Musings on Volume Management

A Nephrologist’s Perspective

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Objectives

• The science (and art) of estimating fluid deficit
• Volume of distribution
• IV fluid choices available
• Specific clinical examples and treatment
Volume Deficit-Clinical Types

- **Intravascular (Blood):**
  - Acute hemorrhage

- ** Extracellular (intra+extravasc): (Salt and water loss)**
  - secretory diarrhea, ascites, edema
  - Third spacing

- **Total body: (Water)**
  - Water loss (diabetes insipidus, osmotic diarrhea)
Clinical Diagnosis

• **Intravascular depletion**
  
  MAP = CO x SVR
  
  Hemodynamic effects
  
  • BP  HR  JVP
  
  • Cool extremities
  
  • Reduced sweating
  
  • Dry mucus membranes

• **E.C.F. depletion**
  
  – Skin turgor, sunken eyeballs
  
  – Weight
  
  – Hemodynamic effects

• **Water Depletion**
  
  Thirst
  
  Hypernatremia
"They all sound the same to me after 30 years."
## Diagnostic Accuracy of Vital Signs for Acute Blood Loss

<table>
<thead>
<tr>
<th>Finding</th>
<th>Source, y</th>
<th>Moderate Blood Loss, Sensitivity (95% CI),%</th>
<th>Large Blood Loss, Sensitivity (95% CI),%</th>
<th>Before Blood Loss, Specificity (95% CI),%</th>
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</thead>
<tbody>
<tr>
<td>Postural pulse increment ≥30/min or severe postural dizziness†</td>
<td>Knopp et al, 1980</td>
<td>57</td>
<td>98</td>
<td>98</td>
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<tr>
<td></td>
<td>Shenkin et al, 1944</td>
<td>...</td>
<td>100</td>
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<td></td>
<td>Baraff and Schriger, 1992</td>
<td>8</td>
<td>...</td>
<td>100</td>
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<td></td>
<td>Witting et al, 1994</td>
<td>14</td>
<td>...</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Summary measure‡</td>
<td>22 (6-48)</td>
<td>97 (91-100)</td>
<td>98 (97-99)</td>
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<tr>
<td>Postural hypotension (&lt;20 mm Hg decrease in SBP)†§</td>
<td>Baraff and Schriger, 1992</td>
<td>7</td>
<td>...</td>
<td>98</td>
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<tr>
<td>Age ≤65 y</td>
<td>Witting et al, 1994</td>
<td>9</td>
<td>...</td>
<td>90</td>
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<td></td>
<td>Summary measure‡</td>
<td>9 (6-12)</td>
<td>...</td>
<td>94 (84-99)</td>
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<tr>
<td>Age ≥65 y</td>
<td>Witting et al, 1994</td>
<td>27 (14-40)</td>
<td>...</td>
<td>86 (76-97)</td>
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<td>Supine tachycardia (pulse &gt;100/min)</td>
<td>Ralston et al, 1961</td>
<td>0</td>
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<td>100</td>
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<td>Shenkin et al, 1944</td>
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<td>Wallace and Sharpey-Schafer, 1941</td>
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<td>16</td>
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<td>Skillman et al, 1967</td>
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<td>100</td>
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<tr>
<td></td>
<td>Summary measure‡</td>
<td>0 (0-42)</td>
<td>12 (5-24)</td>
<td>96 (88-99)</td>
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<td>Supine hypotension (SBP &lt;95 mm Hg)</td>
<td>Warren et al, 1945</td>
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<td>Wallace and Sharpey-Schafer, 1941</td>
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<td>...</td>
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<td>Bergenwald et al, 1977</td>
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<td>Summary measure‡</td>
<td>13 (0-50)</td>
<td>33 (21-47)</td>
<td>97 (90-100)</td>
</tr>
</tbody>
</table>

*McGee S...JAMA. 1999;281(11):1022-1029*
Jugular Venous Pressure

JVP = 2 + 5
= 7 cm of water

Top of Jugular Vein
Vertical distance above angle of Louis

5 cm
Right Atrium
ALI/ARDS

- Bilateral pulmonary infiltrates on chest x-ray
- Pulmonary Capillary Wedge Pressure <18mmHg
- PaO2/FiO2* <300 = ALI
- PaO2/FiO2 <200 = ARDS

Am J Respir Crit Care Med 1994; 149(3 Pt 1):818-824
Diagnostic utility of B-type natriuretic peptide in critically ill patients with pulmonary edema
Comparison of two fluid-management strategies in acute lung injury.

