GUIDELINES

Transient loss of consciousness—initial assessment, diagnosis, and specialist referral: summary of NICE guidance

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Transient loss of consciousness is a spontaneous loss of consciousness with complete recovery, affecting a quarter to half of the population at some point in their lives.1,2 The condition has many possible causes, including cardiovascular disorders (ranging from cardiac arrhythmias to vasovagal syncope), epilepsy, and psychogenic attacks. Diagnosis is often inaccurate, inefficient, and delayed, and management varies considerably.3 Experience shows that the importance of obtaining information on the event itself and the need for early electrocardiography are not widely appreciated. This article summarises the most recent recommendations from the National Institute for Health and Clinical Excellence (NICE) on the management of transient loss of consciousness in people aged 16 and over.4

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the Guideline Development Group’s experience and opinion of what constitutes good practice. The recommendations emphasise elements of the diagnostic algorithm published in the Quick Reference Guide version of the NICE guidance, to which the reader should refer.5 Evidence levels for the recommendations are in the full version of this article on bmj.com.

Initial assessment

• At any stage, including initial presentation, if the person has sustained an injury or has not made a full recovery of consciousness, or if transient loss of consciousness is secondary to a condition that needs immediate action, use clinical judgment to determine appropriate management and the urgency of treatment.
• Ask the person with suspected transient loss of consciousness, and any witnesses (try to contact these by phone if necessary), to describe what happened:
  - Before the event (circumstances, posture, prodromal symptoms)
  - During the event (appearance and colour; movement; any tongue biting or injury; and duration of transient loss of consciousness)
  - During the recovery period (confusion, weakness down one side).
• Use this information to confirm whether transient loss of consciousness has occurred. When in doubt assume it has.
• Assess and record:
  - Details of any previous transient loss of consciousness
  - Medical history and any family history of cardiac disease
  - Current medication
  - Vital signs
  - Lying and standing blood pressure if appropriate
  - Other cardiovascular and neurological signs.

Electrocardiography, additional tests, and transfer of records

• Record a 12 lead electrocardiogram for all patients with transient loss of consciousness, using automated interpretation. If automated interpretation is not available, the 12 lead electrocardiogram should be interpreted by someone competent in identifying certain abnormalities (box). If any abnormality listed in the box is identified in the electrocardiogram, treat it as a “red flag.”
• If you suspect an underlying problem causing (or additional to) the transient loss of consciousness, conduct relevant examinations and investigations (for example, check blood glucose levels if hypoglycaemia...

Important abnormalities in a 12 lead electrocardiogram in patients with transient loss of consciousness

• Atrial arrhythmia (sustained)
• Inappropriate persistent bradycardia
• Conduction abnormality (for example, complete right or left bundle branch block or any degree of heart block)
• Left or right ventricular hypertrophy
• Long QT interval (corrected >450 ms) and short QT interval (corrected <350 ms)
• Pathological Q waves
• Ventricular pre-excitation
• Any ventricular arrhythmia (including ventricular extrasystoles)
• Brugada syndrome
• Paced rhythm
• Any abnormalities in ST segment or T wave, especially abnormal T wave inversion

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This is one of a series of BMJ summaries of new guidelines based on the best available evidence; they highlight important recommendations for clinical practice, especially where uncertainty or controversy exists. Further information about the guidance, a list of members of the guideline development group, and the supporting evidence statements are in the full version on bmj.com.
is suspected, or haemoglobin levels if anaemia or bleeding is suspected).

- Record all information related to the transient loss of consciousness (include paramedics’ records). Obtain a witness description by telephone, if necessary. Give copies of the electrocardiogram and the patient report form to the receiving clinician when care is transferred, and to the person who had the transient loss of consciousness.

**Making a judgment based on initial assessment**

- Red flags: refer the patient within 24 hours for a specialist cardiovascular assessment by the most appropriate local service if the person has any of the following:
  - Transient loss of consciousness during exertion
  - New or unexplained breathlessness
  - Heart failure
  - Family history of sudden cardiac death in people younger than 40 years and/or an inherited cardiac condition
  - A heart murmur
  - Any of the important electrocardiographic abnormalities listed (box).

