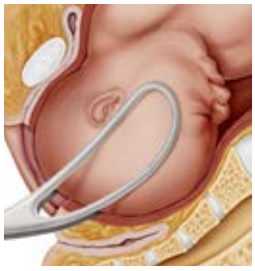
education

THE ART OF MEDICINE

Down there—you know . . . whatchamacallit!



MARK MILLER/SPL

It amazes me how the words vulva and vagina make people's toes curl. Female patients use all sorts of euphemisms to describe their genitalia, implying shame associated with the anatomical terms. The medical profession colludes with this taboo, and obstetrics is one of the worst offenders. Stages of cervical dilatation are all freely discussed but vaginal examinations are disguised as internal examinations or shortened to VE. The comedy does not end there. During forceps delivery several healthcare professionals peer intently at a woman's vulva but obstetricians loudly announce "examinations down below"—to the confusion of many birthing partners.

After a caesarean delivery, the last steps involve "cleaning you down there," that shameful abyss, which—like Lord Voldemort—is not allowed to be named. What a paradoxical situation—where looking at, examining, suturing, and cleaning are all done on full display but the word vagina or vulva is rarely used.

It is acceptable for the public to struggle with anatomical terms, but there is no excuse for healthcare professionals to do the same. We do not use "up there," "thingy," or "doo-da" to refer to other parts of the body.

Use of the correct terminology by professionals empowers women to use the right words, enabling them to communicate openly about medical problems and taking away some of the perceived embarrassment. We owe it to our patients to promote the view that every part of the body has a name and no part is shameful or embarrassing.

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We welcome contributions to this column via our online editorial office: https://mc.manuscriptcentral.com/BMJ

CLINICAL UPDATES

Ciclosporin eye drops for dry eye disease

Ciclosporin can be offered to adults with severe dry eye disease that has not responded to treatment with artificial tear preparations. Steroids often improve symptoms and may also be used initially, but should not be continued beyond 6-8 weeks because of side effects.

www.nice.org.uk/guidance/ta369

Biological drugs for juvenile idiopathic arthritis

Adalimumab, etanercept, and tocilizumab are now recommended by NICE for patients with polyarticular juvenile idiopathic arthritis (JIA) over 2 years of age who have not responded to, or are intolerant of, methotrexate. Abatacept is recommended for patients over 6 years who have not responded to other drugs, including at least one tumour necrosis factor inhibitor. Etanercept is recommended for psoriatic JIA in patients over 12 years. Previously only etanercept was recommended in JIA.

www.nice.org.uk/guidance/ta373

Personalised treatment targets in type 2 diabetes

A recent NICE guideline update advocates an individualised approach to determining HbA_{1c} targets in type 2 diabetes. For patients treated with drugs associated with hypoglycaemia, aim for an HbA_{1c} of 53 mmol/mol (7%); for others aim for 48 mmol/mol. Modify the target if efforts to maintain it impair quality of life or have adverse effects, including hypoglycaemia, and involve patients in the decision.

www.nice.org.uk/guidance/ng28/chapter/1-Recommendations

FAST FACT—SPOTTING HEART FAILURE

The British Society for Heart Failure advises that there is a high index of suspicion for the diagnosis of heart failure in patients presenting with:

- A history of ischaemic heart disease
- Atrial fibrillation
- A chest infection that is not getting better
- "Late onset asthma"
- "Always putting things down to their age"
- Chronic obstructive pulmonary disease (COPD) that is deteriorating more than it should be
- Breathlessness in patients with diabetes or hypertension

CPD/CME You can gain CPD points from your reading by recording what you have read in your appraisal folder. You should try to link your reading back to a learning need and also consider how you plan to improve your practice as a result of your learning. http://learning.bmj.com

GUIDELINES

Tuberculosis—diagnosis, management, prevention, and control: summary of updated NICE guidance

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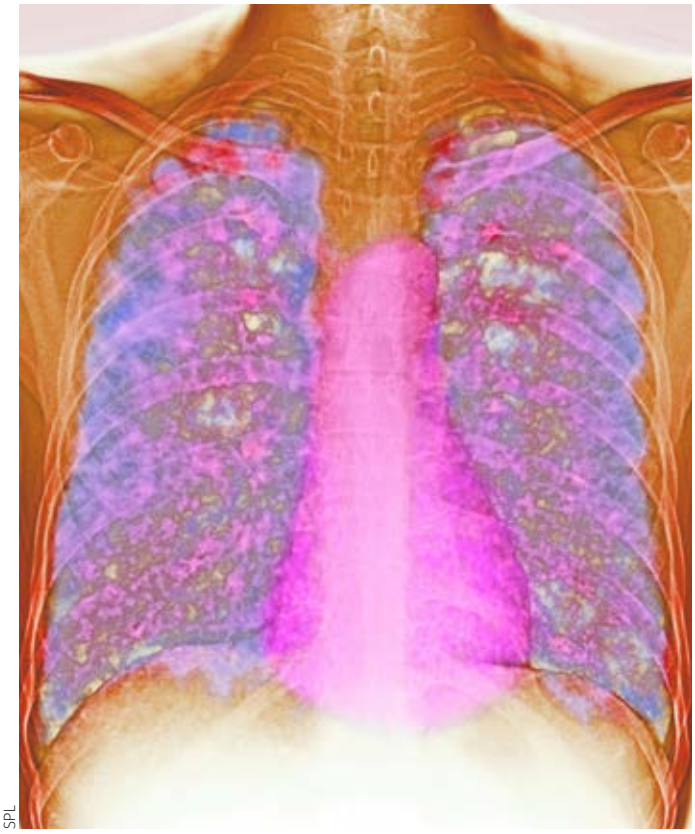
Further information about the guidance, a list of members of the guideline development group, and the supporting evidence statements are in the full version on thebmj.com.

