EVALUATING TILT TABLE TESTING IN SYNCOPE 1: THE PROCEDURE

SYNCOPE

Syncope is defined as a sudden loss of consciousness caused by a temporarily insufficient flow of blood to the brain, accompanied by loss of postural tone, resulting in a fall (Parry and Kenny, 1999).

The condition is a common problem. It causes 3% of all visits to A&E departments and 1-6% of all hospital admissions each year (Parry and Kenny, 1999). In 2005-2006 there were 82,999 admissions to hospital in England with ‘syncope and collapse’ (Anderson and Smith, 2007). It will affect around 30% of all adults at some point in their lives and is particularly common in children and young people, and in people in their 60s and 70s. Syncope can be life-threatening depending on its cause. Even when it does not pose a risk to a patient’s life the symptom can have devastating consequences, with 35% sustaining injuries and 5–7% of these being fractures (Goldschlager et al, 2003). Recurrent syncope can lead to anxiety and depression and can adversely affect people’s employment and personal freedom, for example, by making them unfit to drive.

In older people, syncope is a frequent cause of unexplained falls. It causes a great deal of anxiety for patients and carers alike, leading to loss of confidence and reduced quality of life. The problem is complicated by the fact that older people often have retrograde amnesia for the loss of consciousness, making diagnosis difficult in view of a lack of clear history. The injuries caused by syncope can often lead to permanent impairment in older people.

Causes and investigations

There are many causes of syncope (see box on Portfolio Pages) but, broadly speaking, it can be divided into cardiac and non-cardiac causes. Neurocardiogenic syncope is found more commonly in young and middle-aged people. In older people it is more likely to be related to underlying heart disease. This group may also have multiple causes.

The cause of syncope can often be identified by taking a detailed history, including family history and questions about the frequency and circumstances of each event, pre-syncope symptoms and any precipitating factors. A witness account of the event can provide information about the duration of the loss of consciousness, changes in skin colour and any muscle twitching or clonic activity.

A physical examination, including lying and standing blood pressure (BP) and pulse rate, cardiovascular examination and 12-lead ECG (electrocardiogram) – should be carried out to identify any arrhythmias, underlying heart disease and orthostatic hypotension. Other helpful investigations of syncope include ambulatory ECG or holter monitor, echocardiogram and tilt table testing, which is discussed later.

A review of patients’ medication should be carried out to identify any drugs that cause arrhythmia or hypotension.

PHYSIOLOGY

The carotid arteries, found on either side of the neck, supply blood to the head and neck. Just below the angle of the jaw the common carotid artery bifurcates into the external and internal carotid arteries. Here the artery dilates forming the carotid sinus; this area is rich with specific stretch receptors called baroreceptors. When stimulated these cause slowing of the heart, vasodilatation and a fall in BP.

When people assume an upright posture the effect of gravity on circulation is increased, with the pooling of around 500ml of blood in the lower extremities. The body automatically adjusts to this by increasing vascular tone, heart rate and cardiac output, to maintain BP, cerebral flow and consciousness. Failure of this compensatory mechanism due to any cause can lead to syncope (Hermosillo et al, 2001).

Normally, on standing, the systolic BP drops by no more than 5–10 mmHg, diastolic rises slightly and the pulse rate increases by 5–10 beats per minute (Frishman et al, 2003).

In some people the carotid sinus seems to become over-sensitive, causing inappropriate slowing of the heart rate and vasodilatation leading to dizziness or syncope. Tilt table testing assesses patients’ physiology and monitors what is happening to their cardiovascular system during carotid sinus massage and upright posture.

LEARNING OBJECTIVES

1. Understand the importance of tilt table testing in the evaluation of patients who collapse.
2. Know how the procedure is carried out.

AUTHORS

Jill Austin, RGN, is junior sister, George Stamp unit, Orpington Hospital, Kent; Aza Abdulla, MBChB, MSc, FRCP, MRCP, is consultant physician, Princess Royal University Hospital, Kent.

ABSTRACT


This is the first of a two-part unit on syncope and the value of tilt table testing. This part discusses background information on syncope, physiology, the procedure of tilt table testing, and indications and contraindications for it.