- Consider referring within 24 hours anyone over 65 years who had transient loss of consciousness without prodromal symptoms.

- If the patient has no features suggesting an alternative cause of transient loss of consciousness (note that brief seizure activity can occur during uncomplicated faints), diagnose uncomplicated faint or situational syncope, or suspect orthostatic hypotension when there are suggestive features as follows:
  - Uncomplicated faint (the “three Ps”): posture (a faint may follow prolonged standing or the patient may have a history of similar episodes prevented by lying down); provoking factors (such as a medical procedure); prodromal symptoms (such as sweating before transient loss of consciousness)
  - Situational syncope, in which syncope is clearly and consistently provoked by straining (such as with micturition), coughing, or swallowing
  - Orthostatic hypotension, in which the history is typical and lying and standing blood pressure (with repeated measurements while standing for three minutes) confirms orthostatic hypotension.

- Suspect epileptic seizures and refer people who present with one or more of the following for an assessment (within two weeks') by a specialist in epilepsy:
  - A bitten tongue
  - Head turning to one side during transient loss of consciousness
  - No memory of abnormal behaviour even though such behaviour has been witnessed by someone else before, during, or after transient loss of consciousness
  - Unusual posturing
  - Prolonged jerking of limbs
  - Confusion after transient loss of consciousness.
  - Prodromal déjà vu, or jamais vu (a feeling that something is happening for the first time, despite knowing rationally that it has happened before)

- Do not routinely use electroencephalography in the investigation of transient loss of consciousness.\footnote{If a person has persistent transient loss of consciousness, consider psychogenic non-epileptic seizures if the nature of the episodes changes over time or the person has many different unexplained physical symptoms or unusually prolonged episodes. Psychogenic non-epileptic seizures can be difficult to distinguish from epilepsy; therefore refer for neurological assessment if suspected.}

**Transfer of care**

- If the diagnosis is uncomplicated faint or situational syncope and the presentation is not to the general practitioner, ask the general practitioner to arrange for electrocardiography to take place within three days (unless electrocardiography has already taken place).

- Refer all people with transient loss of consciousness for a specialist cardiovascular assessment by the most appropriate local service unless an uncomplicated faint, situational syncope, orthostatic hypotension, or suspected epilepsy is diagnosed.

**Specialist cardiovascular assessment and diagnosis**

- Conduct a specialist cardiovascular assessment and thereby assign a suspected cause of syncope (such as structural heart disease, cardiac arrhythmia, carotid sinus syncope, or neurally mediated syncope) or unexplained syncope. Offer further testing as directed in the recommendations or other tests as clinically appropriate.

- Offer exercise testing (unless contraindicated) when transient loss of consciousness has been experienced during (not after) exercise.

- Do not offer a tilt test to people who have a diagnosis of vasovagal syncope on initial assessment, because tilt testing has a low predictive accuracy in this population.

- For people with suspected vasovagal syncope who experience recurrent episodes adversely affecting their quality of life, or are at high risk of injury, consider a tilt test only to assess whether the syncope is accompanied by a severe cardioinhibitory response (usually asystole).

- For people with suspected carotid sinus syncope and for people with unexplained syncope who are aged 60 years or older, offer carotid sinus massage in a controlled environment as a first line investigation.

- For people with suspected cardiac arrhythmia as a cause of syncope, or with unexplained syncope (including those aged 60 years and older who have had a negative result for carotid sinus massage), offer ambulatory electrocardiography (and do not offer a tilt test before this procedure). Choose the type of ambulatory electrocardiography according to the frequency of the patient’s transient loss of consciousness:
  - Several episodes a week: offer Holter monitoring (up to 48 hours), then if no further loss of consciousness occurs offer an external event recorder
  - Episodes every one to two weeks: offer an external event recorder, then if necessary offer an implantable event recorder
Information on driving and health and safety at work

- Advise all people who have had transient loss of consciousness that:
  - If an uncomplicated faint or provoked situational syncope was diagnosed, they can drive provided the criteria of the Driver and Vehicle Licensing Agency are met.6
  - If referred for a specialist assessment, they must not drive while waiting for their assessment, and they must discuss driving with the specialist.
  - There are implications for their health and safety at work.