Tuberculosis (TB) incidence in the UK remains high compared with other western European countries.[1] It disproportionately affects underserved groups, including homeless people, people in poor housing or affected by poverty, people with problem drug use, and people born in countries with a high incidence of TB.[2] However, many cases are preventable with public health measures, and, when disease does occur, most people can be cured. This article summarises the updated recommendations on diagnosing, managing, and preventing TB from the National Institute for Health and Care Excellence (NICE).[1]



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WHAT'S NEW IN THIS GUIDANCE

- Increase in the upper age limit for testing and treatment for latent TB from 35 years to 65 years
- A Mantoux test is considered positive at an induration of ≥5 mm regardless of BCG history
- How to re-establish treatment for active or latent TB after interruptions by adverse events from drug treatment

WHAT YOU NEED TO KNOW

- Undertake tuberculosis (TB) testing in close contacts of people with pulmonary or laryngeal TB, people who are immunocompromised and at high risk of TB, and new entrants from high incidence countries who present to healthcare services
- Seek specialist input in the diagnosis and management of TB in children, and in the management of people with multidrug resistant TB or those with TB and comorbidities
- Consider enhanced case management, including directly observed therapy (DOT), in patients with clinically or socially complex needs
- Apply appropriate infection control measures if a person has suspected or confirmed infectious TB (pulmonary or laryngeal TB)

Diagnosing latent infection

General principles in identifying latent infection:

- Offer TB testing to close contacts of people with pulmonary or laryngeal TB, people who are immunocompromised and at high risk of TB, and new entrants from high incidence countries presenting for healthcare
- The upper age limit for offering to test and treat latent infection is 65 years
- In any patient, regardless of BCG history, consider a Mantoux test as positive if skin induration is ≥5 mm
- If any test for latent infection is positive, assess for active TB; if this assessment is negative, offer treatment for latent TB infection.

Children and young people who have been in close contact with people with infectious TB

- For children aged less than 2 years who have been in close contact with people with pulmonary or laryngeal TB, see figure 1.

GLOSSARY OF TERMS

Active tuberculosis disease—Infection with mycobacteria of the *M tuberculosis* complex where mycobacteria are growing and causing symptoms and signs of disease. This is distinct from latent infection, where mycobacteria are present but are not causing disease.

Directly observed therapy (DOT)—A trained health professional, or responsible lay person supported by a trained health professional, provides the prescribed medication and watches the person swallow every dose.

High incidence country—More than 40 cases of TB per 100 000 people per year.[3]

Interferon γ release assay (IGRA)—A blood test used to diagnose latent TB (as an alternative or addition to tuberculin skin tests) based on detecting the response of white blood cells to TB antigens.

Latent infection—Infection with mycobacteria of the *M tuberculosis* complex where the bacteria are alive but not currently causing active disease.

Mantoux test—A type of tuberculin skin test in which tuberculin is injected intradermally. The injection site is examined for signs of a local skin reaction (induration) after 2-3 days. In any patient, regardless of BCG history, this guidance recommends that a Mantoux test is considered positive for TB infection if the transverse diameter of the area of induration is ≥5 mm.

Multidrug resistant TB—TB resistant to isoniazid and rifampicin, with or without any other resistance.

Nucleic acid amplification test (NAAT)—A test to detect fragments of nucleic acid, allowing rapid and specific diagnosis of *M tuberculosis* directly from different clinical samples.

TB case manager—A named individual, appointed as soon as a patient becomes known to the TB service, who takes responsibility for ensuring that diagnostic investigations are completed and outcomes documented, that an appropriate treatment regimen is monitored and completed, and that contacts are identified, evaluated, and treated.

Treatment interruption—A break in the prescribed antituberculosis regimen for ≥2 weeks in the initial phase, or more than 20% of prescribed doses missed intermittently.

- For a child or young person aged between 2 and 17 years who has been in close contact with people with pulmonary or laryngeal TB, offer Mantoux testing. If negative, wait 6 weeks, offer an IGRA and repeat the Mantoux test.
- Only consider using the IGRA alone in children and young people if Mantoux testing is not available or is impractical. This includes situations in which large numbers need to be tested.

People who are immunocompromised

- Refer children and young people who are immunocompromised and at risk for TB to a specialist.
- For adults who are severely immunocompromised (including those with HIV and CD4 counts $<200\times10^6$ cells/L, or after solid organ or allogeneic stem cell transplant) and at risk for TB, offer an IGRA and a concurrent Mantoux test.
- For other adults who are immunocompromised and at risk for TB, consider an IGRA alone or with a concurrent Mantoux test.

New entrants from high incidence countries who present to healthcare services

- Offer Mantoux testing to this group. If Mantoux testing is unavailable, offer an IGRA.

Diagnosing active disease (see table)

- Request rapid diagnostic nucleic acid amplification tests (NAATs) for the *M tuberculosis* complex on primary specimens if
  - There is clinical suspicion of TB disease
  - The person has HIV infection
  - Rapid information about mycobacterial species would alter the person's care
  - The need for a large contact tracing initiative is being explored.
- In children and young people aged 15 years or younger, usually only one NAAT is needed per specimen type (for example, spontaneous sputum, induced sputum, or gastric lavage).
- Once a person has been diagnosed with active TB, inform relevant colleagues so that the need for contact tracing can be assessed without delay, and assess the need for infection control measures.

