GUIDELINES

Identification, assessment, and management of overweight and obesity: summary of updated NICE guidance

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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 thebmj.com.

Overweight and obesity lead to serious health and social difficulties. In the United Kingdom, the prevalence of obesity rose from 6% of men and 8% of women in 1980 to 24% of men and 25% of women in 2012.[1 2] Severe obesity (body mass index (BMI) >40), which was rare in 1980, now affects 2.4% of the population.[2] In 2012, about three in 10 children aged 2-15 years were overweight or obese. Obesity related illnesses include type 2 diabetes, hypertension, obstructive sleep apnoea, and gastro-oesophageal reflux disease.[3] Obesity also increases the risk for many common cancers[3] and contributes to psychological and psychiatric morbidity.[4] The treatment of obesity can be challenging and requires multicomponent weight management programmes; however, existing service provision is varied and often limited.[5]

Newly available evidence on very low calorie diets and on the effectiveness of bariatric surgery in people with recent onset type 2 diabetes and a lack of clear guidance on follow-up after bariatric surgery have led to the need to revise the original National Institute for Health and Care Excellence (NICE) guideline from 2006.[6] This article summarises the most recent recommendations from NICE (CG189).[7]

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. Evidence levels for the recommendations are in the full version of this article on thebmj.com. Boxes 1-4 summarise some recommendations from the guideline that have not been updated on general principles of care; identification and assessment of overweight and obesity; lifestyle interventions; and pharmacological and surgical interventions.

Use of very low calorie diets

- Do not routinely use very low calorie diets (≤800 kcal (1 kcal=4.18 kJ)/day) to manage obesity (defined as BMI >30). (New recommendation.)
- Only consider very low calorie diets as part of a multicomponent weight management strategy (box 3) for people who are obese and who have a clinically assessed need to lose weight rapidly (for example, those who need joint replacement surgery or who are seeking fertility services). Ensure that:
  - The diet is nutritionally complete
  - The diet is followed for a maximum of 12 weeks (continuously or intermittently)
  - People following the diet are given ongoing clinical support. (New recommendation.)
- Before starting people on a very low calorie diet as part of a multicomponent weight management strategy:
  - Consider counselling and assess for eating disorders or other psychopathology to make sure the diet is appropriate for the person
  - Discuss the risks and benefits
  - Tell people that this is not a long term weight management strategy and that any weight regain (which can occur) will not be the result of their own or their clinician's failure

Box 1 | General principles of care

- Offer regular non-discriminatory long term follow-up by a trained professional. Ensure continuity of care in the multidisciplinary team through good record keeping
- Equip specialist settings for treating adults who are severely obese with special seating and adequate weighing and monitoring equipment
- Hospitals should have access to specialist equipment (for example, larger scanners and beds) when providing general care for people who are severely obese
- Discuss and agree the choice of interventions for weight management with the person. Tailor the components of the planned weight management programme to the person's preferences, initial fitness, health status, and lifestyle
- Coordinate care of children and young people who are overweight or obese around their individual and family needs; encourage parents or carers to take the main responsibility for lifestyle changes (taking into account age and maturity of the child)
- Aim to create a supportive environment that helps children who are overweight or obese and their families to make lifestyle changes; interventions should aim to tackle lifestyle within the family setting
- Make decisions about the care of a child who is overweight or obese together with the child and family. Tailor interventions to the needs and preferences of the child and the family
- Ensure that interventions for children who are overweight or obese deal with lifestyle within the family and in social settings. Encourage parents or carers to take the main responsibility for lifestyle changes in children who are overweight or obese, especially if they are younger than 12 years

THE BOTTOM LINE

- Obesity is a chronic condition that causes serious disease and disability
- Management should include diet, physical activity, and behaviour change components. Long term follow-up is needed
- Bariatric surgery is a treatment option for some patients with severe obesity, particularly those with type 2 diabetes. Such patients should be assessed for their suitability for this treatment
- Follow-up after bariatric surgery should be comprehensive. After discharge from a surgical service, follow-up should be annual and lifelong

