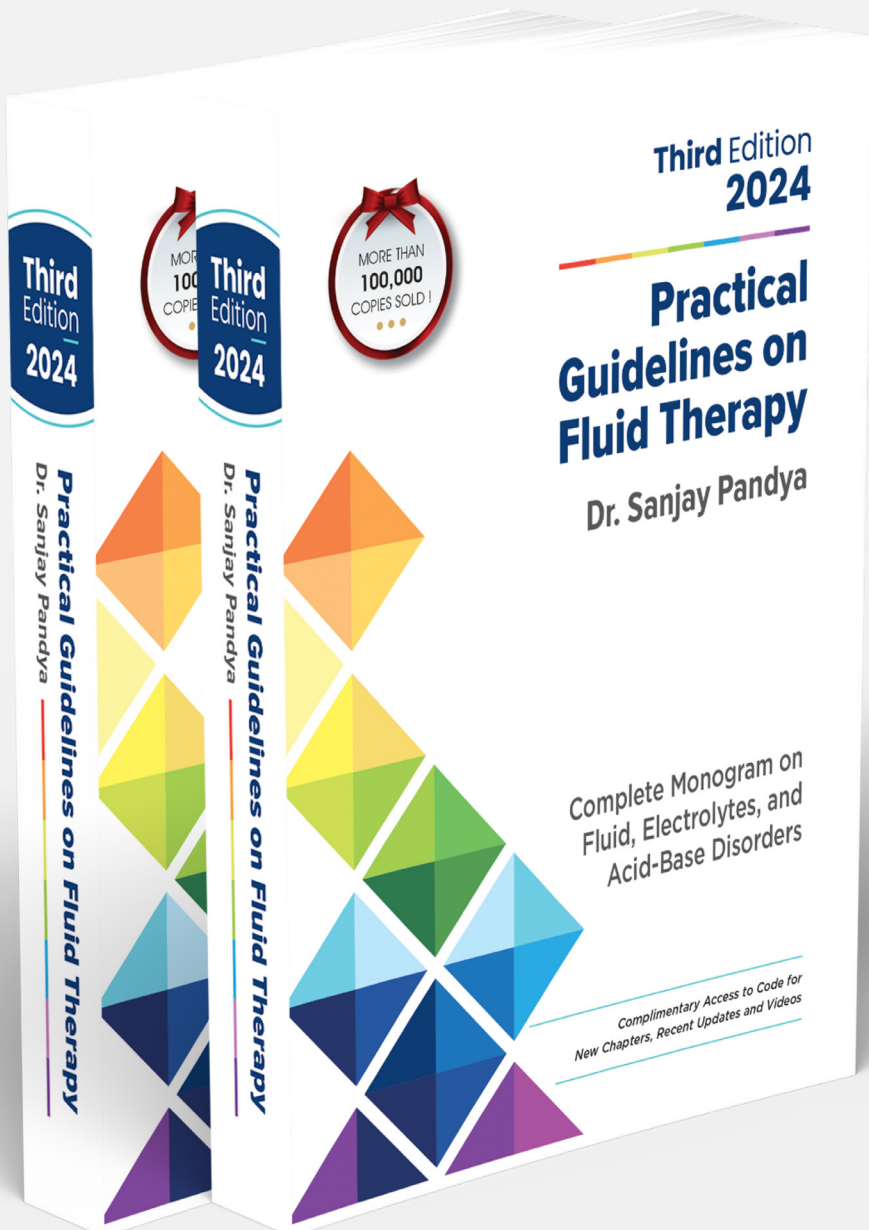




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## Chapter 28: Hypomagnesemia



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# 28

# Hypomagnesemia

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## SERUM MAGNESIUM

Disorder of magnesium, especially hypomagnesemia, is expected particularly in ICU patients and usually occurs due to renal and gastrointestinal (GI) losses. However, hypermagnesemia is a less frequent disorder than hypomagnesemia, and its most common cause is renal failure.

### BASIC PHYSIOLOGY

- Magnesium is the fourth most common cation of the body (after Na<sup>+</sup>, K<sup>+</sup>,

and Ca<sup>2+</sup>), the second most common intracellular cation (after K<sup>+</sup>), and the commonest intracellular divalent cation.

- **Distribution:** About 60% of body magnesium is in bones, 39% is within the cells, and only 1% is in extracellular fluid (ECF). Up to 40% of total plasma magnesium is protein-bound, 5–10% is in complex form, and about 50–55% is in a free, ionized form, which is a biologically active ion (like calcium).

**Table 28.1 Interpretation of serum magnesium concentration**

Hypomagnesemia			Normal range	Hypermagnesemia		
Severe	Moderate	Mild		Mild	Moderate	Severe
<1.0 mg/dL	1.0-1.5 mg/dL	1.6-1.9 mg/dL	1.7-2.1 mg/dL	4.8-7.2 mg/dL	7.2-12 mg/dL	>12 mg/dL
<0.5 mmol/L	0.4-0.6 mmol/L	0.7-0.8 mmol/L	0.70-0.85 mmol/L	2.0-3.0 mmol/L	3.0-5.0 mmol/L	>5 mmol/L
<0.8 mEq/L	0.8-1.2 mEq/L	1.4-1.6 mEq/L	1.4-1.7 mEq/L	4.0-6.0 mEq/L	6.0-10 mEq/L	>10 mEq/L

Conversion factors for serum magnesium: 1 mEq/L = 1.2 mg/dL = 0.5 mmol/L

- **Normal blood ranges:** The normal serum magnesium level is 1.7 to 2.1 mg/dL (0.70 to 0.85 mmol/L, 1.4 to 1.7 mEq/L), and their values in magnesium disorders are summarized in Table 28.1.
- As the clinical effects of magnesium disorders are determined primarily by tissue magnesium content, serum magnesium levels have limited diagnostic value.

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