Clinical Policy Title: Tilt table testing

Clinical Policy Number: CCP.1249

Effective Date: October 1, 2016
Initial Review Date: July 20, 2016
Most Recent Review Date: August 7, 2018
Next Review Date: August 2019

Related policies:
- CCP.1005 Autonomic nervous system testing for neuropathy
- CCP.1159 Non-pharmaceutical treatments for chronic vertigo

ABOUT THIS POLICY: Select Health of South Carolina has developed clinical policies to assist with making coverage determinations. Select Health of South Carolina’s clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of “medically necessary,” and the specific facts of the particular situation are considered by Select Health of South Carolina when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. Select Health of South Carolina’s clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. Select Health of South Carolina’s clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, Select Health of South Carolina will update its clinical policies as necessary. Select Health of South Carolina’s clinical policies are not guarantees of payment.

Coverage policy

Select Health of South Carolina considers the use of tilt table testing to be clinically proven and, therefore, medically necessary as a diagnostic test for (Epstein, 2013; Moya, 2009):
- Members with recurrent and not fully explained syncope, or an unexplained single syncopal episode in high-risk settings (e.g., risk of injury).
- Members with postural orthostatic tachycardia syndrome, whose cause is not well understood after prior diagnostic efforts.

Limitations:

All other uses of tilt table testing as a diagnostic tool are not medically necessary, due to a lack of evidence in the peer-reviewed medical literature supporting efficacy of this test.

All uses of the test to evaluate effectiveness of treatments or to guide treatment selection are also considered not medically necessary.
Contraindications to the administration of isoproterenol include ischemic heart disease, uncontrolled hypertension, left ventricular outflow tract obstruction, and significant aortic stenosis. Caution should be used in patients with known arrhythmias.

Alternative covered services:

- History, physical examination, including orthostatic blood pressure measurements.
- Non-invasive and invasive electrocardiographic monitoring.
- Electrophysiological testing.
- Adenosine triphosphate testing.
- Diagnostic imaging.
- Exercise stress testing.
- Cardiac catheterization.
- Behavioral health assessment.
- Neurological testing.

Background

Syncope is a common symptom that affects three to six of every thousand persons in a given year. Incidence is highest in the elderly and in females (Peeters, 2014). Syncope, which is characterized by a brief loss of consciousness and muscle strength due to reduced blood flow from the brain, typically masks a specific diagnosis. Many of these conditions are treatable, but some can be serious and require immediate medical care.

Vasovagal syncope, also known as neurocardiogenic syncope is marked by a sudden loss of consciousness from cerebral ischemia secondary to a decrease in cardiac output, peripheral vasodilation, and bradycardia. This occurs when the autonomic nervous system that controls blood pressure and heart rate suddenly lowers them for a short time, reducing blood flow to the brain, causing faintness.

Postural orthostatic tachycardia syndrome is a condition of orthostatic intolerance characterized by a rapid increase in heart rate upon standing (Dysautonomia International, 2012). The cause of postural orthostatic tachycardia syndrome is poorly understood, but an estimated 1,000,000 to 3,000,000 Americans are impacted by this condition, mostly women between the ages of 15 and 50.

A medical history, physical examination, and electrocardiogram can uncover the cause of syncope, which typically is heart- or hypotension-related (both naturally mediated and orthostatic). Further testing may be indicated to improve diagnostic accuracy.

Tilt table testing is designed to reproduce the same symptoms while monitoring blood pressure and heart rate in a clinical setting. It may eliminate the need to conduct more advanced and complex tests, if performed relatively early in the workup. During the test, the patient lying flat and supine is slowly lifted upwards, so that the patient’s head is first elevated 30 degrees, then (after several minutes) to 60 degrees.
When a tilt table test changes the patient from a supine to an upright position, a large increase in heart rate results, and symptoms may be triggered. Any excessive drop in blood pressure will result in the test being stopped.

The patient may be given an intravenous administration of isoproterenol, which will increase the average heart rate to trigger abnormal responses in susceptible patients (Protheroe, 2013). In addition to isoproterenol, patients may be given isosorbide dinitrate (Macedo, 2012) or sublingual nitroglycerine (Uhm, 2012). The test typically takes between 20 to 60 minutes to complete.

**Searches**

Select Health of South Carolina searched PubMed and the databases of:

- UK National Health Services Centre for Reviews and Dissemination.
- Agency for Healthcare Research and Quality’s National Guideline Clearinghouse and other evidence-based practice centers.
- The Centers for Medicare & Medicaid Services.

We conducted searches on June 12, 2018. Search terms were: “Tilt-Table Test” (Mesh), “Orthostatic Intolerance” (Mesh), and free text terms “tilt table test,” “syncope,” and “postural orthostatic tachycardia syndrome.”

We included:

- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.
- **Guidelines based on systematic reviews**.
- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

One recent meta-analysis shows that head-up tilt table testing is highly effective for diagnosing vasovagal syncope. This publication included 55 studies, comparing 4,361 subjects with syncope of unknown origin to 1,791 controls with no prior history of syncope (Forleo, 2013). Tilt table testing had a strong ability to discriminate between symptomatic patients and asymptomatic controls. Test specificity was highest for patients who were elderly and those positioned at a 60-degree angle, and test sensitivity increased when nitroglycerine was used instead of isoproterenol to increase heart rate.