Box 2 | Identification, classification, and assessment of overweight and obesity

- Use body mass index (BMI) as a practical estimate of adiposity in adults (supplement with waist circumference for BMI <35)
- Interpret BMI with caution, particularly in highly muscular adults or those of Asian origin (risk factors are a concern at a lower BMI in adults of Asian origin)
- Use age and sex specific BMI centile charts in children and young people (BMI z-scores or the Royal College of Paediatrics and Child Health UK-World Health Organization growth charts[8]
- Investigate comorbidities and other factors to an appropriate level, depending on the person, timing of assessment, degree of overweight or obesity, and previous assessments
- Assess any environmental, social, and family factors, including family history of overweight or obesity and comorbidities
- In adults, consider referral to tier 3 specialist weight management services if the underlying cause needs to be assessed, their needs cannot be managed adequately in tier 2 with lifestyle interventions alone (such as, those with learning disabilities), conventional treatment is unsuccessful, or drug treatment is being considered in those with BMI greater than 50
- In children who are overweight or obese and who have serious comorbidities or complex needs (such as, those with learning disabilities), consider referral to a specialist with the appropriate expertise to meet their needs

Box 3 | Lifestyle interventions, physical activity, and dietary approaches

- Multicomponent interventions are the treatment of choice
- Weight management strategies should include behaviour change strategies to increase people's physical activity levels or decrease inactivity and improve eating behaviours
- People should have relevant information on realistic targets for weight loss (5-10% of original weight)
- To prevent obesity, most people may need to do 45-60 minutes of moderate intensity activity a day, particularly if they do not reduce their energy intake. Advise people who have been obese and have lost weight that they may need to do 60-90 minutes of activity a day to avoid regaining weight
- The main requirement of a dietary approach is that total energy intake should be less than energy expenditure
- Diets with 600 kcal/day deficit (600 kcal fewer than is needed to stay the same weight; 1 kcal=4.18 kJ) or that reduce energy intake by reducing fat content in combination with expert support and intensive follow-up are recommended for sustainable weight loss

Box 4 | Pharmacological and surgical interventions

- Consider drug treatment (for adults) only after dietary, exercise, and behavioural approaches have been started and evaluated, and a target weight loss has not been reached or a plateau has been reached
- Drug treatment is generally not recommended for children under 12 years unless severe comorbidities are present
- Bariatric surgery is a treatment option if body mass index (BMI) is 40 or more (or 35-40 in the presence of comorbidities such as type 2 diabetes or high blood pressure; for recommendations specific to type 2 diabetes see the main text), all appropriate non-surgical measures have been tried but the person does not achieve or maintain weight loss, the person is already being treated or will be treated in a tier 3 specialist weight management service, the person is fit for anaesthesia and surgery, and the person commits to the need for long term follow-up
- Bariatric surgery is the option of choice (instead of lifestyle interventions or drug treatment) for adults with a BMI of more than 50 when other interventions have not been effective
- Preoperative assessment before surgery should include: risk-benefit analysis including prevention of complications of obesity (such as type 2 diabetes, hypertension, obstructive sleep apnoea, and gastro-oesophageal reflux), assessment for eating disorders, and assessment of psychological or clinical factors that might affect adherence to postoperative care
- Multidisciplinary teams should be able to conduct preoperative assessments, give psychological support before and after surgery, and provide postoperative assessment and surgical follow-up
- Surgical intervention is not generally recommended in children or young people except in exceptional circumstances and if they have achieved or have nearly achieved maturity

  - Discuss the reintroduction of food after a liquid diet. (New recommendation.)
- Provide a long term multicomponent strategy to help people maintain their weight after the use of a very low calorie diet (see box 3). (New recommendation.)

Bariatric surgery for adults with recent onset type 2 diabetes

Box 4 outlines key indications for bariatric surgery that have not been updated.