- Liberal-strategy group:
  - CVP 10-14
  - PAOP 14-18

- Conservative-strategy group:
  - CVP < 4
  - PAOP < 8
<table>
<thead>
<tr>
<th>Measured intravascular pressure (mm Hg)</th>
<th>MAP &lt;60 mm Hg or a need for any vasopressor (except dopamine ≤5 μg/kg/min); consider correctable causes of shock first</th>
<th>MAP ≥60 mm Hg without vasopressors (except dopamine ≤5 μg/kg/min)</th>
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<tbody>
<tr>
<td></td>
<td>Conservative strategy</td>
<td>Liberal strategy</td>
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<td>Conservative strategy</td>
<td>Liberal strategy</td>
<td>Conservative strategy</td>
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<tr>
<td>Range 1</td>
<td>&gt;13</td>
<td>&gt;18</td>
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<td>Range 2</td>
<td>9–13</td>
<td>15–18</td>
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<td>Range 3</td>
<td>4–8</td>
<td>10–14</td>
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<td>Range 4</td>
<td>&lt;4</td>
<td>&lt;10</td>
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<tr>
<td>Outcome</td>
<td>Conservative Strategy</td>
<td>Liberal Strategy</td>
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<td>----------------------------------------------</td>
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<td><strong>Death at 60 days (%)</strong></td>
<td>25.5</td>
<td>28.4</td>
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<td><strong>Ventilator-free days from day 1 to day 28†</strong></td>
<td>14.6±0.5</td>
<td>12.1±0.5</td>
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<td><strong>ICU-free days†</strong></td>
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<tr>
<td>Days 1 to 7</td>
<td>0.9±0.1</td>
<td>0.6±0.1</td>
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<tr>
<td>Days 1 to 28</td>
<td>13.4±0.4</td>
<td>11.2±0.4</td>
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<td><strong>Organ-failure–free days†‡‡</strong></td>
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<tr>
<td>Days 1 to 7</td>
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<tr>
<td>Cardiovascular failure</td>
<td>3.9±0.1</td>
<td>4.2±0.1</td>
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<tr>
<td>CNS failure</td>
<td>3.4±0.2</td>
<td>2.9±0.2</td>
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<td>Renal failure</td>
<td>5.5±0.1</td>
<td>5.6±0.1</td>
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<tr>
<td>Hepatic failure</td>
<td>5.7±0.1</td>
<td>5.5±0.1</td>
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<tr>
<td>Coagulation abnormalities</td>
<td>5.6±0.1</td>
<td>5.4±0.1</td>
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<td>Days 1 to 28</td>
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<tr>
<td>Cardiovascular failure</td>
<td>19.0±0.5</td>
<td>19.1±0.4</td>
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<td>CNS failure</td>
<td>18.8±0.5</td>
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<td>Renal failure</td>
<td>21.5±0.5</td>
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<tr>
<td>Hepatic failure</td>
<td>22.0±0.4</td>
<td>21.2±0.5</td>
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<td>Coagulation abnormalities</td>
<td>22.0±0.4</td>
<td>21.5±0.4</td>
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<td><strong>Dialysis to day 60</strong></td>
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<tr>
<td>Patients (%)</td>
<td>10</td>
<td>14</td>
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<tr>
<td>Days</td>
<td>11.0±1.7</td>
<td>10.9±1.4</td>
</tr>
</tbody>
</table>
Right Heart Cath

“volume responsive”
"volume responsive"
Preinfusion CVP (○, individual values; •, mean values) of responders (R) and nonresponders (NR).

Osman.. Crit Care Med35 :64 –68, 2007
Preinfusion PaOP (•, individual values; ●, mean values) of responders (R) and nonresponders (NR).

Osman.. Crit Care Med 35:64–68, 2007
Passive Leg Raise – Spontaneous Breathing

Figure 1. Study design. PLR, passive leg raising; VE, volume expansion.
Figure 1. Study design. PLR, passive leg raising; VE, volume expansion.

