GUIDELINES

Reducing the risk of venous thromboembolism in patients admitted to hospital: summary of NICE guidance

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Cite this as: *BMJ* 2010;340:c95
doi: 10.1136/bmj.c95

This is one of a series of *BMJ* summaries of new guidelines, which are 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.

Why read this summary?

Of an estimated 25 000 deaths in England each year attributable to hospital acquired venous thromboemobolism (VTE), many are potentially preventable.[1 2] Despite the substantial evidence base for the benefits of thromboprophylaxis this was used in only about half of eligible patients and many healthcare professionals seemed to be unaware of the risks.[3 4] The National Institute for Health and Clinical Excellence (NICE) published guidance on the prevention of VTE for surgical patients in 2007.[5] This article summarises the most recent recommendations from NICE on VTE prophylaxis for all patients in hospital.

Recommendations

NICE recommendations are based on systematic reviews of best available evidence. When minimal evidence is available, recommendations are based on the Guideline Development Group's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are in the full version of this article on bmj.com.

Assessing the risks of VTE and bleeding

- Assess all patients on admission to identify those who are at increased risk of VTE.
- Regard medical patients as being at increased risk of VTE if one of the following applies:
  - Expected to be bed bound, unable to walk unaided, or spend a substantial part of their day in bed or in a chair for three days or more.
  - Expected to have ongoing reduced mobility relative to their normal state and have one or more of the risk factors shown in box 1.
- Regard surgical patients and patients with trauma as being at increased risk of VTE if they meet one of the following criteria:
  - Surgical procedure with a total anaesthetic and surgical time of more than 90 minutes or 60 minutes if the surgery involved the pelvis or lower limb.
  - Acute surgical admission with inflammatory or intra-abdominal condition.
  - Expected substantial reduction in mobility.
  - Presence of one or more of the risk factors shown in box 1.
- Assess all patients for risk of bleeding before offering prophylactic drugs for VTE. Do not offer such prophylaxis to patients with any of the risk factors for bleeding shown in box 2, unless the risk of VTE outweighs the risk of bleeding. Prescribers should consult the summary of product characteristics for the prophylactic drug being used or planned for further details.
- Reassess patients' risk of bleeding and VTE within 24 hours of admission and whenever the clinical situation changes, with the aim of:
  - Ensuring that the methods of VTE prophylaxis being used are suitable.

Box 1 | Risk factors for venous thromboembolism (VTE)

- Active cancer or cancer treatment
- Age over 60 years
- Admission to critical care
- Dehydration
- Known thrombophilia
- Obesity (body mass index over 30 kg/m^2)
- One or more significant medical comorbidities (for example, heart disease; metabolic, endocrine, or respiratory pathologies; acute infectious diseases; inflammatory conditions)
- Personal history or first degree relative with a history of VTE
- Use of hormone replacement therapy
- Use of oestrogen containing contraceptives
- Varicose veins with phlebitis

Box 2 | Risk factors for bleeding

- Active bleeding
- Acquired bleeding disorders (such as acute liver failure)
- Concurrent use of anticoagulants known to increase the risk of bleeding (such as warfarin with international normalised ratio (INR) higher than 2)
- Lumbar puncture, epidural anaesthesia, or spinal anaesthesia expected within the next 12 hours
- Lumbar puncture, epidural anaesthesia, or spinal anaesthesia within the previous four hours
- Acute stroke, in line with NICE clinical guideline 68.[6]
- Thrombocytopenia (platelets <75×10^9/l)
- Uncontrolled systolic hypertension (≥230/120 mm Hg)
- Untreated inherited bleeding disorders (such as haemophilia and von Willebrand's disease)

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- When to suspect child maltreatment (2009;339:b2689)
- Early management of persistent non-specific low back pain (2009;338:b1805)
- Recognition and assessment of coeliac disease in children and adults (2009;338:b1684)
- Newer agents for blood glucose control in type 2 diabetes (2009;338:b1668)
- Diarrhoea and vomiting caused by gastroenteritis in children under 5 years (2009;338:b1350)
- Diagnosis and management of patients at risk of or with metastatic spinal cord compression (2008;337:a2538)
- Management of type 2 diabetes (2008;336:1306)
- Commentary: controversies in NICE guidance on management of type 2 diabetes (2008;336:1308)
- Risk assessment and lipid modification for primary and secondary prevention of cardiovascular disease (2008;336:1246-1248)

- Ensuring that VTE prophylaxis is being used correctly.
- Identifying adverse events resulting from VTE prophylaxis.