- Offer an expedited assessment for bariatric surgery to people with a BMI of 35 or more who have recent onset type 2 diabetes (defined as duration of 10 years or less) as long as they are also receiving or will receive assessment in a tier 3 specialist weight management service (or equivalent). (New recommendation.)
- Consider an assessment for bariatric surgery for people with a BMI of 30-34.9 who have recent onset type 2 diabetes as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). (New recommendation.)
- Consider an assessment for bariatric surgery for people of Asian origin who have recent onset type 2 diabetes at a lower BMI than other populations (see box 2) as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). (New recommendation.)

Follow-up care after bariatric surgery

- Offer people who have had bariatric surgery a follow-up care package for a minimum of two years within the bariatric service. This should include:
  - Monitoring of nutritional intake (including protein and vitamins: concentrations of vitamin B_{12}, folic acid, and vitamin D in the blood) and mineral deficiencies (such as concentrations of calcium, iron, zinc, and copper in the blood)
  - Monitoring for comorbidities (such as blood pressure and lipid profile, and glycated haemoglobin (HbA_{1C}) for type 2 diabetes, continuous positive airway pressure for obstructive sleep apnoea, and pain and mobility for osteoarthritis)
  - Medication review
  - Dietary and nutritional assessment, advice, and support
  - Physical activity advice and support
  - Psychological support tailored to the individual
  - Information about professionally led or peer support groups. (New recommendation.)
- After discharge from bariatric surgery service follow-up, ensure that all people are offered at least annual monitoring of nutritional status (for example, using blood tests as described above) and appropriate

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- Lipid modification and cardiovascular risk assessment for the primary and secondary prevention of cardiovascular disease (*BMJ* 2014;349:g4356)
- The management of atrial fibrillation (*BMJ* 2014;348:g3655)

supplementation (which should be lifelong) according to need as part of a shared care model of chronic disease management. (New recommendation.)

Overcoming barriers

Obesity is a chronic condition that requires multicomponent treatment strategies as part of a shared care model of chronic disease management. Three main barriers to implementation of this guidance include a change in practice for who should be considered for bariatric surgery, the associated increased costs, and the need to expand the provision of tier 3 services to support these recommendations.

Given that those with a BMI of 35 or more are most likely to benefit from bariatric surgery, assessment for surgery should be expedited in this group to prevent unnecessary delays that could lead to poorer surgical outcomes.[9] Consider assessment for bariatric surgery in those with a BMI of 30-34.9 only in exceptional circumstances, such as in people with other obesity related conditions, or where diabetes cannot be successfully managed with alternative lifestyle or pharmacological measures.[10]

The costs related to recommendations for bariatric surgery will be partially offset by future savings obtained from a reduction in treatment costs related to diabetes, complications of diabetes (such as diabetic foot), and other obesity related comorbidities. The guideline's economic literature review shows that the overall cost to the NHS is justified by higher health benefits relative to non-surgical management strategies. Appropriate resources should therefore be diverted towards bariatric surgery to ensure that it is available for those who are most likely to benefit.

Finally, appropriate assessment before possible surgery may prove a challenge, with current local variation in the provision of tier 3 specialist weight management services. However, it is important to establish such services nationally for equity of access to assessment and multicomponent weight management.

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FROM DRUG AND THERAPEUTICS BULLETIN

Nicotine and health

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Nicotine, an alkaloid derived from the leaves of tobacco plants (Nicotiana tabacum and Nicotiana rustica) is the primary addictive agent in tobacco products.[1 2] There are different ways of administering the various products including smoking cigarettes, chewing tobacco, holding moist snuff in the mouth, inhaling dry snuff through the nose, inhaling smoke from a waterpipe, and inhaling vapour from an electronic cigarette.[3-6] It can be difficult differentiating the effects of nicotine from the many other toxic substances these products also contain. Here we review the pharmacological effects of nicotine but we will not review the well known harmful effects of cigarettes, where it is primarily the toxins and carcinogens in tobacco smoke rather than the nicotine that cause illness and death.[7]

Nicotine and its pharmacology

What's in nicotine containing products?