Numerous studies found tilt table testing effective for diagnosing vasovagal syncope (Macedo, 2012; Parry, 2008) and postural orthostatic tachycardia syndrome (Freeman, 2006; Lamarre-Cliché, 2001). Tilt table
testing was a prognostic factor in neurocardiogenic syncope (vasovagal syncope), according to a study of 665 males (Uhm, 2012). Another report found that high-dose isoproterenol in 300 patients with syncope (who had tested negative without the drug) reproduced neurocardiogenic syncope during tilt table testing (Vlay, 2000).

Carew (2009) found that a 10-minute tilt table test is enough to diagnose postural orthostatic tachycardia syndrome in most patients, but that a longer time is needed to diagnose vasovagal syncope. One review concluded that new criteria were needed for diagnosing postural orthostatic tachycardia syndrome in children and adolescents (Singer, 2012); another group concluded a tilt angle of 60 degrees and test time of 45 minutes was most suitable for diagnosing children with orthostatic intolerance (Lin, 2015). Tilt table testing demonstrated high rate of abnormal findings in persons with persistent post-concussion symptoms, warranting further study of autonomic dysfunction in these patients (Heyer, 2016).

Tilt table testing has been used to aid in diagnosing other conditions with little success. Some patients with Chronic Fatigue Syndrome had abnormal responses to tilt table tests and showed improvement in symptoms after taking anti-hypotensive medications; but tilt table testing offered no additional value in predicting response to medication (Klonoff, 1996). One study found the test had only a 40 percent accuracy rate in predicting clinical response to decompression for patients with Chiari, and was not a useful test to guide surgical decision-making (Strauss, 2009). One failed to show that the tilt table test could distinguish Parkinson syndrome patients into groups, by patterns of autonomic abnormalities (Reimann, 2010).

Policy updates:

In 2017, we added one evidence-based guideline from the European Society of Cardiology (Moya, 2009). They included an additional indication for tilt table testing: diagnosing an unexplained single syncopal episode in high-risk settings (e.g., risk of injury). The policy was amended with this addition.

In 2018, we added no new information to the policy. Policy ID changed from CP #09.01.13 to CCP.1249.

Summary of clinical evidence:

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forleo (2013)</td>
<td>Key points:</td>
</tr>
<tr>
<td>Meta-analysis of studies on effectiveness of tilt table testing</td>
<td>• 55 trials, 4,361 subjects with syncope/unknown origin, 1,791 controls (no syncope).</td>
</tr>
<tr>
<td></td>
<td>• Head-up tilt testing highly effective for diagnosing vasovagal syncope.</td>
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<tr>
<td>Macedo (2012)</td>
<td>Key points:</td>
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<tr>
<td>Comparison of specificity, sensitivity, accuracy of tilt table testing</td>
<td>• 120 subjects with history of vasovagal syndrome, divided into longer and shorter tests (patient given isosorbide dinitrate immediately vs. after a latency).</td>
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<tr>
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<td>• Shorter test had similar percentage of positive results, was equally accurate, and had fewer false positives than the longer test.</td>
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<td>• Concluded diagnosis was faster and test better tolerated in the shorter test group.</td>
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### Citation and Content, Methods, Recommendations

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
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</thead>
<tbody>
<tr>
<td>Uhm (2012)</td>
<td><strong>Key points:</strong>&lt;br&gt;• Prospective study of 665 males age 17 to 27 were given tilt tests and followed for 12 months.&lt;br&gt;• Those with negative results after 30 minutes were administered sublingual nitroglycerin.&lt;br&gt;• Neurocardiogenic syncope was greater in those with positive results in passive phase of tests and those with previous syncopal episodes.</td>
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<tr>
<td>Moya (2009) for the European Society of Cardiology</td>
<td><strong>Key points:</strong>&lt;br&gt;• Recommended for unexplained single syncopal episode in high risk settings, recurrent episodes in the absence of organic heart disease, or recurrent episodes in the presence of organic heart disease after cardiac causes of syncope have been excluded.&lt;br&gt;• Recommended when it is of clinical value to demonstrate susceptibility to reflex syncope.&lt;br&gt;• Not recommended for assessment of treatment.&lt;br&gt;• Other indications have conflicting or insufficient evidence of efficacy.</td>
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### References

**Professional society guidelines/other:**


**Peer-reviewed references:**


**Centers for Medicare & Medicaid National Coverage Determinations:**

No National Coverage Determinations identified as of the writing of this policy.
Local Coverage Determinations:

L35448 Independent Diagnostic Testing Facility (IDTF).

Commonly submitted codes

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
<th>Comments</th>
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<tr>
<td>93660</td>
<td>Evaluation of cardiovascular function with tilt table evaluation, with continuous ECG monitoring and blood pressure monitoring, with or without pharmocological intervention</td>
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<tr>
<td>95924</td>
<td>Testing of autonomic nervous system function; combined parasympathetic and sympathetic adrenergic function testing with at least 5 minutes of passive tilt</td>
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<tr>
<td>95922</td>
<td>Testing of autonomic nervous system function; vasomotor adrenergic innervation (sympathetic adrenergic function), including beat-to-beat blood pressure and R-R interval changes during Valsalva maneuver and at least 5 minutes of passive tilt</td>
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<thead>
<tr>
<th>ICD-10 Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>R55</td>
<td>Syncope include vasovagal syncpe</td>
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<thead>
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<th>HCPCS Level II Code</th>
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<tbody>
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<td>N/A</td>
<td>No applicable codes</td>
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