Multidrug resistant TB

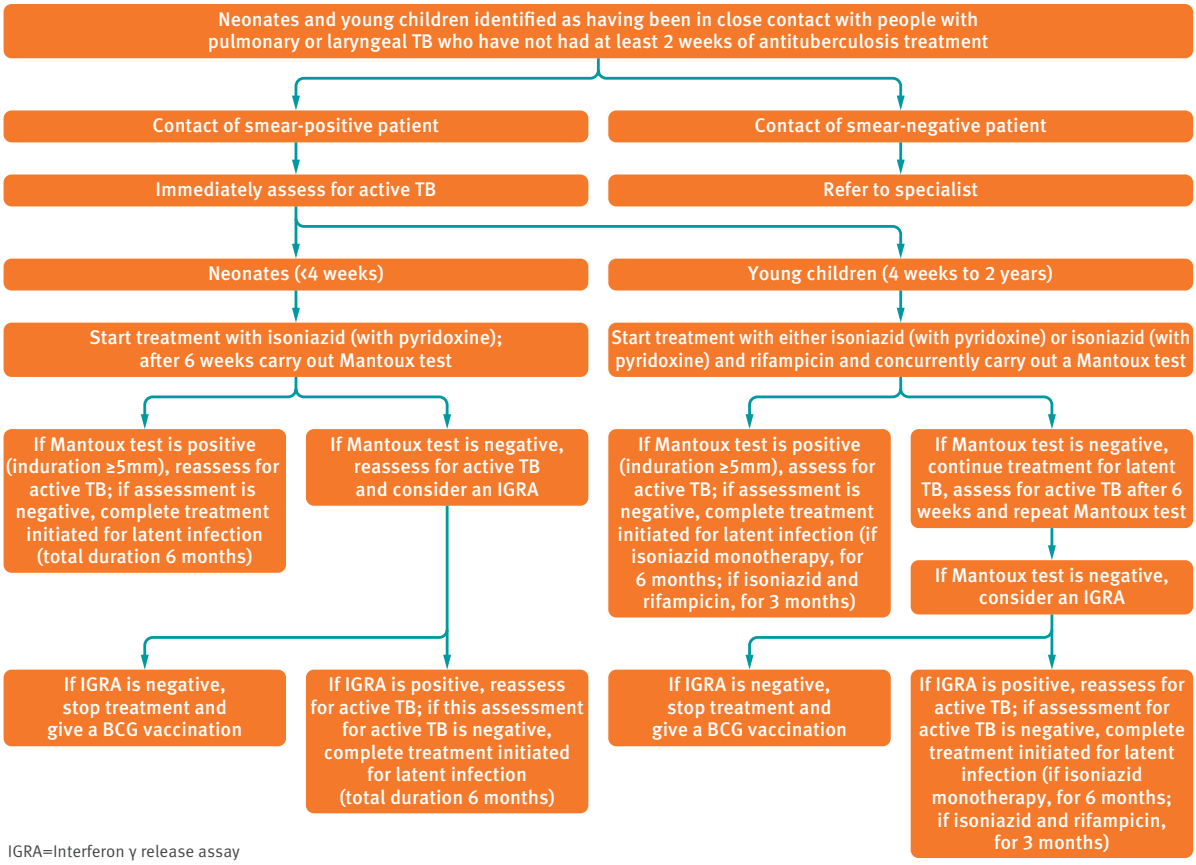
- Request rapid diagnostic NAATs for rifampicin resistance if risk factors for multidrug resistance are identified:
  - Previous TB drug treatment, particularly with poor adherence
  - Contact with a known case of multidrug resistant TB
  - Birth or residence in a country in which the World Health Organization reports that a high proportion (≥5%) of new TB cases are multidrug resistant (fig 2).[3]

Start infection control measures:

- If the NAAT for rifampicin resistance is positive
  - Continue infection control measures until pulmonary or laryngeal disease has been excluded
  - Manage treatment along with a multidisciplinary team with experience of managing multidrug resistant TB
  - Offer treatment with at least six drugs to which the mycobacterium is likely to be sensitive
  - Test for resistance to second line drugs.

Treating latent infection

- For people with evidence of latent TB, including those with HIV infection or those under 65 years old, offer either
  - Three months of isoniazid (with pyridoxine) and rifampicin, *or*
  - Six months of isoniazid (with pyridoxine).
- Base the choice of regimen on the person's clinical circumstances. For example, offer three months of isoniazid (with pyridoxine) and rifampicin if hepatotoxicity is a concern, or offer six months of isoniazid (with pyridoxine) if interactions with rifamycins are a concern (such as in people with HIV or after a transplant).



IGRA=Interferon γ release assay

Fig 1 | Pathways for diagnosing latent TB infection in neonates and young children

- If people at increased risk of developing active TB (box 1) do not have treatment for latent TB for any reason, advise them of the risks and symptoms of TB.

Treating active disease

- If clinical features are consistent with a diagnosis of tuberculosis, start treatment (box 2) without waiting for culture results. Continue this regimen even if subsequent culture results are negative.

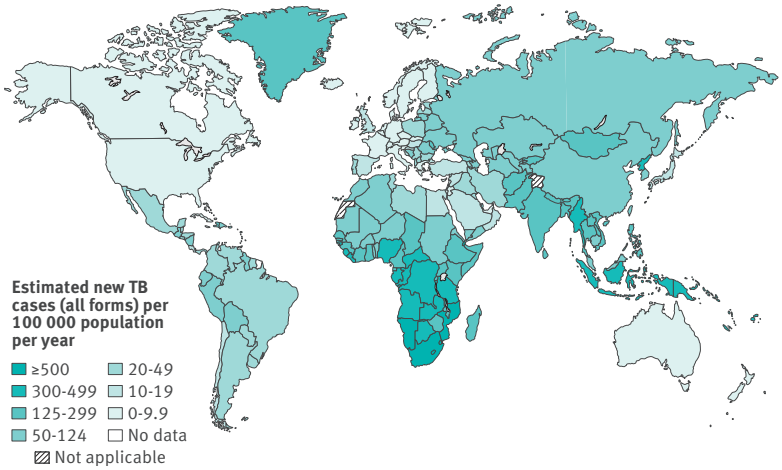


Fig 2 | Estimated incidence of TB by country in 2014. (Adapted from WHO *Global Tuberculosis Report 2016*[3])

Adherence

- TB case managers should work with the person diagnosed with TB to develop a health and social care plan, and support them to complete therapy successfully. They should
  - Offer a risk assessment to every person with TB, to identify their needs and whether they should have enhanced case management (a package of tailored, supportive care, which may include directly observed therapy (DOT))
  - Educate the person about TB and the treatment
  - Develop an individual care plan after discussion with the person
  - Gain the person's consent to the plan and agree a review date
  - Coordinate discharge planning, especially for people on DOT
  - Explore appropriate ways that peers and voluntary organisations can provide support.

Uptake of BCG vaccination in people from eligible groups

- To improve the uptake of vaccination, identify eligible groups[4] opportunistically, such as through new registrations in primary care, with antenatal services, or other points of contact with secondary or tertiary care; people entering education; links with statutory and voluntary groups; or contact investigations.