Reducing the risk of VTE

- Encourage patients to become mobile as soon as possible.
- Offer prophylactic drugs to general medical patients assessed to be at increased risk of VTE. Choose one of:
  - Fondaparinux sodium.
- - Low molecular weight heparin. At the time of publication some types do not have marketing authorisation in the United Kingdom for VTE prophylaxis in medical patients. Prescribers should consult the summary of product characteristics for the individual drug.
  - Unfractionated heparin (for patients with renal failure).
- Start prophylactic drugs as soon as possible after risk assessment has been completed. Continue until the patient is no longer at increased risk of VTE.

Patient information and planning for discharge

- Before starting VTE prophylaxis, offer patients and their families or carers (if appropriate) verbal and written information on:
  - The risks and possible consequences of VTE.
  - The importance of VTE prophylaxis and its possible side effects.
  - The correct use of VTE prophylaxis (such as antiembolism stockings, foot impulse devices, or intermittent pneumatic compression devices).
  - How patients can reduce their risk of VTE (for example, by keeping well hydrated and, if possible, exercising and becoming more mobile).
- As part of the discharge plan, offer patients and their families or carers (if appropriate) verbal and written information on:
  - The signs and symptoms of deep vein thrombosis and pulmonary embolism.
  - The correct and recommended duration of use of VTE prophylaxis at home (if discharged with prophylaxis)
  - The importance of correct use of VTE prophylaxis at home (if discharged with prophylaxis) and its recommended duration.
  - The signs and symptoms of adverse events related to VTE prophylaxis (if discharged with prophylaxis).
  - The importance of seeking help and details of who to contact about problems with using the prophylaxis (if discharged with prophylaxis).
  - The importance of seeking medical help and who to contact if deep vein thrombosis, pulmonary embolism, or another adverse event is suspected.

Overcoming barriers

Organisational and professional barriers exist to implementing this guidance. Most medical inpatients now arrive as direct urgent or emergency admissions. VTE prophylaxis stands the best chance of being effective the earlier it is delivered in the course of the illness and the period of immobilisation. This is sometimes overshadowed on admission, however, by clinical priorities of establishing a working diagnosis and instigating treatment of the most pressing problems. Nonetheless, a provisional plan for VTE prophylaxis can be made simultaneously, on the basis of an individualised risk assessment, and reviewed appropriately. This should be done using the Department of Health's national VTE risk assessment template.[7]

The professional obstacles are related to differing perceptions of risk. Anticoagulation in any form carries a risk of bleeding; if this complication occurs, the prescriber may feel a sense of responsibility and may prescribe anticoagulation less readily in the future. In contrast, thromboembolic events do not have an evident effect on subsequent prescribing.[8] Orthopaedic surgeons have been the most concerned about bleeding risks because non-life threatening bleeding may set in train disastrous postoperative complications after joint and limb surgery.[9] Thus a representative panel of seven orthopaedic surgeons was involved at every stage of developing these guidelines.

Contributors: TT and JH both contributed to a first draft that followed the template agreed by the *BMJ* and NICE and they shared in the subsequent editing. TT is guarantor.

Funding: The National Clinical Guideline Centre for Acute and Chronic Conditions was commissioned and funded by the National Institute for Health and Clinical Excellence to write this summary.

Competing interests: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare (1) JH and TT have support from NICE for work on guideline development: JH and her department are funded by NICE and TT receives honorariums for chairing the guideline development meetings; (2) no relationships with any company that might have an interest in the submitted work; (3) no spouses, partners, or children have financial relationships that may be relevant to the submitted work; and (4) no non-financial interests that may be relevant to the submitted work."

Provenance and peer review: Commissioned; not externally peer reviewed.