Different products deliver varying doses of nicotine and other toxic substances (see table). In considering the dose of nicotine from tobacco and other products, it is important to understand the difference between the nicotine content of the product (how much nicotine is contained in the product either by weight of tobacco or in a unit of use, eg, a cigarette) and the systemic dose of

Examples of nicotine content and systemic dose of products[3 6 8 13]

Product	Nicotine content	Systemic dose	Potentially toxic components
Cigarettes	13-29 mg/cigarette	Typically 8-12 puffs of 40-75 mL over 5-7 minutes, inhaling 0.5-0.6 L of smoke; 1-3 mg nicotine/cigarette	Yes: around 4000 other toxins, eg, TSNAs
Electronic cigarettes	6-36 mg/mL	Variable	Yes: eg, four major TSNAs; in vitro studies have shown that liquids have a cytotoxic effect on pulmonary fibroblasts
NRT gum	2-4 mg	1 mg (2 mg gum) or 2 mg (4 mg gum)	No
NRT inhalator	10-15 mg/cartridge	About 13 rtμg nicotine/inhalator puff for a 10 mg cartridge	No
NRT lozenge	1-4 mg	Bioavailability slightly >50%	No
NRT nasal spray	0.5 mg/50 μL spray (10 mg/mL)	Bioavailability averages about 50%, but varies considerably between individuals	No
NRT patch	5-25 mg/16 h and 7-21 mg/24 h	Variable plasma nicotine concentrations achieved from different brands of patches with the same nominal yields	No
Smokeless tobacco	Moist snuff: 13 mg/g; chewing tobacco: 10 mg/g	2.5 g of moist snuff held in the mouth for 30 minutes: average 3.6 mg; 8 g of tobacco chewed for 30 minutes: average 4.5 mg nicotine	Yes: most types of smokeless tobacco contain at least 28 carcinogenic chemicals including TSNAs (although levels vary widely in different products), but without combustion products
Waterpipe	Variable	50-200 puffs of 0.15-1 L each over 20-80 minutes (this could be the equivalent of 100 cigarettes)	Yes: eg, carbon monoxide, heavy metals, charcoal combustion products

NRT = nicotine replacement therapy; TSNAs = tobacco specific nitrosamines

nicotine delivered to the user (the absolute amount of nicotine absorbed by the user).[6]

Absorption, distribution, and excretion

The distribution and elimination of nicotine vary according to the delivery method.[13] When tobacco smoke reaches the small airways and alveoli of the lungs, nicotine is absorbed rapidly; about 25% of nicotine inhaled during smoking reaches the bloodstream, and it reaches the brain within 15 seconds.[14 15] Concentrations of nicotine in the blood rise gradually with the use of smokeless tobacco and tend to reach a plateau after about 30 minutes.[14] While the elimination half life of nicotine is around 2-3 hours, it has a very long terminal half life of 20 hours or more, reflecting the slow release of nicotine from body tissues.[14]

If nicotine is swallowed, it undergoes first pass metabolism in the liver, reducing the overall bioavailability, so nicotine replacement products are formulated for absorption through the oral or nasal mucosa (chewing gum, lozenges, sublingual tablets, inhaler/inhalator, spray) or the skin (transdermal patches).[8]

Receptor activity

Nicotine is a tertiary amine consisting of a pyridine and a pyrrolidine ring, which binds to nicotinic cholinergic receptors (nAChRs), resulting in the release of dopamine and other neurotransmitters, including noradrenaline (norepinephrine), acetylcholine, serotonin, γ-aminobutyric acid, glutamate, and endorphins.[13] Habitual cigarette smoking (but not nicotine administration) reduces brain monoamine oxidase A and B (MAOA and MAOB) activity, which increases monoaminergic neurotransmitters such as dopamine and noradrenaline in synapses, augmenting the effects of nicotine and contributing to addiction.[13] With repeated exposure to nicotine, tolerance develops to some of the effects, with an increase in the number of nAChR binding sites in the brain, believed to represent up-regulation in response to nicotine mediated desensitisation of receptors.[13] Nicotine also activates nAChRs in the adrenal medulla, leading to the release of adrenaline (epinephrine) and β endorphin, which may contribute to the systemic effects of nicotine.[16]

