Does your dementia patient walk as if their feet are stuck to the floor?

iNPH
idiopathic Normal Pressure Hydrocephalus
Gait Disturbance

- Severity of gait disturbance ranges from mild imbalance to a complete inability to stand or walk; many patients describe it as having their feet “stuck to the floor”
- A patient’s gait is wide-based, short, slow, and shuffling
- Patients may have difficulty turning and lifting their feet, leading to difficulty in negotiating stairs and frequent falls

Mild Dementia

- Executive functions are affected early in the course of disease, while psychometric findings may remain normal
- Later deficits often include psychomotor slowing, impaired attention and concentration, and slowing and reduced precision of fine motor performance
- Cognitive symptoms in late-stage disease may include apathy, reduced drive, indifference, bradyphrenia or reduced speech production, and rarely, akinetic mutism

Urinary Incontinence

- Impairment in bladder control is usually characterized by urinary frequency and urgency in mild cases; while urinary incontinence can occur in more severe cases, some patients display no sign of bladder problems
Up to 700,000 people in the United States may be living with iNPH and not even know it.

Basic Facts About iNPH

- It is estimated that 8 in 10 iNPH patients go undiagnosed.
- iNPH is treatable and may be the underlying cause in an estimated 5% of dementia and Alzheimer disease patients in the USA.
- Diagnosis is based on clinical and radiologic findings, and testing with cerebrospinal fluid (CSF) drainage, which can predict success of shunt treatment.

iNPH can appear like Alzheimer’s or Parkinson’s disease.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>iNPH</th>
<th>Alzheimer’s</th>
<th>Parkinson’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gait disturbance</td>
<td>●</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>First symptom: Wide-based shuffle</td>
<td></td>
<td></td>
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<tr>
<td>Postural instability</td>
<td>D</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Impaired memory or thinking</td>
<td>●</td>
<td>●</td>
<td>D</td>
</tr>
<tr>
<td>Disturbance of urinary function</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Difficulty performing familiar tasks</td>
<td>D</td>
<td>●</td>
<td>D</td>
</tr>
<tr>
<td>Changes in behavior</td>
<td>D</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Rigidity of limbs</td>
<td></td>
<td>●</td>
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<tr>
<td>Tremor of limbs</td>
<td></td>
<td>●</td>
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<tr>
<td>Bradykinesia</td>
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</tbody>
</table>

● Present in most patients  ● Partial or late in some patients
CONFIRM Diagnosis

Taken together, clinical and radiologic findings, followed by CSF withdrawal and subsequent gait improvement, can confirm the iNPH diagnosis and lead to evaluation for shunt surgery. Begin the process with a clinical exam and take action based on the results at each stage, as shown here.

CT scan (axial view) shows ventriculomegaly with iNPH vs. normal scan.

MRI image (coronal view) confirms disproportionately enlarged subarachnoid space hydrocephalus (DESH), distinguishing iNPH from Alzheimer’s disease.

Normal
iNPH
Alzheimer’s
iNPH
EVALUATE Surgical Candidacy

### Diagnostic and Supplemental Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Observations and Findings</th>
<th>Shunt Responsive Positive Predictive Value (PPV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical exam and MRI (DESH)</td>
<td>Any triad element present and ventriculomegaly</td>
<td>~80% PPV⁷</td>
</tr>
<tr>
<td>Lumbar Puncture (LP) Cerebrospinal Fluid (CSF) withdrawal</td>
<td>Temporary improvement of symptoms</td>
<td>~73% PPV⁸</td>
</tr>
<tr>
<td>External Lumbar Drainage (ELD) Protocol</td>
<td>Temporary improvement of symptoms</td>
<td>~90% PPV¹⁰</td>
</tr>
</tbody>
</table>

RECOMMEND Treatment

iNPH symptoms may be reversible by CSF shunt therapy. A programmable valve allows for optimized and customized treatment for each individual patient⁹.

The Codman® Hakim® Programmable Valve and the Codman® CERTAS™ Plus Programmable Valve are both adjustable. Using external programmers, the patient’s shunt setting can be changed without additional surgery.

Take the first step, go to LifeNPH.com

Identify > Confirm > Evaluate > Recommend
Codman® CERTAS® Plus Programmable Valve:

**INDICATIONS:** The Codman CERTAS Plus Programmable Valve is an implantable device that provides constant intraventricular pressure and drainage of CSF for the management of hydrocephalus. The Codman CERTAS Tool Kit allows the noninvasive reading or adjustment of the valve setting.

**CONTRAINDICATIONS:** These devices are contraindicated in patients receiving anticoagulants or known to have a bleeding diathesis. Avoid shunt implantation if infection is present within the body. Delay the shunt procedure when infections such as meningitis, ventriculitis, peritonitis, bacteremia, and septicemia are present.

**WARNINGS**
- Choose an implantation site for the valve where the tissue over the valve is not too thick (i.e., tissue thickness < 10mm). Otherwise locating, reading, and adjusting the valve with the tool kit may be difficult (i.e., multiple attempts may be required) or impossible. If unable to adjust the valve, the valve will maintain a constant operating pressure and the patient should be informed of this risk.
- Testing shows that the valve mechanism is resistant to unintended changes in the setting in a 3 Tesla MRI. However, the clinician should confirm the valve setting after a magnetic resonance imaging (MRI) procedure.
- Read MRI Information before performing an MRI procedure on a patient implanted with the valve.
- Do not interchange the Codman CERTAS Tool Kit (82-8850) components with the Codman CERTAS Therapy Management System TMS (82-8850) components.
- The Indicator Tool has a precise operating mechanism and is vulnerable to damage if mishandled. Store and carry all components of the Tool Kit in the storage case when not in use to prevent damage. Replace the Indicator Tool immediately if dropped (or suspected of being dropped) to ensure accurate performance. Replacement Indicator Tools are available from your local Codman representative.

Codman® Hakim® Programmable Valve:

**INDICATIONS:** The Codman Hakim Programmable Valves are implantable devices that provide constant intraventricular pressure and drainage of CSF for the management of hydrocephalus.

**CONTRAINDICATIONS:** The Codman Hakim Programmable Unitized Valve Systems are not recommended for atrial placement. Use the nonunitized versions for this procedure. These devices are contraindicated in patients receiving anticoagulants or known to have a bleeding diathesis. Avoid shunt implantation if infection is present within the body. Delay the shunt procedure when infections such as meningitis, ventriculitis, peritonitis, bacteremia, and septicemia are present.

**WARNINGS**
- Subjecting the valve to strong magnetic fields may change the setting of the valve.
- The use of Magnetic Resonance (MR) systems up to 3 T will not damage the valve mechanism, but may change the setting of the valve. Confirm the valve setting after an MRI procedure. See Programming the Programmable Valve.
- Common magnets greater than 80 gauss, such as household magnets, loudspeaker magnets, and language lab headphone magnets, may affect the valve setting when placed close to the valve.
- Magnetic fields generated from microwaves, high-tension wires, electric motors, transformers, etc., do not affect the valve setting. Read MRI Information before performing an MRI procedure on a patient implanted with the programmable valve. The SIPHONGUARD® device is intended to reduce the rapid flow of CSF. It also reduces the ability to prime the shunt system during implantation to a rate of approximately 0.5 mL/minute.

**References:**