Tests to diagnose active TB

Suspected site of disease	Possible imaging techniques*	Specimen	Routine test	Additional tests (if they would alter management)
Pulmonary (people aged ≥16 years)	X ray† CT thorax	3 respiratory samples (preferably spontaneously produced, deep cough sputum samples, otherwise induced sputum or bronchoscopy and lavage; preferably 1 early morning sample)	Microscopy Culture Histology	NAAT
Pulmonary (children aged ≤15 years)	X ray† CT thorax	3 respiratory samples (preferably spontaneously produced, deep cough sputum samples, otherwise induced sputum or bronchoscopy and lavage; preferably 1 early morning sample)	Microscopy Culture] Histology NAATs (1 per specimen type)	IGRA and/or Mantoux test (with expert input)
Pleural	X ray Bronchoscopy	3 respiratory samples (preferably spontaneously produced, deep cough sputum samples, otherwise induced sputum or bronchoscopy and lavage; preferably 1 early morning sample)	Microscopy Culture Histology	—
		Pleural fluid	Microscopy Culture Cytology	Adenosine deaminase assay
Central nervous system	CT† MRI†	Biopsy of suspected tuberculoma	Microscopy Culture Histology	—
		Cerebrospinal fluid	Microscopy Culture Cytology	Adenosine deaminase assay
Meningeal	CT† MRI†	Cerebrospinal fluid	Microscopy Culture Cytology	NAAT Adenosine deaminase assay
Lymph node (including intrathoracic mediastinal adenopathy)	Ultrasound CT MRI	Biopsy	Microscopy Culture Histology	NAAT
		Aspirate	Microscopy Culture Cytology	NAAT

CT=computed tomography. NAAT= Nucleic acid amplification test. MRI=magnetic resonance imaging.
*Taking into account, for example, the exact site of suspected disease and the availability of the test at the time of assessment.
†Routine imaging.

Box 1 | People at increased risk of developing active TB

- People with HIV, diabetes, chronic kidney disease, or silicosis, or receiving haemodialysis
- Children younger than 5 years old
- People with an excessive alcohol intake or who are injecting drug users
- People who have had solid organ transplantation
- People who have a haematological malignancy or are receiving chemotherapy
- People who have had a gastrectomy or jejunoileal bypass
- People who are having treatment with anti-tumour necrosis factor alpha or other biologic agents

Box 2 | Treatment regimen for active TB

- For people with active TB without central nervous system involvement, offer

–Isoniazid (with pyridoxine), rifampicin, pyrazinamide, and ethambutol for two months, *then*

–Isoniazid (with pyridoxine) and rifampicin for a further four months

- For people with active TB of the central nervous system, offer

–Isoniazid (with pyridoxine), rifampicin, pyrazinamide, and ethambutol for two months, *then*

–Isoniazid (with pyridoxine) and rifampicin for a further 10 months

- Modify the treatment regimen according to drug susceptibility testing

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

Committee members involved in this guideline update included lay members who contributed to the formulation of the recommendations summarised here

GUIDELINES INTO PRACTICE

Does the patient have signs, symptoms, or risk factors for TB, and, therefore, should diagnostic efforts be initiated?

Should infection control measures be initiated, and to what degree? Do rapid diagnostic tests for drug resistance need to be ordered?

- In primary care
  - Educate and support practice staff, such as by raising awareness of guidelines and who is at risk and promoting BCG and TB testing in eligible groups;
  - Incorporate reminders for staff on practice computers
  - Consider financial incentives for practices
  - Use written reminders, telephone calls, text messages, or a combination of these for reminders ("immunisations due") and recall ("immunisations overdue").
- Incorporate computer reminders into maternity service (obstetrics) IT systems for staff.
- Vaccinate babies at increased risk of TB before discharge from hospital or before handover from midwifery to primary care, if possible. Otherwise, vaccinate soon afterwards (for example, at the 6 week postnatal check).
- Trained lay health workers, community based healthcare staff, or nurses should use home visits to give information and advice to disadvantaged people on the importance of immunisation.

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Exercise induced bronchoconstriction in adults: diagnosis and management

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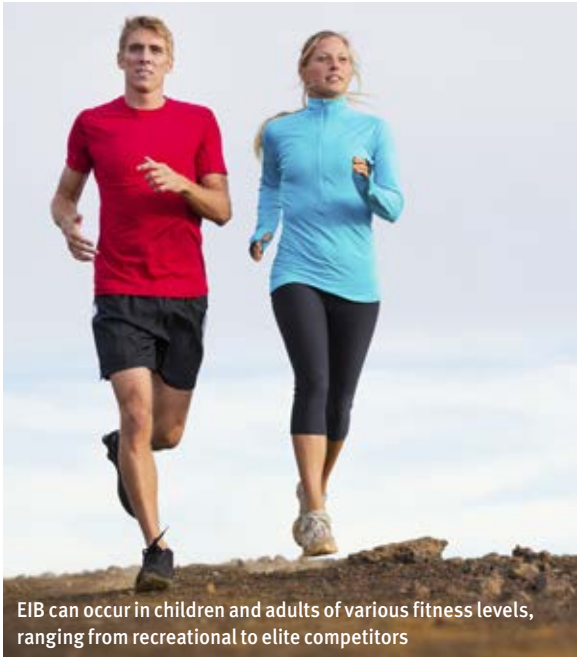
CPD/CME
1 CREDIT

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

A patient story is included in this article on thebmj.com



EIB can occur in children and adults of various fitness levels, ranging from recreational to elite competitors

What is exercise induced bronchoconstriction (EIB)?

EIB is defined as "the transient narrowing of the lower airway following exercise in the presence or absence of clinically recognized asthma."[1] Bronchoconstriction typically develops within 15 minutes after exercise and spontaneously resolves within 60 minutes. After an episode of EIB, there is often a refractory period of about 1-3 hours in which, if exercise is repeated, the bronchoconstriction is less emphasised in 40-50% of patients.[2 3] EIB can also occur during exercise.[4 5]

The term "exercise induced bronchoconstriction" is preferred to that of "exercise induced asthma" since asthma is a chronic condition which is not induced by a single bout of exercise. EIB is more likely in people with asthma, but it also occurs in individuals without asthma.[1 6] EIB is characterised by falls in forced expiratory volume in one second (FEV_1) after exercise, while in people with asthma there is persistent airway inflammation and recurrent symptoms outside of exercise (that is, with allergen exposure or upper respiratory infections). Often, at baseline there is evidence of reversible lower airway obstruction.