Overcoming barriers

Healthcare professionals often seem to lack the confidence to diagnose simple faints, and many patients are therefore thought to be subjected to inappropriate investigations, incorrect diagnoses, and unnecessary and potentially harmful treatments.7 To overcome this problem clinicians need to be more aware of the importance of information gathering and of the likely diagnoses, and be careful to tailor their management according to correct pathways of care. Initial assessment is critical and is dependent on careful history taking, particularly from a witness; this is an important topic for medical training.

For patients who have not had a simple uncomplicated faint, several potentially life threatening causes for transient loss of consciousness are possible, and these may need urgent, usually cardiological, assessment. Historically, cardiological services have tended to focus on ischaemic heart disease; new service models may improve access to timely investigations for people with blackouts.

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1 Fitzpatrick AP, Cooper P. Diagnosis and management of patients with blackouts. Heart 2006;92:559-68.

A PATIENT’S JOURNEY

External aortic support for people with Marfan’s syndrome

Camilla Allen, John Pepper

In 2007 Camilla Allen became the ninth person with Marfan’s syndrome to have an external aortic root support wrapped around her dilated aorta. She has since become the first woman with an exostent to become pregnant and give birth

Stopped in my tracks

In October 2006 I agreed to take part in research related to Marfan’s syndrome being undertaken at St George’s Hospital in London. The research involved detailed measurements of my heart being taken using echocardiograms. I did not give my participation a second thought until a couple of months later when I received a letter from St George’s telling me that my aortic root diameter had expanded to 4.3 cm and that with such a dilated aorta I should not conceive a child due to the risk of fatal aortic dissection. This news was a devastating blow to my husband and me as we had been trying to conceive our second child for the previous nine months.

An appointment with my local cardiology consultant was hastily arranged for January 2007. The measurement was confirmed, and, although it was not particularly worrying in itself, as most patients undertaking root and valve replacement surgery have aortic root diameters nearer the 5.0 cm mark, it showed that mine had increased since my first echocardiogram at the age of 14 and had worsened during my first pregnancy. The consultant considered surgery in the form of the Bentall procedure, a composite aortic root replacement, which is a necessary precaution against

- An episode less than once every two weeks: offer an implantable event recorder.
- For people with suspected structural heart disease, investigate appropriately (for example, with cardiac imaging). Other mechanisms for syncope are possible in this group, so investigate also for coexisting cardiac arrhythmia, and consider investigating for orthostatic hypotension (often caused or exacerbated by drug treatment) or for neurally mediated syncope.

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This is one of a series of occasional articles by patients about their experiences that offer lessons to doctors. The BMJ welcomes contributions to the series. Please contact Peter Lapsley (plapsley@bmj.com) for guidance

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In the third trimester, pregnancy enhanced levels of progesterone help to soften the ligaments of the pelvis to ease the path of the baby during delivery. Unfortunately in the presence of a weakened aorta associated with Marfan’s syndrome there is a risk that the aorta may enlarge and rupture. The current standard approach is to perform the Bentall operation. This is a safe and reliable procedure, but, as Camilla says, it involves cardiopulmonary bypass and replacement of the aortic valve. The valve substitute can be mechanical, which is durable but necessitates lifelong anticoagulation and is an extra hazard for pregnancy, or it can be a tissue valve, which does not require anticoagulation but is of limited durability.

We wanted to prevent further expansion of the aortic root in the simplest way possible. Wrapping the aorta with artificial material is an old idea, but the suggestion by Golesworthy of using modern computer aided design to produce a bespoke sleeve seemed very attractive. We have since developed an individually tailored external “jacket” for the aortic valve, aortic root, and ascending aorta for patients with Marfan’s syndrome.