Figure 2. Evolution of aortic blood flow at the four steps of the study, expressed as percent change from base 1. Open circles, evolution in the subgroup of nonresponders, in whom neither volume expansion (VE) nor passive leg raising (PLR) changed aortic blood flow; filled circles, evolution in the subgroup of responders, in whom the increase of aortic blood flow induced by fluid infusion was preceded by an increase induced by passive leg raising. †p < .05 vs. base 1; †#p < .05 vs. base 2.
Figure 3. Individual values (open circles) and mean ± SD (filled circles) of changes of aortic blood flow (ABF) and of changes of pulse pressure (PP) induced by passive leg raising (PLR) (both expressed as percent variation from base 1) in responders (R) and nonresponders (NR). *p < .05 vs. nonresponders.
Figure 4. Receiver operating curves comparing the ability of variations in aortic blood flow (ABF) and pulse pressure (PP) induced by passive leg raising (PLR) (both expressed as percent variation from base 1) to discriminate responders and nonresponders to volume expansion in the whole population.
Do FeNa FeUrea Predict Persistent AKI?
FEur $\leq$ 35% and FENa $\leq$ 1%

AUC
$FE_{\text{Urea}} = 0.56 \pm 0.11$
(P = 0.3)
$FE_{\text{Na}} = 0.83 \pm 0.07$
(P = 0.001).
The difference between AUCs is 0.27 (P = 0.04)
Hemodynamic Truths

- Tachycardia is never a good thing.
- Hypotension is always pathologic.
- There is no such thing as normal cardiac output.
- Central venous pressure is only elevated in disease.
- Peripheral edema is of cosmetic concern

Pinsky.. Chest. 2007; 132:2020-2029)
Volume of Distribution of Water

- 60% Males
- 50% Females

Diagram:
- H₂O
- Solids

60%-Males
50%-Females
Solids 40% of Wt

Intracellular (2/3)

Extracellular (1/3)

H₂O  

H₂O  

Na
E.C.F. COMPARTMENTS

Interstitial (extravascular) 3/4

Intra-vascular 1/4

H₂O  ↔  H₂O

Na  ↔  Na

Colloids & RBC
“Third Space”

- Acute sequestration in a body compartment that is not in equilibrium with ECF
- Examples:
  - Intestinal obstruction
  - Severe pancreatitis
  - Peritonitis
  - Major venous obstruction
  - Capillary leak syndrome
  - Burns
Daily Fluid Balance

Intake: 1-1.5L

Insensible Loss
- Lungs 0.3L
- Sweat 0.1 L

Urine: 1.0 to 1.5L
MATH-70 kg male

Total body water = 60% body wt
= 0.6 \times 70 = 42 \text{ liters}

ECF = \frac{1}{3}
0.3 \times 42 = 13 \text{ liters}

ICF = \frac{2}{3}
0.6 \times 42 = 25 \text{ liters}

Blood = \frac{1}{4} \text{ (ECF)}
0.25 \times 13 = 3.3 \text{ liters}
Principles of Treatment

• How much volume?
  – Need estimate of fluid deficit

• Which fluid?
  – Which fluid compartment is predominantly affected?
  – Need evaluation of other acid/base/electrolyte/nutrition issues.
The IV Fluid Supermarket

- **Crystalloids**
  - Dextrose in water
    - D5W
    - D10W
    - D50W
  - Saline
    - Isotonic (0.9% or “normal”)
    - Hypotonic (0.45%, 0.25%)
    - Hypertonic
  - Combo
    - D51/2NS
    - D5NS
    - D10NS
  - Ringer’s lactate “physiologic”.
    - (K, HCO3, Mg, Ca)

- **Colloids**
  - Albumin
    - 5% in NS
    - 25% (Salt Poor)
  - Dextran
  - Hetastarch

- **Blood**
# 1 Liter 0.9% saline

<table>
<thead>
<tr>
<th>ECF=1 liter</th>
<th>Intravascular</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>=1/4 ECF=250 ml</td>
</tr>
<tr>
<td>Interstitial=3/4 of ECF=750ml</td>
<td></td>
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</tbody>
</table>

### Total body water
- ECF=1 liter
- ICF=0

1 Liter 0.9% saline
1 liter 5% Dextrose

- Total body water = 1 liter
- ECF = 1/3 = 300 ml
- ICF = 2/3 = 700 ml
- Intravascular = 1/4 of ECF = 75 ml
1 liter 5% Albumin

Intravascular=1 liter
A Comparison of Albumin and Saline for Fluid Resuscitation in the Intensive Care Unit

Example- GI Bleed

A 25 year old patient presents with massive hematemesis (vomiting blood) x 1 hour. He has a history of peptic ulcer disease.

