Hypovolemia and Ascites

Precision and Accuracy of Physical Signs

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PART 1

IS THIS ADULT PATIENT HYPOVOLEMIC?

STEVEN MCGEE, MD
WILLIAM B. ABERNATHY III, MD
DAVID L. SIMEL, MD, MHS
Clinical scenarios

Case 1:  54-year-old man, taking ibuprofen.1 day history of melena. Puls 80/min, BD 140/82mmHg supine, P 115/min and BD 132/86mmHg when standing. Mild epigastric tenderness, positive guaiac-test for occult blood in the stool. Hematocrit 39%

Case 2:  26-year-old-woman with 6 months of episodic vertigo, unilateral hearing loss attributed to Ménière disease. Treatment with hydrochlorothiazid, 3 weeks later her dizziness is worse. P 80/min, BD 160/84mmHg supine, P 88/min and 134/82mmHg when standing. On standing slight dizziness.

Case 3:  82-year-old-woman with 1-day-history of nausea and vomiting. Known dementia, KHK, VHF, emphysema, hypertension. Treatment with aspirine, isosorbide dinitrate, furosemide, beta-agonist inhalers, lisinopril. Clinical diagnosis of gastroenteritis, afebrile. P 75/min, BD 154/90mmHg supine, 90/min and 130/76mmHg when upright. Tonghue, axillae and mucous membranes are moist.
Clinical scenarios

Case 1: 54-year-old man, taking ibuprofen. 1 day history of melena. Puls 80/min, BD 140/82mmHg supine, P 115/min and BD 132/86mmHg when standing. Mild epigastric tenderness, positive guaiac-test for occult blood in the stool. Hematocrit 39%

Severity of GI tract hemorrhagia?

Case 2: 26-year-old-woman with 6 months of episodic vertigo, unilateral hearing loss attributed to Ménière disease. Treatment with hydrochlorothiazid, 3 weeks later her dizziness is worse. P 80/min, BD 160/84mmHg supine, P 88/min and 134/82mmHg when standing. On standing slight dizziness.

Volume depletion because of diuretic?

Case 3: 82-year-old-woman with 1-day-history of nausea and vomiting. Known dementia, KHK, VHF, emphysema, hypertension. Treatment with aspirine, isosorbide dinitrate, furosemide, beta-agonist inhalers, lisinopril. Clinical diagnosis of gastroenteritis, afebrile. P 75/min, BD 154/90mmHg supine, 90/min and 130/76mmHg when upright. Tonghue, axillae and mucous membranes are moist.

Volume depletion? How reliable are the clinical findings?
Methods

• MEDLINE database
• Articles from January 1966 – November 1997 in English language
• Humans older than 16 years

3 searching strategies

• (1) Search terms: „dehydratation/di“, „hypotension/orthostatic“ „tilt table test“ ...
• (2) Search terms: „exp dehydratation“ „exp hypotension, orthostatic“, „exp heart rate“, „exp physical examination“ ...
• (3) Search terms: „skin turgor“, „acute blood loss“, orthostatic vital signs“ ...

• Review of titels and abstractes
• Identifying relevant publications
• Review of the bibliographies of relevant articles
• Review of textbooks
Clinical Examination

Tilt Test: Obtaining vital signs supine and standing

• Heart rate increases 11/min (95% CI, 8.9 - 13/min)
• Systolic blood pressure decreases 3.5mmHg (95% CI, -1.5 - -5.5)
• Diastolic blood pressure increases 5.2mmHg (95% CI, 2.8 – 7.6mmHg)

Pathologic

Postural Pulse Increment of 30/min (Sensitivity 96% (95% CI, 92%-98%))

Postural Hypotension: Decrement of systolic BP > 20mmHg after standing from supine position