Negative effects of nicotine

Dependence

Addiction to nicotine arises from a combination of genetic, environmental, and pharmacological factors, but the characteristics of the nicotine delivery system are also crucially important; for example, cigarettes are the most addictive tobacco product.[6] A report published by the Royal College of Physicians notes that "cigarettes and many other tobacco products have been specifically designed, engineered and marketed to enhance both development and maintenance of addiction," while "medicinal nicotine products are designed and marketed to minimise their addiction potential."[6] Nicotine withdrawal removes the "reward" of the drug and leads to irritability, depressed mood, restlessness, anxiety, difficulty concentrating, increased hunger and eating, insomnia and craving, which may lead to relapse.[13]

Success rates in attempts to quit nicotine containing products vary, being generally lower for cigarettes (around 10-11% when using nicotine gum, nicotine patch, varenicline, or bupropion to assist quit attempts) and higher for smokeless tobacco (around 19% using bupropion, 21% using nicotine lozenge, 26% using nicotine patch, 27% using nicotine gum, or 33% using varenicline).[3] This may be due to differences in pharmacokinetics (eg, cigarette smoking produces significant peaks and troughs in concentrations), presence of non-nicotine substances in tobacco with dependence potential, and the behavioural and sensory aspects of product use (eg, the social elements of product use, the taste, and the smell).[3]

Concerns have been raised about the possibility of addiction to nicotine replacement therapy (NRT), especially nasal sprays, which have the fastest absorption and so are likely to be the most addictive of the medicinal formulations.[6] Nicotine gum, inhaler, and lozenge have similar pharmacokinetic profiles and also provide some degree of positive reinforcement, although much less than a cigarette. Nicotine gum does have some dependence liability and some people have difficulty stopping gum use.[6] Clinical trials of nicotine gum show prolonged use at 12 months after smoking cessation in 9-22% of users, and for nicotine nasal spray in 32-43% of individuals, although sustained

use from self purchased products is much lower.[6] Nicotine patches release nicotine slowly, producing little or no positive reinforcement, so dependence does not appear to be a problem with the use of these products.

Cancer

Nicotine is not a direct carcinogen; animal studies suggest that it may be a tumour promoter, but this has not been established in humans.[13] There is no evidence that medicinal nicotine is carcinogenic.[6]

Cardiovascular disease

Nicotine is a sympathomimetic drug that releases catecholamines, increases heart rate and cardiac contractility, constricts cutaneous and coronary blood vessels, transiently increases blood pressure, reduces sensitivity to insulin, may aggravate or precipitate diabetes, and may contribute to endothelial dysfunction.[13] It has been suggested that such effects on the cardiovascular system could promote atherogenesis and precipitate acute ischaemic events in people with coronary artery disease.[13] In a systematic review (15 trials, 11 074 participants), palpitations or chest pains occurred more frequently with NRT than with placebo (odds ratio 1.88, 95% confidence interval 1.37 to 2.57).[8] However, a meta-analysis of 35 clinical trials involving more than 9000 participants found no evidence of an increase in the incidence of acute cardiovascular events with the use of nicotine patches.[17]

Problems in pregnancy

Suspected adverse reproductive effects of nicotine include fetal neuro-teratogenicity.[13] If abstinence from nicotine is not possible in pregnancy, NRT is considered to be less hazardous than cigarette smoking.[6 13] However, the available data on the safety of NRT during pregnancy are limited, and more clinical trials and post-marketing surveillance studies are needed.[6]

Other unwanted effects of NRT

Unwanted effects of NRT include:

- Hiccoughs, gastrointestinal disturbances, jaw pain, and orodental problems with nicotine gum
- Throat irritation, coughing, and oral burning with inhalers
- Nasal irritation and runny nose with nasal sprays
- Hiccoughs and throat irritation with oral sprays
- Skin sensitivity and irritation with patches
- Hiccoughs, burning and smarting sensation in the mouth, sore throat, coughing, dry lips, and mouth ulcers with sublingual tablets.[8]

However, in general, the local effects of NRT tend to be mild and transient.[6]

Poisoning

Poisoning, which may be fatal, with nicotine has occurred either by deliberate suicidal intent or by accident, related to nicotine containing pesticides or young children eating cigarettes.[18 19] Poisoning related to electronic cigarettes involves the nicotine containing liquid used in the devices and can occur by ingestion, inhalation, or absorption through the skin or eyes.[9 19]

Symptoms of overdose of NRT are those of acute nicotine poisoning and include nausea, vomiting, increased salivation, abdominal pain, diarrhoea, respiratory failure, pallor, sweating, headache, dizziness, tremor, mental confusion, disturbed hearing or vision, and marked weakness. At high doses, these symptoms may be followed by hypotension, rapid or weak or irregular pulse, breathing difficulties, prostration, circulatory collapse, and general convulsions. NRT overdose may be fatal, especially in small children.[20 21]

Harm reduction with NRT

When nicotine is provided through NRT, the user avoids roughly 4000 other toxic substances that are inhaled with nicotine in tobacco smoke.[10] Nicotine levels in licensed nicotine containing products are much lower than in tobacco, and the way these products deliver nicotine makes them less addictive than smoking tobacco.[7] People can use one product on its own or a combination of different ones; for example, fast acting products (eg, gum, lozenge) deal better with immediate cravings, whereas long acting products (eg, patch) provide a steadier supply of nicotine.[7] Although nicotine itself has the potential to cause harm, it is very much less harmful than tobacco smoke, so while complete abstinence from nicotine is preferred, the risk to health from NRT use is smaller than the risk from continued smoking.[8] Nicotine medications act on nAChRs to mimic or replace the effects of nicotine from tobacco. They facilitate smoking cessation by relief of withdrawal symptoms, and positive reinforcement (particularly for rapid delivery formulations such as nasal spray and to a lesser extent gum, inhaler, and lozenge; less so for patches, which deliver nicotine gradually and produce sustained nicotine levels throughout the day). They also act by desensitising nicotinic receptors, so if a person lapses back to smoking while on NRT, the cigarette is less satisfying and the person is less likely to resume smoking.[13]

Licensed nicotine containing products have marketing authorisation for use as a smoking cessation aid and for tobacco harm reduction from a regulatory body (Medicines and Healthcare Products Regulatory Agency (MHRA) or European Medicines Agency (EMA)). Such authorisation provides assurance that they have been assessed for efficacy and safety and that they are manufactured to a consistent quality.[7] NRT products have been demonstrated in trials to be safe to use for at least five years, and even lifetime use of licensed nicotine containing products will be considerably less harmful than smoking.[7] The commercially available forms of NRT (gum, transdermal patch, nasal spray, inhaler, and sublingual tablets/lozenges) can help people who make a quit attempt to increase their chances of successfully stopping smoking. A systematic review (117 trials, 51 265 participants) assessed the outcome of smoking cessation at ≥6 months follow-up with NRT compared with placebo. It showed greater abstinence for any form of NRT relative to control (4704/27 258 (17%) *v* 2466/24 007 (10%); pooled risk ratio 1.60, 1.53 to 1.68).[8] When cutting down, using NRT products also helps avoid compensatory smoking (inhaling more deeply or smoking more of each cigarette to

compensate for smoking fewer cigarettes).[7] In another systematic review (9 trials, 3429 participants), there was a statistically significant effect of NRT on the likelihood of reducing cigarette use by 50% or more at least six months from baseline compared with placebo or unassisted reduction (226/1767 (13%) *v* 119/1662 (7%); 1.72, 1.41 to 2.10).[11]