Exam: Diaphoretic, normal skin turgor.

Supine BP: 120/70 HR 100

Sitting BP: 90/50 HR=140

Serum Na=140

- What is the nature of his fluid deficit?
- What IV fluid resuscitation would you prescribe?
- What do you expect the hematocrit to be:
  - at presentation?
  - after 12 hours of Normal Saline treatment?
Hemodynamic Shock

- an acute clinical syndrome initiated by ineffective perfusion, resulting in severe dysfunction of organs vital to survival
- tachycardia, relative hypotension (a decrease in baseline BP of 40 mmHg), tachypnea, cool and clammy extremities, oliguria, dysglycemia, and delirium

Weil/Shubin shock classification

- **Hypovolemic**
  - Hemorrhage, vomiting, diarrhea, burns, polyuria (diabetic ketoacidosis)
- **Cardiogenic**
  - MI, cardiomyopathy, drugs (overdose β blocker), valvular dysfunction, arrhythmias
- **Obstructive**
  - Tension pneumothorax, pulmonary embolism, air embolism, pericardial tamponade, aortic dissection
- **Distributive**
  - SIRS related: Sepsis, pancreatitis, trauma, burns
  - Neurogenic: Spinal cord injury,
    Endocrine related: Adrenal insufficiency, thyroid disease
  - Anaphylactic
Consequences of Shock

- Organ dysfunction (definition)
- May be associated with parenchymal damage if prolonged and severe
  - Acute tubular necrosis
  - Watershed CNS infarction
  - “Shock” liver
  - Ischemic colitis
Hemorrhagic Shock

(a)

(b)
Example-Diarrhea and Vomiting

- A 18 year old previously healthy medical student returns from a Caribbean vacation with a healthy tan and severe diarrhea and vomiting x 48 hours.
- Sunken eyeballs, poor skin turgor and dry mucus membranes
- BP 80/70 HR 130 supine.
- Labs: Na 130 K=2.8
  HCO3 =12
  ABG: 7.26/26/100

- What is the nature of his fluid deficit?
- What fluid will you prescribe?
- What would happen if D5W were to be used?
Example-Hyperosmolar State

A 85 year old nursing home resident with dementia, and known diabetes was admitted with confusion.

Exam: Disoriented
BP: 110/70 supine 90/70 sitting. Decreased skin turgor.
Labs: Na = 150 meq/L Wt = 50 kgs
BUN/Cr = 50/1.8 Blood sugar = 1200 mg/dl Hb = 45

What is the pathogenesis of her fluid and electrolyte disorder?

How would you treat her?
Calculation of Water Deficit

Healthy

\[ \text{Osm (P Na)} \times \text{volume} \]

Dehydrated

\[ \text{Osm (P Na)} \times \text{volume} \]

A 50 kg female with Na=150

• \( \text{Na} \times \text{Normal Body Water} = \text{Na} \times \text{Current Body Water} \)

• \( 140 \times \text{NBW} = 150 \times (0.5 \times 50=25 \text{ liters}) \)

• \( \text{NBW} = 26.8 \text{ liters} \)

• \( \text{Water deficit} = \text{NBW-CBW}= 26.8-25=1.8 \text{ liters} \)
A Cirrhotic

A 40-year-old patient with known alcoholic cirrhosis, portal hypertension and ascites is admitted with a rising creatinine.

Exam: BP 100/70 (no orthostasis), JVP 5cms, +++ascites, no peripheral edema, +asterixis.

BUN=12mg/dL Creat=2mg/dL Alb=2.0g/dL

Urine lytes: Na=6meq/L, FeNa=0.5%

Urine volume has been 200cc/24h.

1. Comment on his fluid status
2. If volume-depleted how would you treat him?
Hepato-Renal Syndrome

- A form of prerenal azotemia
- Advanced liver disease
- Kidneys are morphologically normal
Hepatorenal Syndrome: Diagnostic Criteria

**Major Criteria**

Chronic or acute liver disease with advanced hepatic failure and portal hypertension.

Low glomerular filtration rate, as indicated by serum creatinine of >1.5 mg/dL or 24-h creatinine clearance <40 mL/min.