What triggers an episode of EIB?

EIB typically occurs after high intensity aerobic exercise during which high ventilation (>85% of maximal voluntary ventilation) dehydrates the respiratory mucosa and leads to a transient increase in airway osmolarity, mast cell activation with mediator release, and bronchoconstriction. Dry environments exacerbate EIB because of greater respiratory water loss. Exacerbations due to cold air occur due to the reduced water content of the air rather than the low temperature. Increased exposure to allergens and respiratory irritants may exacerbate bronchoconstriction during high ventilation exercise.[9] EIB may be seasonal in some individuals with atopy,[10 11] although research on this association is limited. Figure 1 shows the pathogenesis of EIB and how diagnostic tests and management interventions work.

How does EIB present?

Individuals with EIB typically complain of breathlessness, wheezing, cough, and chest tightness during or after exercise. Athletes may seek medical input because they feel that these symptoms limit their sports performance. However, the non-specific nature of the symptoms can make it hard to reach a firm diagnosis.

How is EIB accurately diagnosed?

Formal diagnosis requires either direct or indirect challenge tests designed to induce bronchoconstriction. Direct challenge uses a nebulised drug to stimulate the airway smooth muscle, whereas indirect challenge attempts to dehydrate the mucosa (see box 1).[22]

WHAT YOU NEED TO KNOW

- Exercise induced bronchoconstriction (EIB) is most common in individuals with asthma but also occurs in those without
- EIB is commonly misdiagnosed because its symptoms (such as shortness of breath, chest tightness, wheezing, and cough) are neither sensitive nor specific
- EIB is most accurately diagnosed by using spirometry to measure forced expiratory volume in one second (FEV_1) before and after a high intensity exercise challenge in dry air or eucapnic voluntary hyperpnoea
- Short acting β agonists are recommended first line treatment for confirmed EIB, used only "as required" rather than daily to avoid tolerance and potential exacerbations
- People with EIB symptoms and a negative bronchoprovocation test or with documented EIB and ongoing symptoms despite treatment should have their management and diagnosis reviewed
- Exercise induced laryngeal obstruction is a relatively common cause of breathlessness in athletes, which may mimic or occur alongside EIB

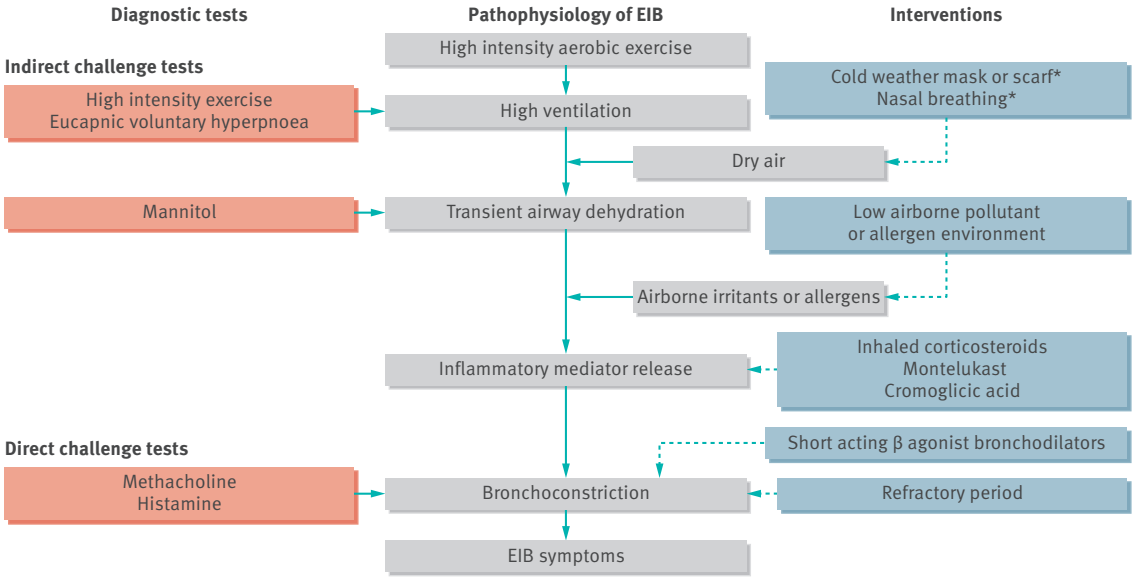


Fig 1 | Relation between pathophysiology of exercise induced bronchoconstriction (EIB), triggers of EIB attacks, diagnostic tests, and management strategies. (*Evidence from small studies suggests these interventions may reduce EIB severity,[12-14] but these may not be practical for athletes engaging in high intensity exercise)

Box 1 | Challenge tests for EIB

Indirect challenge tests

High intensity exercise challenge

- Should be performed in a humidity controlled environmental chamber or by having the individual breathe medical grade compressed dry air (<5 mg H_2O/L) throughout the exercise
- Requires sufficient time spent at high intensity activity, with >90% maximal heart rate for the last 4 minutes of an 8 minute exercise challenge[1]
- >10% decrease in FEV_1 is a positive test

Eucapnic voluntary hyperpnoea

- Performed with the patient hyperventilating for 6 minutes while breathing from a cylinder of medical grade compressed gas containing 4.9-5% CO_2, 21% O_2, balance N_2[29]
- Target ventilation of 30×FEV_1 or >85% of maximal voluntary ventilation (MVV), though >60% MVV is generally sufficient
- For individuals who achieve a ventilation >60% MVV
  10-19.9% decrease in FEV_1 is a mild response
  20-29.9% decrease is a moderate response
  >30% decrease is severe[29]