By using digital information from magnetic resonance imaging, computer aided design and rapid prototyping we are able to create a replica of the patient’s aorta. By heat shrinking an appropriate piece of medically approved plastic cloth, Dacron, we can produce a jacket that exactly matches the contours of the patient’s aorta, including the sinuses of Valsalva and the origins of the coronary arteries.

This jacket is sterilised and taken to the operating room where, under a general anaesthetic and a midline sternotomy, it is placed around the patient’s aortic root and ascending aorta. There is no need for cardiopulmonary bypass or a period of global myocardial ischaemia, and 19 of these operations have now been successfully performed. Camilla’s sleeve was fitted by a relatively short and simple operation. The effect of the exostent on the diameter of her aorta during the second pregnancy compared to the first is remarkable (figure).

<table>
<thead>
<tr>
<th>Date of investigation</th>
<th>Aortic root diameter measurement (mm)</th>
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<td>2010</td>
<td>45</td>
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a 1 in 10 chance of aortic dissection during pregnancy or labour. Suddenly a 10% chance of my dying brought the situation into sharp focus.

Since first being diagnosed with Marfan’s syndrome as a teenager, I had always considered my diagnosis to be an inconvenience rather than life threatening. The condition is only mild in my family, so it hasn’t dominated my life. I had annual echocardiograms, and, although my aortic root diameter had steadily increased from 3.3 cm at age 14 to 4.3 cm at the age of 35, I felt fit, healthy and in no immediate danger. With only minor heart monitoring I had given birth naturally to one child already. It was therefore very difficult to stomach the need for major aortic valve heart surgery with all that it entails.

I am no stranger to surgical procedures, so such a major operation did not fill me with dread—especially as it was a well established procedure with excellent success rates. However, I did not relish the idea of undergoing major heart surgery that included the need for cardiopulmonary bypass and for the removal of my healthy aortic tissue. I was also particularly concerned and frustrated that I would need to have blood thinning anticoagulants for life and that I would need to inject these anticoagulants if I became pregnant. Despite my reservations I was beginning to think it was a foregone conclusion and that there was no alternative. The Henry Ford quote “You can have [a Model T in] any colour as long as it’s black” sprang to mind.

Light at the end of the tunnel

My parents had always encouraged me to choose my own path in life and accept responsibility for my decisions. I have therefore become an independent, decisive, and optimistic person who makes decisions based on all the available information. I did not regard this situation as any different and therefore refused to believe that there was only one way forward.

I discussed the matter with my husband, and we decided to seek a second opinion. Thankfully another consultant who specialised in Marfan’s syndrome pointed us towards Professor John Pepper at the Royal Brompton Hospital in London. Within a week we were sitting in front of him, and he agreed that we needed to act quickly. He explained the option of the exostent procedure, how it worked, and why he thought I was an ideal candidate for it. I said immediately that I wanted to be operated on as soon as possible with no concern that only eight exostent operations had taken place to date.

Despite my reservations I was beginning to think it was a win-win situation. Because of its less invasive nature it could be reversed if for some reason it was not successful, and the fallback position would be the Bentall procedure. Time was of the essence, and I therefore asked to be operated on as soon as possible with no concern that only eight exostent operations had taken place to date. Someone had to be the ninth: why not me?

Within a few weeks, in March 2007, I was on the operating table having an exostent successfully implanted. The treatment at the Brompton was incredibly stress free and of a very high standard. After only five days in hospital I was home, and within a couple of months, I felt like my old self again, but I now had a healthy and secure aortic root measurement of 3.6 cm.
Previous articles in this series
- Vitiligo (BMJ 2010;341:c3780)
- At sixes and sevens: prostate cancer (BMJ 2010;341:c3834)
- Through and beyond anaesthesia awareness (BMJ 2010;341:c3669)
- Oint hypermobility syndrome (BMJ 2010;341:c3044)
- Endometriosis (BMJ 2010;341:c2661)

Back on track
Within a few months of the operation I was allowed to try for another baby, and in November 2007 I became pregnant again. Being the first person to become pregnant after an exostent operation, I was closely monitored in my home town of Bristol. This meant regular echocardiograms and a magnetic resonance imaging scan at 22 weeks’ gestation to check that my exostent was holding well. Five days before the due date my daughter decided it was time to make her entrance, and I gave birth in August 2008. I was treated as high risk in the maternity ward but was fortunate to have a labour that was quick, natural, and very unremarkable. My blood pressure was closely monitored before and after the birth but never rose particularly high. Relieved consultants arranged an echocardiogram and a magnetic resonance imaging scan after the birth, and they proved that the exostent had done what it was designed to do. My aortic root measurement remained stable at 3.6 cm.

