Intradialytic Hypotension

Causes of Intradialytic Hypotension

1. Volume and Circulatory Factors

Excessive fluid removal - Ultrafiltration rate > 0.35 mL/min/kg (> 1.5 L/h in a 70-kg patient)
- Decrease in plasma volume > 20%

Reduced plasma refilling rate

Reduced effective circulating volume

Hemorrhage

2. Cardiac Factors

- Myocardial infarction
- Structural heart disease
- Arrhythmias
- Pericardial tamponade

3. Impaired Vasoconstriction

(Result of patient- and dialysis-related factors below; may be worsened by hemolysis.)

4. Patient-Related Factors

- Autonomic neuropathy (e.g., diabetic, uremic)
- Antihypertensive medications
- Lack of appropriate rise in plasma norepinephrine ("sympathetic failure")
- Decreased sensitivity of the renin–angiotensin and arginine–vasopressin systems
- Food ingestion (splanchnic vasodilation)
- Tissue ischemia (adenosine mediated)
- Bacterial sepsis

- Intradialytic venous pooling
- Increase in core body temperature
- Anemia

5. Dialysis-Related Factors

- Acetate dialysate vasodilation (adenosine mediated)
- Low dialysate sodium and/or ionized calcium concentrations
- Complement activation (C3a and C5a mediated)
- Cytokine generation (interleukin-1 and nitric oxide mediated)

6. Other Acute Contributors

- Dialyzer reaction
- Air embolism
- Hemolysis

7. Central Outcome

Intradialytic hypotension

8. Simplified Pathophysiologic Relationships

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Excessive fluid removal
        ↓ (± reduced plasma refilling)
Reduced effective circulating volume
        ↓
Intradialytic hypotension
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Additional converging inputs: - Hemorrhage → reduced effective circulating volume
- Cardiac factors → ↓ cardiac output → hypotension
- Patient-related + Dialysis-related factors → impaired vasoconstriction → hypotension
- Hemolysis, Dialyzer reaction, Air embolism → direct precipitants of hypotension

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Converting This Markdown to PDF

Options: 1. Pandoc: pandoc intradialytic-hypotension.md -o intradialytic-hypotension.pdf 2. VS Code extension "Markdown PDF". 3. GitHub Actions (pandoc container) or an online Markdown-to-PDF tool. 4. Chrome/Browser: Open rendered Markdown → Print → Save as PDF.

> Let me know if you'd like a version with references, management strategies, or an infographic layout.