Mannitol challenge

- Provides a safe alternative to the other tests because it allows clinicians to produce bronchoconstriction in a controlled and stepwise manner with increasing amounts of inhaled powdered mannitol, which increases osmolarity until a 15% decrease in FEV_1 occurs.[1 8 30] This reduces the risk of severe bronchoconstriction
- Though useful in diagnosis, a negative mannitol challenge result is not sufficient to rule out EIB[8]

Direct challenge tests

- Direct stimulation involves the inhalation of nebulised methacholine in increasing concentrations until a given decrease (generally >15%) in FEV_1 is achieved
- A negative test has a high negative predictive value (>90%) and can potentially rule out asthma and EIB. However, predictive value may be weaker in elite athletes and limits its clinical utility[31]

WHEN TO REFER

- Facilities not available to perform dry air exercise challenge or EVH
- Repeated negative result on properly conducted indirect challenge tests
- Symptoms are not improved despite proper medication use
- Non-reversible airway obstruction

Spirometry before and at 5, 10, 15, and 20 minutes after the stimulus measures the change in FEV_1. A reduction of >10-15% in FEV_1 at two consecutive post-challenge time points is considered diagnostic for EIB, though specific recommendations vary (for example, the European Respiratory Society recommends a >12% fall in FEV_1).[18] About half of athletes with EIB will have a negative exercise challenge test result, so two tests may need to be done to exclude the diagnosis.[24]

With the exception of the mannitol challenge, challenge tests should be conducted only in facilities where bronchodilator, supplementary oxygen, resuscitation equipment, and medical staff are readily available in the event of a severe response.[29] Direct and indirect challenge tests are contraindicated in patients with baseline impairments in FEV_1 (<70-80% of predicted).

Indirect tests are preferable to direct tests as they replicate the environmental conditions and the pathophysiology. The most widely used indirect tests are high intensity exercise and eucapnic voluntary hyperpnoea (see box 1).

What are the consequences of misdiagnosing EIB?

Diagnosis of EIB based on symptoms without proper adherence to protocols has led to false positive diagnoses, and consequent unnecessary use of bronchodilators.[32] However, individuals with false negative results (box 2) may not receive treatment and may continue to experience EIB. This may take the form of an occasional nuisance or severe impairment that causes them to stop taking part in sport and lose the health benefits of physical activity.[20]

What can mimic EIB?

Other conditions can cause shortness of breath during exercise and may be mistaken for EIB (table).

What are the treatment options for EIB?

Non-pharmacological management

A systematic review and meta-analysis[2] found that, before vigorous intensity exercise, a warm-up procedure that included continuous high intensity activity (such as 6

Potential causes of breathlessness or exercise intolerance in athletes who do not have asthma or exercise induced bronchoconstriction (EIB)		
Condition	**Clinical features or specific differentials**	**Basic diagnostic approach**
Upper airway obstruction (primarily EILO)	Pronounced inspiratory stridor, often accompanied by a flattened inspiratory loop; resolves quickly after stopping exercise Failure to respond to EIB management May occur concomitantly with EIB	Continuous laryngoscopy should be performed during an exercise challenge
Inadequate fitness	A physiological limitation to exercise in otherwise normal individuals or obese individuals Relatively intense training regimen results in "shortness of breath" without any pathology Common in team sports (individual less fit than teammates)	Expert evaluation of training regimen
Exercise induced hypoxaemia	Low arterial saturation (‹92% SaO_2) during near maximal exercise causing dyspnoea Physiological limitation to maximal aerobic exercise without cardiometabolic or pulmonary pathology Occurs in about 50% of high level endurance athletes	Near-maximal exercise test with pulse oximetry
Thoracic musculoskeletal pathology	Muscle injury (such as intercostal strain) Costochondritis Skeletal trauma	Musculoskeletal physical examination, radiography
Pneumothorax	Primary pneumothorax (rare, but reported in athletes) Secondary to trauma	Radiography, auscultation
Psychological factors	Sport specific anxiety may result in hyperventilation during exercise or poor quality challenge test Clinical depression General anxiety disorders	Sports psychology assessment Psychological or psychiatric referral
Obesity	Mechanical limitations to ventilation due to excess adipose tissue on the trunk	Body composition analysis; spirometry to detect right shift in flow volume loop or flow limitation
Other factors causing dyspnoea, exercise intolerance, or fatigue	Anaemia Dietary or nutritional deficienciesInadequate recovery or sleep or overtraining syndrome Medication side effects Mitochondrial myopathy Pulmonary infectious disease Systemic infectious disease (such as mononucleosis, Lyme disease) Cardiovascular, pulmonary, or gastroenterological pathology	Thorough patient history to determine most likely differentials to provide more appropriate diagnostic approach

EILO=Exercise induced laryngeal obstruction.

Box 2 | Common causes of false negative challenge results

- Failure to expose the patient to sufficiently dry air[27]
- Insufficient exercise intensity (that is, ‹90% of maximum heart rate)[27]
- Performing a "confirmatory" challenge test while using previously prescribed medication based on symptoms. See table 1 on thebmj.com for details
- Using a peak expiratory flow meter as a diagnostic tool instead of a spirometer (lacks appropriate sensitivity and positive predictive value[33 34])
- Test performed at the wrong time of the year in individuals with seasonal EIB[10 11]

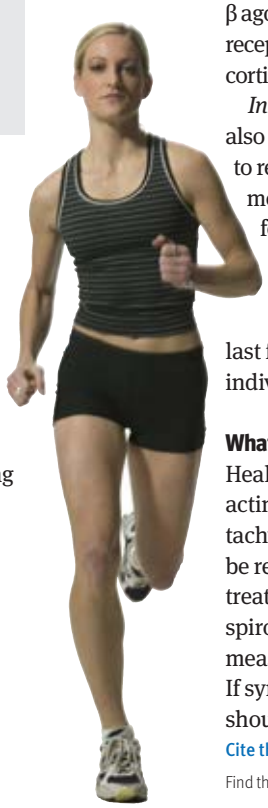
minutes of hard uphill running) or sprint interval bouts reduced the later fall in FEV_1. Athletes with EIB may wish to try including some sprint interval exercise (such as six to eight bouts of 30 second sprints with 45-120 seconds rest between[2]) in their warm-up routine. Individuals with EIB may also try to avoid exercising in areas where they are exposed to high levels of air pollution and airborne allergens, and dry environments when possible.

