Clinical Characteristics of Ratborne Seoul Hantavirus Disease

Appendix

**Appendix Table.** Clinical characteristics of ratborne Seoul hantavirus disease*

<table>
<thead>
<tr>
<th><strong>Clinical symptoms common for HFRS, but also for HCPS</strong></th>
<th><strong>Laboratory anomalies mainly reported for HFRS</strong></th>
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</thead>
<tbody>
<tr>
<td>Headache and influenza-like myalgiae, but no premonitory upper airways symptoms evoking influenza: no rhinorrhea or throat ache</td>
<td>Initial thrombocytopoenia is the earliest and most constant sign† (4–6)</td>
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<td>Acute myopia (2–3 d) as a virtually pathognomonic, but transient sign (6,7,14); rarely acute bilateral glaucoma or retinal hemorrhage (15)</td>
<td>Urine spot PCR§ &gt;0.11 plus microhematuria; early (mostly before hospitalization) and rapidly evolving, but cardinal sign, easy, and cheap to assess day-by-day</td>
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<tr>
<td>Severe flank pain (lumbalgia), sometimes unilateral, mimicking a renal colic (16,17)</td>
<td>Hyponatremia and hypoalbuminemia, predicting clinical severity‡ (5,8,12,22)</td>
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<tr>
<td>Rarely acute bilateral glaucoma or retinal hemorrhage (15)</td>
<td>Highly increased levels of LDH, and particularly of CRP and PCT, mimicking hemolysis (18,22) or a bacteria, rather than a virus, infection (6–10)</td>
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<tr>
<td>Transient acalculous acute cholecystitis provoking right upper quadrant pain and a positive Murphy sign (18–20); considered a general severity sign (21)</td>
<td>Lipid paradox: low acute cholesterolemia (particularly decreased high-density lipoprotein–cholesterol levels), mimicking hemolysis hypertriglyceridemia, both transitory (7,18,23,24)</td>
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<tr>
<td>Paradoxical sinusal bradycardia (&lt;90 bpm), despite fever &gt;38°C (6,7)</td>
<td>Serum creatinine levels might remain initially (18,20) or constantly (4,7,25–27) at standard levels, or barely and briefly increased (28)</td>
</tr>
</tbody>
</table>

**Ultrasound anomalies, reported more for HFRS than for HCPS**

| **Third-space, protein-rich fluid effusions:** (pleuritis, pericarditis, ascites) | Slight-to-frank hypokalemia, despite often clearly impeded renal function (8,29) |
| Longitudinal renal diameter >11 cm¶ (17,18), swollen cortex with echodensity greater than or equal to that for liver. Rare but virtually present or as absent pathognomonic sign; perirenal fluid rim | AAC with mostly distended large gallbladder, and thickened (>4.5 mm) edematous gallbladder wall (18–21) |
| Transient hepatomegaly and splenomegaly (4,8,17) | Liver involvement suggesting Seoul virus (SEOV) involvement |

| Aminotransferase levels increased to 10–20 times (or more) above the standard level (4,12,26) versus mild or no transaminitis in other HFRS forms (6–8); concomitant renal function impediment might be conspicuously absent (4,7) |

*All signs or symptoms are in present or absent characteristic order of appearance. Bold indicates a high diagnostic value. A general common feature is rapid self-remittance within days or weeks without leaving any sequela (6). Ultrasound-documented renal shrinking within days is highly suggestive for HFRS. AAC acute cholecystitis; bpm, beats per minute; CRP, C-reactive protein; HCPS, hantavirus cardiopulmonary syndrome; HFRS, hemorrhagic fever with renal syndrome; LDH, lactate dehydrogenase; PCR, protein-to-creatinine ratio; PCT, procalcitonin. |

†Rare to absent in HCPS, except in Andes virus (ANDV)–induced forms (5). |

‡Also present in HCPS. |

§Urinate spot PCR, or urinary protein-to-creatinine ratio, is calculated in milligrams per deciliter or grams per liter; standard value for adults is <0.11. Urinate spot PCR also is a surrogate for 24-h protein excretion in g/day, indicating that a urinary protein-to-creatinine ratio >3.5 is nephrotic-range proteinuria or equivalent to a dipstick value of ++++. |

¶Standard range 11–12 cm depending on body size. Ultrasound-documented renal shrinking within days is highly suggestive for HFRS.

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References