Tilt table testing was first used 120 years ago in experiments to study the body’s response to posture. Since the 1980s it has entered mainstream clinical practice as an evaluation tool for unexplained loss of consciousness, falls and syncope.

Few statistics are available but, according to STARS (the Syncope Trust And Reflex anoxic Seizures charity), around 175 centres across the UK currently carry out tilt table testing.
THE PROCEDURE
Tilt table testing should be carried out in a quiet, warm room specially equipped for the investigation (Kenny et al., 2000). It must be continuously monitored by a practitioner with experience of the procedure and its potential complications (Parry and Kenny, 1999). The patient lies supine on an automatic motorised couch, which can achieve rapid upright position to an angle of 70°, and is strapped on to avoid falling off when assuming an upright position.

The patient is then attached to a probe called a finometer via a cuff around their ring, middle or index finger. The finometer provides continuous beat-to-beat heart rate and BP monitoring. After resting for a few minutes, gentle but firm massage is applied to the patient’s carotid sinus for five seconds, initially to the right side and then the left. The patient is then put in a 70° head-up position for 10–45 minutes, depending on the individual patient and suspected diagnosis.

Carotid sinus massage is then repeated to the right and then the left carotid sinus in the upright position. Medications such as glyceryl trinitrate spray and isoprenaline may be administered to increase the test’s sensitivity and induce a positive result.

The procedure described is the protocol used in our falls laboratory. However, there are no UK guidelines available and this has led to a wide variety of protocols in the various centres carrying out tilt table testing.

Carotid sinus massage is initially performed on the right side as up to 66% of patients with carotid sinus hypersensitivity have a positive response on the right. In up to 30% the response cannot be elicited in the supine position and is only present in the head upright tilt position.

Throughout, the patient’s heart rate and BP are closely monitored and observed for any signs of syncope or pre-syncope. Pre-syncope might include symptoms such as dizziness, lightheadedness, nausea, blurred vision or weakness. The test is quickly abandoned if syncope or pre-syncope symptoms or complications occur.

The head-up tilt table test result is judged positive when reproducibility of patients’ original symptoms are accompanied by hypotension, bradycardia or both. For pictures showing how tilt table testing is carried out, see Portfolio Pages.

INDICATIONS
Tilt table testing is used to evaluate syncope and help identify its cause. Carotid sinus syndrome, vasovagal syncope and orthostatic hypotension can all be identified through this procedure. The test is recommended for patients who have suffered recurrent unexplained falls, dizziness or syncope where no obvious cause for their symptoms has been found.

The American Heart Association has produced set indications for tilt table testing (Benditt et al., 1996) which are divided into categories: 1 – strongly indicated; 2 – not so strongly indicated; 3 – weak indication.

1) Unexplained single episode of syncope in a high-risk setting and recurrent syncope in the absence of heart disease or once cardiac causes have been excluded.
2) Investigation of recurrent pre-syncope or dizziness or unexplained falls.
3) Patients who have had a single episode of syncope without injury or for those whose symptoms are obviously vasovagal and diagnosis would not alter treatment.

CONTRAINDICATIONS AND COMPLICATIONS
Tilt table testing is generally a safe and benign procedure (Kenny et al., 2000), but it is not recommended for patients with severe carotid/coronary stenosis or severe left ventricular outflow obstruction.

Carotid sinus massage should not be carried out on patients who have had a stroke or myocardial infarction in the previous three months, who have a history of ventricular tachycardia (VT) or ventricular fibrillation (VF) or who have carotid bruit. If bruit are present patients would require carotid dopplers to determine the degree of stenosis before the test and if their stenosis was greater than 50%, carotid sinus massage would not be advised.

There is a small risk of transient ischaemic attack or stroke following carotid sinus massage (Davies and Kenny, 1998), and also a risk of VF or VT. Therefore a resuscitation trolley needs to be readily available and two staff trained to Immediate Life Support level of resuscitation should be present throughout.

These complications can be reduced with careful selection of patients and, in our laboratory, we have not encountered any over the last three years. Nonetheless, patients should be made aware of the possible risks and give written consent for the procedure. Information leaflets outlining the benefits and risks are usually given to patients before the test.

KEY REFERENCES

The full reference list is available in Portfolio Pages at nursingtimes.net

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