1 House of Commons Health Select Committee. The prevention of venous thromboembolism in hospitalised patients: second report of session 2004–05. 2005. www.publications.parliament.uk/pa/cm200405/cmselect/cmhealth/99/99.pdf.
2 Department of Health. Report of the independent expert working group on the prevention of venous thromboembolism (VTE) in hospitalised patients. 2007. www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_073950.pdf.
3 Cohen AT, Agnelli G, Anderson FA, Arcelus JI, Bergqvist D, Brecht JG, et al. Venous thromboembolism (VTE) in Europe. The number of VTE events and associated morbidity and mortality. *Thromb Haemost* 2007;9:756-64.
4 Hunt BJ. Awareness and politics of venous thromboembolism in the United Kingdom. *Arterioscler Thromb Vasc Biol* 2008;28:398-9.
5 Hill J, Treasure T. Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients having surgery: summary of NICE guidance. *BMJ* 2007;334:1053-5.
6 National Institute for Health and Clinical Excellence. Stroke: diagnosis and management of acute stroke and transient ischaemic attack (TIA). 2008. www.nice.org.uk/nicemedia/pdf/CG68NICEGuideline.pdf.
7 Department of Health. Risk assessment for venous thromboembolism (VTE). www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_088216.pdf.
8 Choudhry NK, Anderson GM, Laupacis A, Ross-Degnan D, Normand SL, Soumerai SB. Impact of adverse events on prescribing warfarin in patients with atrial fibrillation: matched pair analysis. *BMJ* 2006;332:141-5.
9 Sharrock NE, Gonzalez D, V, Go G, Lyman S, Salvati EA. Potent anticoagulants are associated with a higher all-cause mortality rate after hip and knee arthroplasty. *Clin Orthop Relat Res* 2008;466:714-21.

A PATIENT'S JOURNEY

Synaesthesia

Anonymous

This patient has lived with synaesthesia since childhood, but the condition was diagnosed only when she sought help for depression

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Cite this as: *BMJ* 2009;339:b3191
doi: 10.1136/bmj.b3191

Fractions were the crunch. Up until then I got on fine. Then we started on decimal points and the more and less signs. How do you have more orangey red or less bottle green? They are what they are, surely? It was about then that I reckoned I wasn't any good at maths. We moved into algebra, which turned into a greyish slur on the whiteboard, and literally, to me, dripped off in a sort of slimy haze. Yet geometry was fabulous. I could conjure up the shapes and work out the answers in my head in milliseconds; just don't ask me to write anything down. I do things in tens; they array in front of my face in sets, and I count them out. But I don't fathom dozens, pounds, pints, or anything else imperial. Thank goodness for American cookbooks.

I think I was about 15 years old when I mentioned to a friend that my numbers were colours, and she said I was weird. So I didn't tell anyone again for nearly 25 years. For most of that time I thought maybe I really was weird and a bit mad. You see, it's not only the numbers that have crossed over. Whole words are either strong or weak shades, and I have the unnerving experience of my feelings presenting through bursts and swirls of colour. I've developed my own systems and methods for working things out, and sometimes this makes me look strange. When I'm stressed, I just open my hand and let the shopkeeper take the money as I can't count it out. Hardly anyone knows I struggle with counting; they see me as articulate and able.

Synaesthesia. Someone once explained that some of my senses had their wires crossed. For me it is as normal as having 10 toes and 10 fingers. The journey I've been on is one of discovering that it isn't normal for everyone else and that some of the experiences I have lead to reactions and behaviour from other people that have been difficult for me to understand and deal with. A combination of events led me to seek help, but not initially for the synaesthesia—because of course I thought that was normal, and I didn't even have a name for it.

A depression captured my body and mind, and I sought help. While the main priority was to understand and treat the depression, it was during one of the visits to my psychiatrist that my synaesthesia was revealed. While some things

Box 1 | The good and the less good

What went well?
- Patient and listening practitioners
- Therapy to give meaning to what happens and to manage my reactions to synaesthesia
- Not mixing up synaesthesia with any other diagnosis
- Being respectfully treated as a capable patient who sometimes couldn't cope.