Should people with EIB avoid exercise?

Patients with EIB should be encouraged to continue taking exercise while adhering to their management plan, and should seek further medical evaluation if their symptoms do not resolve.

Pharmacological management

β agonists—People with EIB, with or without asthma, should be prescribed short acting (1-6 hours, depending on drug) β agonist bronchodilators, which should be used only as needed. Long acting β agonists are not used as sole therapy for either EIB or asthma because of the potential risk of severe asthma exacerbations and death.[42] A systematic review (including studies of adults and children with EIB) found that a single dose of a β agonist was effective in preventing EIB but confirmed that daily use leads to tolerance, which reduces its effectiveness as a rescue medication.[43] β agonists can be used before exercise two to four times a week to prevent bronchoconstriction or taken as a rescue inhaler as needed, but they should not be used daily.[1 8 44] If β agonists are needed more frequently, then a leukotrienes receptor antagonist (such as montelukast) or a daily inhaled corticosteroid should be considered.[1 8]



Inhaled corticosteroids—Patients with known asthma who also have EIB should be managed with inhaled corticosteroids to reduce airway inflammation. Inhaled corticosteroids are most effective when administered daily and may take up to four weeks to reach maximal effectiveness.[1 8 44]

Leukotrienes receptor antagonists—These cannot reverse bronchoconstriction but may prevent episodes of EIB if taken two hours before exercise. Protection can last for 24 hours,[1 8] but effectiveness varies widely between individuals.[45]

What if symptoms persist despite treatment?

Health professionals should review the use of any short acting β agonist to ensure this is not being overused (risking tachyphylaxis) or underused. Inhaler technique should be reviewed. If there is no subjective improvement with treatment, patients should be offered repeat testing with spirometry or a repeat exercise challenge to provide objective measures of lung function and airway hyper-responsiveness. If symptoms persist despite these measures, the diagnosis should be re-evaluated.

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Find this at: http://dx.doi.org/10.1136/bmj.h6951

CASE REVIEW **Hyperkalaemia on the surgical ward**

A 56 year old woman was admitted with an infected stump wound at the site of a below the knee amputation. Her medical history included type 2 diabetes, diabetic foot ulcer, and painful peripheral neuropathy.

Her regular drugs were metformin, amitriptyline, lansoprazole, Humulin I and Novorapid SC insulin, aspirin, paracetamol, morphine sulfate, gabapentin, and carbamazepine. In hospital she was also prescribed dalteparin 5000 units subcutaneously once daily, intravenous benzylpenicillin, and flucloxacillin.

Before admission, serum potassium was 4.6-4.8 mmol/L (reference range 3.6-5.0). During admission, she had persistent hyperkalaemia peaking at 6.2 mmol/L and received repeated doses of insulin-dextrose and salbutamol over three days. Renal function was stable throughout (creatinine 60-85 µmol/L (60-120), estimated glomerular filtration rate >60 mL/min/1.73 m^2). She was mildly acidotic (bicarbonate 18-20 mmol/L (22-30)) with a serum lactate of 1.9 mmol/L (0.6-2.4). A paired sample of serum and urine showed serum: potassium 5.7 mmol/L, osmolality 312 mOsm (280-296); urine: sodium 69 mmol/L, potassium 18 mmol/L, osmolality 370 mOsm.

1 From the history, what are the likely causes of the hyperkalaemia?
2 How do the paired serum and urine results help determine the cause of hyperkalaemia?
3 What are the treatment options in this case?

Submitted by David P Baird, Robert W Hunter, and John J Neary

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Patient consent obtained.

Find this at: http://dx.doi.org/10.1136/bmj.h5531

SPOT DIAGNOSIS
A man with COPD, fever, and leucocytosis

A 68 year old man with severe chronic obstructive pulmonary disease (COPD), who was on home oxygen and still smoked, presented to the emergency room with fever, fatigue, and leucocytosis (14×10^9 white blood cells/L). Computed tomography was performed (figure). What is the diagnosis?

Submitted by Raghav Murthy and Kemp Kernstine

Patient consent obtained.

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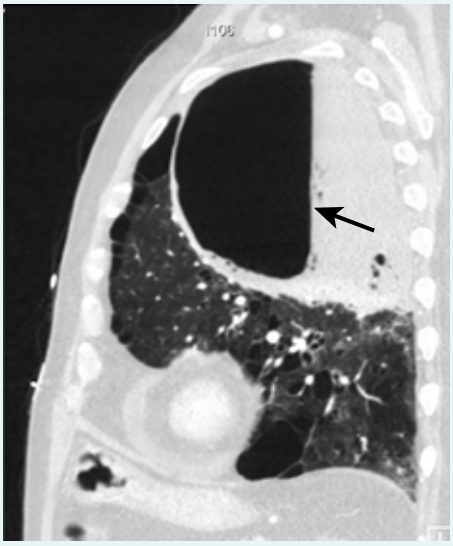
Find this at: http://dx.doi.org/10.1136/bmj.h6067



Sagittal computed tomography image

SPOT DIAGNOSIS **Nail changes**

A 67 year old woman attended clinic before receiving her fifth cycle of adjuvant chemotherapy for breast cancer. On examination she was found to have nail changes. Can you name the nail changes shown (figure) and explain the cause?

Submitted by Thomas Wells

Patient consent obtained.

Cite this as: *BMJ* 2015;351:h6072

Find this at: http://dx.doi.org/10.1136/bmj.h6072

answers

CASE REVIEW **Hyperkalaemia on the surgical ward**

1 Potassium in intravenous penicillin preparations or release of intracellular potassium from necrotic muscle in the stump. Potassium excretion may be impaired due to type IV renal tubular acidosis associated with diabetes or dalteparin.
2 They are used to calculate the transtubular potassium gradient (TTKG). In the normal physiological response to hyperkalaemia, urinary potassium excretion is raised. This patient's low TTKG (2.66) indicates impaired aldosterone bioactivity in the distal nephron (type IV renal tubular acidosis).
3 Restriction of dietary (and drug) sources of potassium. Seek specialist advice if there is a need to continue dalteparin as fludrocortisone has been used to manage the hyperkalaemia until the need for heparin has elapsed.