Capillary refill time

normal 2s children and adult men

3s adult woman

4s elderly

Neurological findings

Mucous membranes
## Accuracy of Physical Signs for *Acute Blood Loss*

<table>
<thead>
<tr>
<th>Finding</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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<tbody>
<tr>
<td>Postural Pulse &gt;30/min ↑ or severe dizziness</td>
<td>22 (6 – 48)</td>
<td>97 (91 – 100)</td>
<td>98 (97 – 99)</td>
</tr>
<tr>
<td>Postural Hypotension &gt;20mmHg ↓</td>
<td>9 (6-12)</td>
<td>...</td>
<td>94 (84 – 99)</td>
</tr>
<tr>
<td>Supine Tachycardia P &gt; 100/min</td>
<td>0 (0 – 42)</td>
<td>12 (5 – 24)</td>
<td>96 (88 – 99)</td>
</tr>
<tr>
<td>Supine Hypotension SBP &lt; 95mmHg</td>
<td>13 (0 – 50)</td>
<td>33 (21 – 47)</td>
<td>97 (90 – 100)</td>
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Accuracy of Physical Signs for *Other Causes of Hypovolemia*

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<th>Definition of Abnormal Finding</th>
<th>Sensitivity %</th>
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<th>LR + (95% CI)</th>
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<td><strong>Postural vital signs</strong></td>
<td></td>
<td></td>
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<td></td>
<td>43</td>
<td>75</td>
<td>1.7 (0.7-4.0)</td>
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<td>Hypotension ↓ &gt; 20mmHg</td>
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<td>29</td>
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<td><strong>Skin, Eyes, mucous membranes</strong></td>
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<td>Dry axilla</td>
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<td>Dry mucous membranes</td>
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<td>Sunken eyes</td>
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<td>3.4 (1.0-12)</td>
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<td>Confusion present</td>
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<td>Extremity weakness</td>
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<td>Capillary refill time</td>
<td>&gt; than age and sex</td>
<td>34</td>
<td>95</td>
<td>6.9 (3.2-15)</td>
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None of these findings is helpful!
Conclusion

Simple serum and urine chemistry measurements (used in all of these studies as criterion standards) are accessible easily.

A pragmatic clinical reference standard continuous to be a problem.

Most clinicians would accept a Combination of laboratory findings and response to rehydration as reference standards.
PART 2

DOES THIS PATIENT HAVE ASCITES?

JOHN W. WILLIAMS, JR; MD
DAVID L. SIMEL, MD, MHS
Clinical scenarios

Case 1  A 44-year-old man with cirrhosis, fever and no obvious source of infection

Case 2  A 57-year-old woman with an adnexal mass and recent weight gain

Case 3  A 65-year-old man with KHK, decreased exercise tolerance, increased abdominal girth and ankle edema
Clinical scenarios

Case 1  A 44-year-old man with cirrhosis, fever and no obvious source of infection

*Spontaneous bacterial peritonitis?*

Case 2  A 57-year-old woman with an adnexal mass and recent weight gain

*Ovarian carcinoma?*

Case 3  A 65-year-old man with KHK, decreased exercise tolerance, increased abdominal girth and ankle edema

*Congestive Heart failure?*
Hands or Sound?
SURFmed Guidelines 2009

Reference Standard Test: Ultrasonography

The clinical diagnosis of ascites is difficult and below an amount of 1 – 1.5l not possible

Survey among colleagues

Use your brain and take the ultrasound scanner!
How to elicit Symptoms and Signs of Ascites

Focused medical history
- Recent ankle edema
- Weight gain
- Change in abdominal girth
- History of liver disease
- History of congestive heart failure

Physical examination
- Inspection for bulging flanks
- Percussion for flank dullness
- Test for shifting dullness
- Test for a fluid wave
- (Puddle sign)
## Accuracy of History and Symptoms for Ascites

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Clinical history distinguishes patients with high and low probabilities for ascites.
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Clinical history distinguishes patients with high and low probabilities for ascites
Precission of the Signs for Ascites

Good agreement among physicians on the presence or absence of traditional signs of ascites

Accuracy of the Signs for Ascites

There is no single sign for ascites that is both sensitive and specific

No data about use of signs in combination
Pooled sensitivity and specificity for **Signs of Ascites**

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<th>Physical Sign</th>
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<td>Bulging flanks</td>
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<td>Shifting dullness</td>
<td>2.7 (1.9 – 3.9)</td>
<td>0.3 (0.2 – 0.6)</td>
<td>0.77 (0.64 – 0.90)</td>
<td>0.72 (0.63 – 0.81)</td>
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Pooled sensitivity and specificity for **Signs of Ascites**

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Summary and recommendation

**Ultrasonography is the standard**

Absence of any pathological finding does not exclude presence of ascites