On reflection
As of October 2009 the exostent procedure has been carried out on 20 people with Marfan’s syndrome and has been accepted as a clinically approved procedure at the Royal Brompton Hospital.

For myself, this innovative procedure was the ideal solution to my predicament, but it has always frustrated me that I came so close never to hearing about it. It was only my “refuse to accept it” mentality that led me to seek a second opinion and so discover the alternative course of action. My concern is that some professionals who work with people with Marfan’s syndrome choose, for whatever reason, not to present the exostent as an alternative to the Bentall operation. Of course it does not yet have a long history of success, and not all patients would be suitable. Others may make different choices. However, for those who have healthy aortic tissue and valves, the exostent can offer a less drastic alternative to the Bentall procedure.

I must confess to not having known much about the procedure before my operation, but since then I have learnt a lot more about its conception and application. In addition, I have met and enjoyed the ongoing support and friendship of the key players involved in the development of the exostent, Tal Golesworthy and Tom Treasure. They are publicising the exostent technique, especially in the Marfan’s syndrome community, and are making sure that research is ongoing. As part of this I am involved in a mentoring scheme for possible recipients of an exostent, which goes some way to helping publicise the procedure. I hope that this will ensure that all people with Marfan’s syndrome receive the necessary information and support to make informed decisions when embarking upon a journey similar to mine.

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ANSWERS TO ENDGAMES, p 561. For long answers go to the Education channel on bmj.com

STATISTICAL QUESTION
Incidence rate ratio
b, c, and d are all true; a is false.

ON EXAMINATION QUIZ
Metabolic acidosis
Situations A, B, and D can result in metabolic acidosis. Situations C and D do not.
Metabolic acidosis may arise as a consequence of lactic acidosis (sepsis, myocardial infarction, or cirrhosis) or may accompany bicarbonate losses with hydrogen ion retention. Laxatives cause a metabolic alkalosis with excessive chloride loss.

PICTURE QUIZ
An acutely swollen knee
1 Figure 1 shows creamy opaque synovial fluid suggestive of septic arthritis. Figure 2 shows the synovial fluid under compensated polarised light (<40 magnification). Intracellular and extracellular birefringent crystals can be seen, indicating monosodium urate crystals (yellow) and calcium pyrophosphate dihydrate crystals (blue). Figure 3 is a radiograph of the left knee illustrating features typical of chondrocalcinosis (calcium pyrophosphate deposition disease): punctate and linear opacities in the hyaline and fibrocartilaginous tissues.

2 Septic arthritis must be ruled out first, but given that this patient is elderly it is more likely that he has acute crystal induced monoarthritis. The crystals seen on light microscopy are consistent with a diagnosis of concomitant gout and pseudogout. Further differential diagnoses must include degenerative diseases and inflammatory systemic joint diseases. Rarer diseases to be considered are neoplasms and haematological conditions (for example, haemophilia, use of anticoagulants).

3 Joint aspiration must be performed and the fluid sent for microscopy and culture. Serum urate levels and radiography of the affected joint could also help diagnosis. Nevertheless, a normal level of serum urate does not exclude gout, given that serum urate levels are normal in about 50% of flares.

4 The main therapeutic goal for acute crystal induced arthritis is to provide rapid relief of pain and inflammation. First line agents for quickly terminating acute attacks are oral colchicine and non-steroidal anti-inflammatory drugs (NSAIDs). In the absence of prove joint infection, intra-articular aspiration and injection of a long acting steroid is an effective and safe treatment.