Hypermagnesemia

August 15, 2019 by Josh Farkas

CONTENTS

- Diagnosis (#diagnosis)
- Causes (#causes)
- Evaluation (#evaluation)
- Treatment (#treatment)
- Podcast (#podcast)
- Questions & discussion (#questions & discussion)
- Pitfalls (#pitfalls)

rough correlation between Mg level and symptoms
Hypermagnesemia - EMCrit Project

**interpreting magnesium levels**

<table>
<thead>
<tr>
<th>Severe hypermagnesemia</th>
<th>mg/dL</th>
<th>mM</th>
<th>mEq/L</th>
<th>Clinical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;12</td>
<td>&gt;5</td>
<td>&gt;10</td>
<td>Severe symptoms</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Muscle weakness</td>
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<td></td>
<td>- Respiratory distress, apnea</td>
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<td>- Heart block, severe bradycardia</td>
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<td>- Delirium, coma</td>
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<tr>
<td>Moderate hypermagnesemia</td>
<td>5-12</td>
<td>2-5</td>
<td>4-10</td>
<td>Hyporeflexia</td>
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<td>Mild symptoms</td>
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<td>- Lethargy, confusion</td>
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<td>- Nausea, vomiting</td>
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<td></td>
<td>- Bradycardia</td>
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<tr>
<td>Therapeutic target during Mg infusion</td>
<td>3.6-4.9</td>
<td>1.5-2</td>
<td>3-4</td>
<td>Should be asymptomatic.</td>
</tr>
<tr>
<td>Normal</td>
<td>1.7-3</td>
<td>0.7-1.2</td>
<td>1.4-2.4</td>
<td>Normal. May consider targeting Mg &gt;2 mg/dL (or &gt;0.8 mEq/L) to avoid arrhythmias in patients at increased risk.</td>
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<tr>
<td>Moderate hypermagnesemia</td>
<td>1.2-1.7</td>
<td>0.5-0.7</td>
<td>1-1.4</td>
<td>May see:</td>
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<tr>
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<td>- Neuromuscular irritability</td>
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<td>- Tetany</td>
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<td>- Hypokalemia</td>
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<tr>
<td>Severe hypermagnesemia</td>
<td>&lt;1.2</td>
<td>&lt;0.5</td>
<td>&lt;1</td>
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<td>May see:</td>
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<td>- Tetany</td>
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<td></td>
<td></td>
<td></td>
<td>- Nystagmus</td>
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<td>- Seizures</td>
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<td>- Psychosis</td>
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<td>- Arrhythmia</td>
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</tbody>
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Serum magnesium level is only a blunt tool to evaluate for intracellular hypomagnesemia. Furthermore, these cutoff values are somewhat arbitrary (Van Laecke 1999 PMID 30220246). -The Internet Book of Critical Care, by @PulmCrit

**physical examination**

- Hyporeflexia
  - Presence of reflexes argues against severe hypermagnesemia.
  - Hyporeflexia is nonspecific, however (e.g. some patients have sluggish reflexes at baseline).
- Bradycardia, hypotension

**EKG findings**

- wide QRS and peaked T-waves (can mimic hyperkalemia)
- heart block

**range of symptoms that may occur**

- Cardiac
  - Hypotension
  - Bradycardia, complete heart block
- Neurologic
  - Muscular weakness (can progress to respiratory failure from diaphragmatic involvement)
  - Delirium, coma
  - Smooth muscle paralysis: urinary retention, intestinal ileus, pupillary dilation

**causes**

(back to contents) 

**Renal Failure plus:**

- Persistent hypermagnesemia requires renal failure (or, less commonly, and ongoing source of magnesium).
- However, in addition to renal failure, there is usually another source of magnesium

**(1) exogenous magnesium**

- Magnesium infusions for pre-eclampsia
- Magnesium-containing antacids
- Magnesium-containing laxatives or enemas

**(2) endogenous magnesium from cellular lysis**

- Rhabdomyolysis
- Hemolysis

https://emcrit.org/ibcc/hypermagnesemia/
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10/29/2019

- Tumor lysis syndrome
- Crush injury, severe burns

**evaluation**

If the lab is hemolyzed, repeat it (hemolysis may cause pseudo-hypermagnesemia)
- Obtain complete set of electrolytes including Ca/Mg/Phos (to evaluate for additional concurrent electrolyte abnormalities).
- Consider LDH, creatinine kinase, or uric acid (to evaluate for hemolysis, rhabdomyolysis, or tumor lysis).

**treatment**

**moderate hypermagnesemia (e.g. Mg <10 mg/dL, no cardiac/respiratory symptoms)**
- Volume resuscitation
- Treatment of underlying cause
- Furosemide may be considered to enhanced magnesium excretion, but make sure to replace excreted volume to avoid hypovolemia.

**severe hypermagnesemia (cardiac and/or respiratory consequences)**
- IV calcium may stabilize myocardium
  - Two grams of calcium gluconate IV over 5-10 minutes (or one gram of calcium chloride).
  - May need to repeat or, in extreme cases, give as a continuous infusion.
- Elimination
  - Not oliguric: forced diuresis with furosemide plus saline (with close monitoring of volume status and other electrolyte levels).
  - Oliguric: emergent dialysis

**podcast**

The segment of this podcast about hypermagnesemia begins at 18:30:


The Podcast Episode

Want to Download the Episode?
[Right Click Here and Choose Save-As](https://traffic.libsyn.com/ibccpodcast/IBCC_Episode_50_Hyper_and_HypoMagnesium.mp3)

**questions & discussion**

To keep this page small and fast, questions & discussion about this post can be found on another page [here](https://emcrit.org/pulmcrit/magnesum/).
Moderate hypermagnesemia (e.g. Mg 5-8 mg/dL) is generally pretty well tolerated. Be careful about attributing severe symptoms to this degree of hypermagnesemia.

Going further

- [Hypermagnesemia](https://wikem.org/wiki/Hypermagnesemia) (WikEM)