had 15 days on it.

### DISCUSSION

Hypomagnesemia has been reported up to 12% of hospitalized patients<sup>7</sup>. It may go undetected because is not often measured in routine blood tests. Clinical symptoms usually appear with serum levels below 1.2 mg/dL and is usually associated with other electrolytes disturbances as hypocalcaemia and hypokalaemia.

Our patient had serum vitamin D and electrolytes in range and magnesium levels were above 1.2 mg/dL although, they were replenished by intravenous infusion. The required magnesium dose depended on serum levels and clinical symptoms due to sudden onset of symptoms after magnesium infusion discontinuation.

The main problem in our patient was the diarrhoea. However there are not reports proposing immediate magnesium deficiency after stop supplement infusion even with diarrhoea controlled as our case.

Our case underlines the importance of continuous monitoring of patient who undergoes intestinal elective surgery and according to new theories, gene screening<sup>7</sup>. Although this side effect has been reported, evidence has not showed with the immediacy of our case and with different course than expected due to concomitant electrolytes disturbances were not found.

To sum up, magnesium deficiency should be taken into account in patients undergoing elective bowel surgery with a resection greater than 50 centimeters. In addition, this deficiency may occur as single electrolyte disturbance with sudden onset.

*Conflicts of interest: The authors declare no conflicts of interest.*

**Table 1. Plasma magnesium concentration**

| Date              | 27/09/2019 | 30/09/2019 | 02/10/2019 | 04/10/2019 | 12/10/2019 | 13/10/2019 |
|-------------------|------------|------------|------------|------------|------------|------------|
| Magnesium (mg/dL) | 1,69       | 2,71       | 1,5        | 2,37       | 1,2        | 2,1        |

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