Absence of shock, ongoing bacterial infection, and current or recent treatment with nephrotoxic drugs. Absence of gastrointestinal fluid losses (repeated vomiting or intense diarrhea) or renal fluid losses (weight loss >500 g/d for several days in patients with ascites without peripheral edema or 1,000 g/d in patients with peripheral edema).

No sustained improvement in renal function (decrease in serum creatinine to 1.5 mg/dL or less or increase in creatinine clearance to 40 mL/min or more) following diuretic withdrawal and expansion of plasma volume with 1.5 L of isotonic saline.

Proteinuria <500 mg/dL and no ultrasonographic evidence of obstructive uropathy or parenchymal renal disease.

**Additional Criteria**

- Urine volume <500 mL/d.
- Urine sodium <10 mEq/L.
- Urine osmolality greater than plasma osmolality.
- Urine red blood cells <50 per high power field.
- Serum sodium concentration <130 mEq/L.
**Therapeutic Interventions**

- Liver transplantation
- Transjugular intrahepatic portosystemic shunts
- Vasoconstrictors

**Pathogenesis**

1. Cirrhosis
   - Increased intrahepatic vascular resistance

2. Portal hypertension
   - Increased splanchnic production of vasodilators

3. Splanchnic vasodilatation

4. Severe arterial underfilling
   - Low arterial pressure

5. Stimulation of vasoconstrictor systems
   - Vasoconstriction of limbs and cerebral circulation

6. Renal vasoconstriction
   - Renal vasoconstrictors > renal vasodilators

7. Renal replacement therapy

8. Hepatorenal syndrome
Terlipressin +/- Albumin In HRS

Hepatology 36 (2002), pp. 941–948
Transjugular Intrahepatic Portosystemic Shunts in Hemodialysis-dependent Patients and Patients with Advanced Renal Insufficiency: Safety, Caution, and Encephalopathy

- Prompt post-procedure HD is required to prevent pulmonary edema
- Effective control of ascites/variceal bleed
- Severe encephalopathy is usual

High-dose Furosemide for Established ARF

- 338 pts with ARF on dialysis
- Furosemide (25mg/kg IV or 35mg/kg PO, or matched placebo) daily.
- No difference in:
  - Survival
  - Renal recovery
- Shorter time to 2L/day diuresis

“Renal Dose” Dopamine: from whence the madness?

Physiologic Effects

- Natriuretic
  - effects a decrease in tubular Na reabsorption
- Vasodilator
  - effects an increase in RBF with little of no change in GFR

Dose-Dependent Effects

- 0-2mcg/kg/minute – D1-4, vasodilatory
- 3-5mcg/kg/minute – mixed D and β₁ effects
- 5-10mcg/kg/minute – β₁ effects and increasing α₁ effects
- >10mcg/kg/minute – α₁ effects dominate

Ben Bodnar P&S 2009
Dopamine: So hot right now
Meta-analysis: low-dose dopamine increases urine output but does not prevent renal dysfunction or death.

**Ann Intern Med 2005 Apr 5;142(7):510-24.**

<table>
<thead>
<tr>
<th>Study, Year (Reference)</th>
<th>Dopamine Group, n/n</th>
<th>Control Group, n/n</th>
<th>RR (95% CI)</th>
<th>Weight, %</th>
<th>RR (95% CI)</th>
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<tr>
<td>Cardiac surgery</td>
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<td>Sumeray et al., 2001 (46)</td>
<td>2/24</td>
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<td>0.5</td>
<td>5.00 (0.25–98.96)</td>
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<td>Other surgery</td>
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<td>Grundmann et al., 1982 (56)</td>
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<td>44.6</td>
<td>1.00 (0.73–1.37)</td>
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<td>Swygert et al., 1991 (57)</td>
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<td>1/25</td>
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<td>0.6</td>
<td>1.14 (0.08–17.11)</td>
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<td>Carmellini et al., 1994 (59)</td>
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<td>5.6</td>
<td>0.60 (0.25–1.44)</td>
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<td>Schulze et al., 1999 (66)</td>
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<td>11.06 (0.62–198.56)</td>
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<td>0.47 (0.04–5.01)</td>
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<td>Intravenous contrast dye</td>
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<td>Weisberg et al., 1994 (75)</td>
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<td>3/15</td>
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<td>0.9</td>
<td>0.33 (0.04–2.85)</td>
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<td>Other nephrotoxic medications</td>
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<td>Somlo et al., 1995 (81)</td>
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<td>0.4</td>
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<td>Miscellaneous indications</td>
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<td>Lumlertgul et al., 1989 (92)</td>
<td>5/9</td>
<td>8/10</td>
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<td>ANZICS 2000 (90)</td>
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<td>40/163</td>
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<td>27.4</td>
<td>0.89 (0.60–1.32)</td>
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<td>Sánchez et al., 2003 A (91)</td>
<td>7/20</td>
<td>6/20</td>
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<td>5.4</td>
<td>1.17 (0.48–2.86)</td>
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<td>Sánchez et al., 2003 B (91)</td>
<td>4/20</td>
<td>4/20</td>
<td></td>
<td>2.8</td>
<td>1.00 (0.29–3.45)</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>606</td>
<td>610</td>
<td></td>
<td>100.0</td>
<td>0.93 (0.76–1.15)</td>
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</table>