What could have helped?
- An earlier diagnosis, though this is predicated on my ability to have been aware of the difference and spoken about it
- Having some authoritative written resources to refer to (box 2).

Box 2 | Useful resources

Synaesthesia Research (www.syn.sussex.ac.uk/index.html)—Information for patients

UK Synaesthesia Association (www.uksynaesthesia.com)—Information for patients

A DOCTOR'S PERSPECTIVE

This description comes from a woman in her mid 40s referred initially because of a cycling mood disorder that had increased in severity over at least a decade and had started to affect her work. She had a background of substantial traumatic stress that had needed treatment in its own right and physical difficulties necessitating surgery during her psychiatric care. Her underlying personality was resilient and normal both at interview and in the judgment of her GP. Treatment for the mood disorder included pacing of activities, mood stabilisers, and low dose antipsychotic drugs, along with regular sleeping tablets at times of jet lag, which was an identified risk factor for mood instability in her case.

In her fifth consultation she described intermittent visual loss. On detailed inquiry she explained that she was able to see words, but not understand their meaning, leading to practical difficulties such as being unable to find or identify a platform number at a railway station. These episodes would last a number of weeks and then gradually fade. She also described a longer term association of colours and numbers—grapheme-colour synaesthesia—with these experiences sometimes located in external space rather than within the mind.

Neurological examination and magnetic resonance imaging scan were normal.

The neurological phenomena lessened a little with caffeine intake, and later, she observed, with mood stabilisers. Neither affective instability nor anxiety or stress had any effect on these experiences.

A practitioner might be unaware of synaesthesia. The visual disturbances did not bother the patient—indeed they sometimes enhanced her perceptual experiences. Of greater concern here was her report of difficulties with word recognition, which she described as visual impairment, and which led to an MRI scan even though this association had been reported in previous personal accounts. Her perceptions experienced in external space might seem psychotic to the inexperienced, but they are not based in mental disorder.

With appropriate treatment her mood swings are minimised, and she continues a busy and productive life as a businesswoman and author.

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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

made sense at the time, not everything did—and I have since found the process of therapy with a psychotherapist to be very useful in really helping me to understand more about the meaning of what may be occurring. I know enough to understand that I have been fortunate to have a psychiatrist who could diagnose the difference between my spatially and colour orientated synaesthesia and schizophrenia. The two conditions are easily confused. Had I been diagnosed with schizophrenia, my life would have changed greatly, and I am thankful for the time my psychiatrist took and the patience he showed in making my diagnosis (box 1). So often emphasis is given to treatment, but for me the value has been in the diagnosis. It was an "Aha!" moment that has enabled me to progress on a personal journey of learning about how my perceptions work.

It feels like a personal process and not one that can be medicalised. I tap into a range of support systems as I feel I need them. My doctors and I have experimented with various medications, not so much to treat the synaesthesia directly but rather to treat related symptoms. I've found topiramate worked well as a mood stabiliser and helped me find ways to manage day to day and to deal with the confusion that mixed senses can bring. I no longer take this drug and now concentrate on sleeping well and minimising stress. Nothing I've taken has changed my experiences, though some drugs can help me cope better with what I do experience. I've noticed, however, that high doses of caffeine can make some colours seem a bit sharper. This has been a very private process, unlike my experiences with other medical conditions. It feels unique to me and difficult to describe to anyone else. I've chosen not to read widely about the condition. In fact what little I have found on the web looks like rubbish and irrelevant. Sometimes, when I hear someone else talk in a certain way, like "this drink smells pink," I wonder whether they have similar experiences. But it's not like cancer. It doesn't seem to be something you talk about or have support groups for. Perhaps that's because, for those of us who experience it, it feels so normal. It's part of who we are.

Competing interests: None declared.

Provenance and peer review: Not commissioned; not externally peer reviewed.

Accepted: 21 March 2009

Histoptysis or oncoptysis: suggested terms for tissue expectoration

Expectoration of abnormal tissue leading to pulmonary diagnosis is a rarely reported event.[1-5] Spurred by personal experience of one such episode, we would like to propose a name for this strange clinical manifestation.