SPOT DIAGNOSIS **A man with COPD, fever, and leucocytosis**

An infection within a giant bulla.

SPOT DIAGNOSIS **Nail changes**

The transverse white lines are known as Mees' lines or leuconychia striata and they were caused by the patient's chemotherapy.

Intraperitoneal bladder rupture

A 27 year old woman presented with acute abdominal pain after a brief syncope while on a fairground ride. She reported no history of serious trauma. Because blood tests showed acute renal impairment a urinary catheter was inserted. Unenhanced computed tomography showed gross intraperitoneal free fluid with no clear cause. Diagnostic laparoscopy identified intraperitoneal bladder rupture, which required open surgical repair. Even in the absence of a clear history of trauma, the presence of a large volume of free fluid and acute renal impairment should raise suspicion of intraperitoneal bladder rupture. This can occur with minimal trauma when the bladder is full. Surgical repair offers an excellent outcome.

Tom Nicholas Blankenstein (tomblankenstein@nhs.net), **Fiona C Minns**, Department of Clinical Radiology, Royal Infirmary of Edinburgh, Edinburgh EH16 4SA, UK, **Simon Paterson-Brown**, Royal Infirmary of Edinburgh, **John T Murchison**, Department of Clinical Radiology, Royal Infirmary of Edinburgh, Edinburgh EH16 4SA, UK

Patient consent obtained.

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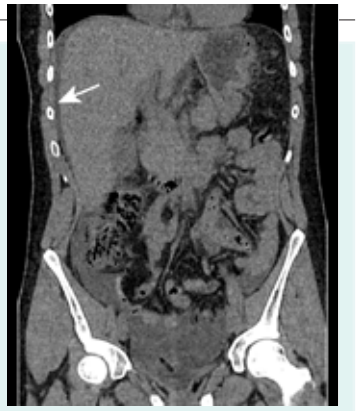
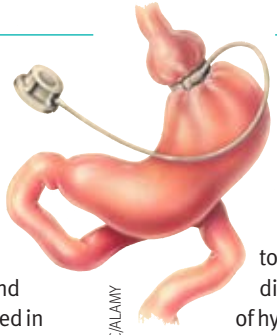


Bariatric success



PHOTOTAKE INC/ALAMY

Bariatric is a Greek based word that arose around 1977 and has come to mean the doctoring of heavy people. As reported in Research News, a study based on the UK Clinical Practice Research Datalink found that bariatric surgery as delivered in the UK healthcare system is associated with dramatic weight loss, sustained at least four years after surgery (*PLoS Med* doi:10.1371/journal.pmed.1001925). In type 2 diabetes, it offers the prospect of remission or greatly improved glycaemic control. In a pooled analysis of a Swedish database and two randomised trials (*Diabetes Care* doi:10.2337/dc15-0575), complete diabetes remission was associated with shorter diabetes duration, lower fasting glycaemia before surgery, and the use of gastric diversion surgery rather than gastric reduction alone.

Saturated with stroke interviews

Qualitative researchers used the term saturation to describe the point at which further interviews fail to reveal new themes. When a group of authors did a meta-analysis of 130 studies of the experiences of stroke patients, they felt quite saturated (*PLoS One* doi:10.1371/journal.pone.0141803). "The observed data saturation suggests that, currently, no further qualitative research simply describing the lived experience of stroke is needed; we propose that it would be more useful to focus on qualitative research informing self-management support interventions and their implementation."

Shared incomprehension and effect sizes

Leading figures in the systematic reviewing world invited 610 staff and trainees in internal medicine and family medicine programmes in eight countries to participate in a study that presented differently formatted summary estimates of hypothetical interventions versus placebo for chronic pain (*CMAJ* doi:10.1503/cmaj.150430). The results show that many doctors may not be well equipped to understand and share information about effect sizes. Respondents best understood risk difference, followed by relative risk and ratio of means. They preferred effects that were expressed dichotomously rather than variably and were most often fazed by the statisticians' favourite—the standardised mean difference.

Screen time and migraine

A downturned head, busy thumbs, and a bored but slightly startled expression when spoken to are associated with increased risk of migraine in young adults, according to a French study (*Cephalalgia* doi:10.1177/0333102415620286). It found that high levels of screen time exposure to smartphones, computers, tablets, and television combined were associated with self reported migraine in a cohort of mean age 20.8 years (75.5% female) but found no significant association with non-migraine headache.

Nature, Science, and neuroflops

"The demise of basic neuroscience research" is described in a commentary by two neuroscientists in the journal *Engineering* (http://engineering.org.cn/article/2015/2095-8099/12203). They looked at the general science journals *Nature* and *Science* to see the impact of articles published between 1990 and 2000 on the treatment of neurological disease. "Not a single piece of research published in these two prestigious journals led per se to a ground-breaking, clinically effective molecule or procedure, even though major innovations would have been expected."

A harmony of lung sounds?

When six chest physicians from around Europe first tried to agree on what to call various recorded lung sounds there was some discord (*Eur Respir J* http://erj.ersjournals.com/content/44/Suppl_58/P4004). But last month another paper appeared, trumpeting agreement (*Eur Respir J* doi:10.1183/13993003.01132-2015) within the European Respiratory Society task force on respiratory sounds. As with EU apple regulations, only certain varieties are allowed. "Vesicular" breath sounds are no longer permitted. "Rhonchi" unfortunately survive, to mean almost anything. "Squawks" are the most specific term. This is hardly a crackling success.

Deer Hunter deaths

Although the Vietnam war has passed into history, many of its American veterans are still alive. But a comparative study finds that those who had post-traumatic stress disorder are twice as likely to have died, even after adjustment for sociodemographic and other characteristics (*Am J Epidemiol* doi:10.1093/aje/kwv217).

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Find this at: http://dx.doi.org/10.1136/bmj.i94