Figure 2. Effect of low-dose dopamine on need for renal replacement therapy.
**Physiologic Benefits?**

**Increased UOP**

Two Interpretations:

1) There is no good evidence that low-dose dopamine offers important clinical benefits to patients with or at risk for acute renal failure.

2) Low-dose dopamine causes small short-term improvements in renal physiology without statistically significantly increasing adverse events.

Or does it…

---

**Figure 3. Effect of low-dose dopamine on day 1 urine output.**

<table>
<thead>
<tr>
<th>Study, Year (Reference)</th>
<th>Dopamine Group, n</th>
<th>Control Group, n</th>
<th>Ratio of Means (95% CI)</th>
<th>Weight, %</th>
<th>Ratio of Means (95% CI)</th>
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<td><strong>Cardiac surgery</strong></td>
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<td>Wierda et al., 1990 (35)</td>
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<td>3.0</td>
<td>1.93 (1.46–2.55)</td>
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<tr>
<td>Myles et al., 1993 (36)</td>
<td>25</td>
<td>24</td>
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<td>3.7</td>
<td>1.11 (0.90–1.36)</td>
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<td>Lauwers et al., 1994 (37)</td>
<td>129</td>
<td>68</td>
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<td>4.2</td>
<td>1.21 (1.06–1.37)</td>
</tr>
<tr>
<td>Chalyajov and Tatoulis, 1999 (39)</td>
<td>25</td>
<td>25</td>
<td></td>
<td>3.8</td>
<td>1.15 (0.95–1.38)</td>
</tr>
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<td>McInerle et al., 1999 (40)</td>
<td>8</td>
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<td>1.06 (0.97–1.16)</td>
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<td>Lassnigg et al., 2000 (45)</td>
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<td>Sumery et al., 2001 (46)</td>
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<td>Piper et al., 2003 (50)</td>
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<td>1.16 (0.96–1.40)</td>
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<td>Gatot et al., 2004 (51)</td>
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<td>1.23 (1.04–1.44)</td>
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<td><strong>Vascular surgery</strong></td>
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<td>Baldwin et al., 1994 (52)</td>
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<td>de Lasson et al., 1995 (53)</td>
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<td>Sprung et al., 2000 (55)</td>
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<td>Ohata et al., 1994 (60)</td>
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<td>Parks et al., 1994 (61)</td>
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<td>Watanabe et al., 1995 (62)</td>
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<td>Cregg et al., 1999 (64)</td>
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<td>1.35 (1.02–1.78)</td>
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<td>160</td>
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<td>1.49 (1.30–1.63)</td>
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<td>Wahbeh et al., 2000 (68)</td>
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<td>0.99 (0.66–1.48)</td>
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<td>Niyi et al., 2001 (69)</td>
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<td>1.37 (1.16–1.60)</td>
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<td>O’Hara et al., 2002 (71)</td>
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<td>Bianchioni et al., 2004 (73)</td>
<td>48</td>
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<td>0.82 (0.70–0.96)</td>
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<td><strong>Intravenous contrast dye</strong></td>
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<td>Weisberg et al., 1994 (75)</td>
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<td>Cormier et al., 1997 (82)</td>
<td>21</td>
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<td><strong>Total (95% CI)</strong></td>
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<td>786</td>
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<td>100.0</td>
<td>1.24 (1.14–1.35)</td>
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</tbody>
</table>

![Graph showing the effect of low-dose dopamine on day 1 urine output](image-url)
For crying out loud, I was hibernating!... Don't you guys ever take a pulse?