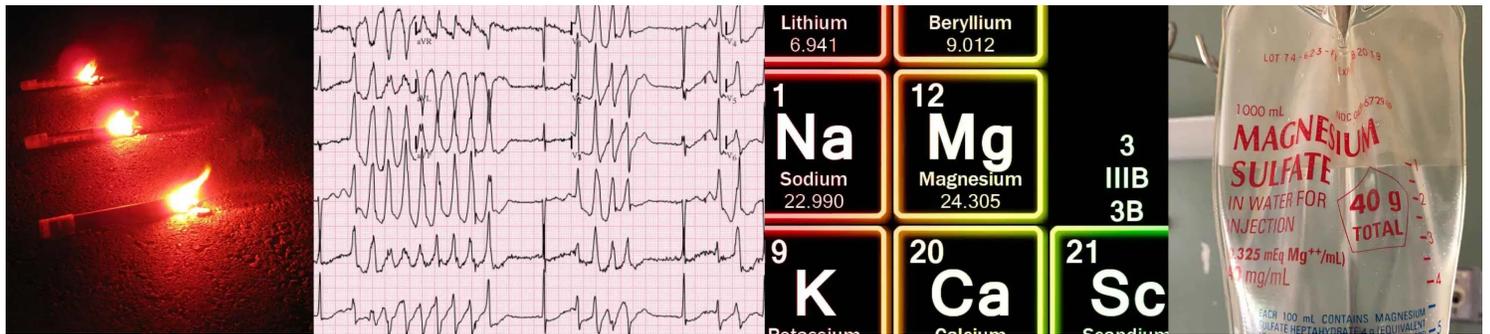


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The Internet Book of Critical Care

Hypermagnesemia

August 15, 2019 by [Josh Farkas](#)



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diagnosis

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rough correlation between Mg level and symptoms

interpreting magnesium levels

	mg/dL	mM	mEq/L	Clinical significance
Severe hypermagnesemia	>~12 mg/dL	>~5 mM	>~10 mEq/L	Severe symptoms - Muscle weakness - Respiratory distress, apnea - Heart block, severe bradycardia - Delirium, coma
Moderate hypermagnesemia	5-12 mg/dL	2-5 mM	4-10 mEq/L	Hyporeflexia Mild symptoms - Lethargy, confusion - Nausea, vomiting - Bradycardia
Therapeutic target during Mg infusion	3.6-4.9 mg/dL	1.5-2 mM	3-4 mEq/L	Should be asymptomatic.
Normal	1.7-3 mg/dL	0.7-1.2 mM	1.4-2.4 mEq/L	Normal. May consider targeting Mg >2 mg/dL (or >0.8 mM) to avoid arrhythmias in patients at increased risk.
Moderate hypomagnesemia	1.2-1.7 mg/dL	0.5-0.7 mM	1-1.4 mEq/L	May see: - Neuromuscular irritability - Tremor - Hypocalcemia - Hypokalemia
Severe hypomagnesemia	<1.2 mg/dL	<0.5 mM	<1 mEq/L	May see: - Tetany - Nystagmus - Seizures - Psychosis - Arrhythmia

Serum magnesium level is only a blunt tool to evaluate for intracellular hypomagnesemia. Furthermore, these cutoff values are somewhat arbitrary (Van Laecke 2019 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

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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

- Tumor lysis syndrome
- Crush injury, severe burns

evaluation

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investigations

- 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

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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

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



<https://i1.wp.com/emcrit.org/wp-content/uploads/2016/11/apps.40518.14127333176902609.7be7b901-15fe-4c27-863c-7c0dbfc26c5c.5c278f58-912b-4af9-88f8-a65fff2da477.jpg>

Follow us on iTunes (<https://itunes.apple.com/ca/podcast/the-internet-book-of-critical-care-podcast/id1435679111>)

The Podcast Episode

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Want to Download the Episode?

[Right Click Here and Choose Save-As \(http://traffic.libsyn.com/ibccpodcast/IBCC_Episode_50_Hyper_and_HypoMagnesium.mp3\)](http://traffic.libsyn.com/ibccpodcast/IBCC_Episode_50_Hyper_and_HypoMagnesium.mp3)

questions & discussion

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To keep this page small and fast, questions & discussion about this post can be found on another page [here \(https://emcrit.org/pulmcrit/magnesium/\)](https://emcrit.org/pulmcrit/magnesium/).



(<https://i1.wp.com/emcrit.org/wp-content/uploads/2016/11/pitfalls2.gif>)

- 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) (<https://wikem.org/wiki/Hypermagnesemia>) (WikEM)

The Internet Book of Critical Care is an online textbook written by Josh Farkas (@PulmCrit), an associate professor of Pulmonary and Critical Care Medicine at the University of Vermont.

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