A 65 year old man underwent heart surgery in 2002. In the course of the procedure an incidentally found nodule was enucleated from his left lower lobe. Histological examination showed a pulmonary blastoma (embryonic type adenocarcinoma). The patient was well and received no postoperative treatment but was followed up radiologically. By September 2007 the nodule had relapsed and was slowly increasing in size; fiberoptic bronchoscopy showed no endobronchial pathology. Random samples taken from the left lower lobe were non-diagnostic. Seven months later, the patient spontaneously coughed up a dark red piece of tissue which he took to the pathology service himself. Histology and immunostaining confirmed that this was identical to the original tumour. He was given chemotherapy, but died soon after from heart failure.

Even though (or indeed because) such a presentation seems to be unusual, we believe it deserves a proper Greek name, and we would like to propose the term histoptysis (from the Greek histo (tissue) and ptysis (expectoration)). As the expectorated tissue was malignant in most reported instances, oncoptysis (expectoration of tumour) could be a more specific alternative. Neither of these terms seems to have been used in the medical literature before; they certainly do not appear in Medline. The value of tissue expectoration in diagnosing previously occult or inaccessible malignant growths in the lungs or other portions of the respiratory tract should be kept in mind.

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Patient consent not required (patient anonymised, dead, or hypothetical).

1 Ziyada WF, Brookes JD, Penman HG. Expectorated tissue leading to diagnosis of renal adenocarcinoma. *J Laryngol Otol* 1994;108:1108-10.
2 Daryanani S, Knausenberger HP, de Takats PG, Guest PJ, Kerr DJ. Spontaneous pneumothorax associated with expectoration of a lump of metastatic renal cancer. *Clin Oncol (R Coll Radiol)* 1997;9:262-3.
3 Park MJ, Woo IS, Son JW, Lee SJ, Kim DG, Mo EK, et al. Endobronchial tuberculosis with expectoration of tracheal cartilages. *Eur Respir J* 2000;15:800-2.
4 Lee SH, Shim JJ, Shin JS, Baekb MJ, Choib YH, Kimc MK, et al. Primary endobronchial leiomyosarcoma. Diagnosis following expectoration of tumor fragment. *Respiration* 2001;68:99-102.
5 Ghetie C, Davies M, Cornfeld D, Suh N, Saif MW. Expectoration of a lung metastasis in a patient with colorectal carcinoma. *Clin Colorectal Cancer* 2008;7:283-6.

Cite this as: *BMJ* 2009;339:b5239

Spitting images: our medical philologist, Jeff Aronson, comments

The Greek word πτύειν (ptuein) meant to spit and πτύαλον (ptualon) saliva. These words came from the same onomatopoeic Indo-European root that gives us spew and puke; spit, spittle, and sputum; spout, sputter, and splutter; spittoon and cuspidor. A ptyalogogue is a substance that induces the flow of saliva, ptyalin is an amylase found in saliva, and ptyalism is excessive salivation. But in Latin, tussire, as in "antitussive," means to cough, not to spit (*BMJ* 2002;325:160). The two do get confused.

"Expectorate" (literally "out of the chest") means to eject material from the lungs, "spit" to eject material from the mouth. In Liddell and Scott's *Greek-English Lexicon* πτύσμα (ptusma) is defined as sputum. But in English a ptysmagogue is a ptyalogogue. "Spit [up]" has been used to mean expectorate since at least the early 18th century. Conversely, "expectorate" has been used to mean spit [out] since the beginning of the 19th. So, the two English words that end in the spitting suffix "–ptysis" are to do with expectoration: pyoptysis and haemoptysis (with its corrupt variants, emptysis, haemoptoe, and haemoptosis). Pyoptysis is obsolete. Haemoptysis means literally spitting blood, but has come to mean expectoration of blood—spitting up then spitting out.

So, by analogy, histoptysis (Greek ἵστός (histos, a tissue or web), so called from the upright beam to which weaving was attached) would mean expectoration of any tissue, and oncoptysis (Greek ὄγκος, pronounced onkos, a mass) expectoration of tumour tissue. Useful words to add to our lexicon.

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Cite this as: *BMJ* 2009;339:b5064