Postulated positive effects of nicotine

People who smoke claim positive effects such as pleasure, arousal, relaxation and improved cognitive performance, as well as relief of negative affect, tension and anxiety.[14 16] To what extent these "rewards" of smoking are caused by the relief of symptoms of abstinence or by an intrinsic enhancement effect of nicotine is unclear.[14] Objective tests assessing choice reaction time, verbal memory, and spatial processing show no difference between smokers, non-smokers, and ex-smokers, so it can be concluded that nicotine has no clear performance enhancing effect.[22] Psychological wellbeing, measured using the general health questionnaire, is worse among smokers than never smokers or ex-smokers and a clear dose-response effect was demonstrated, with heavy smokers feeling worst of all.[22] Similarly, the malaise questionnaire showed progressively increasing unhappiness with the number of cigarettes smoked; malaise scores fell among those who gave up smoking, remained high in those who continued to smoke, and were highest of all in those taking up smoking.[22] These findings do not support the idea that smoking enhances mood or performance.[22]

Although systematic reviews have assessed nicotine as a treatment for Alzheimer's disease,[1] Parkinson's disease,[23] or schizophrenia,[15] trials have been small and the results inconclusive.

Ulcerative colitis is a chronic inflammatory disorder of the colon and is largely a disease of non-smokers and ex-smokers.[24] Anecdotal reports note that intermittent smokers may experience improvement in symptoms while smoking, and non-smokers with ulcerative colitis who begin smoking may go into remission.[24] In a systematic review, after 4-6 weeks of treatment, more people remitted with transdermal nicotine than with placebo (odds ratio 2.56, 1.02 to 6.45; 2 trials, 141 participants) but not when compared with standard therapy (oral prednisone or mesalamine: 0.90, 0.12 to 6.94; 3 trials, 129 participants).[24] Patients treated with nicotine were significantly more likely to withdraw due to adverse events, including light headedness, nausea, and contact dermatitis (5.82, 1.66 to 20.47).[24]

Conclusion

Nicotine is an addictive substance contained in cigarettes, smokeless tobacco, waterpipes, electronic cigarettes, and nicotine replacement therapy (NRT). The harmful effects of smoking are well known, but the specific effects of the nicotine are hard to disentangle from the effects of the many other harmful components of cigarette smoke. Nicotine's sympathomimetic activity affects heart rate and cardiac contractility, constricts cutaneous and coronary blood vessels, transiently increases blood pressure, reduces sensitivity to insulin, may aggravate or precipitate diabetes, and may contribute to endothelial dysfunction. Poisonings and deaths have been reported among people eating cigarettes; by ingestion, inhalation, or absorption through the skin or eyes of liquid from electronic cigarettes; or from overdosing on NRT. Licensed nicotine containing products are a safe and effective way of reducing the amount people smoke or helping them to quit smoking. Positive effects have been suggested for nicotine in ulcerative colitis when compared with placebo but not when compared with standard therapy, and more adverse effects were reported by those using nicotine. The evidence is insufficient to endorse any positive health effects of nicotine.

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ANSWERS TO ENDGAMES, p 38 For long answers go to the Education channel on thebmj.com

STATISTICAL QUESTION

One way analysis of variance: post hoc testing

Statements *b* and *c* are true, whereas *a* is false.

ANATOMY QUIZ

Magnetic resonance arteriography of the neck: time of flight sequence

A: Basilar artery
B: Right internal carotid artery
C: Right external carotid artery
D: Right common carotid artery
E: Right vertebral artery
F: Left common carotid artery bifurcation

PICTURE QUIZ

A collapse with hypertension and hypokalaemia

1 A large mass in the right hilar and posterior lower lobe with confluent hilar lymphadenopathy.
2 Cushing's syndrome secondary to ectopic production of adrenocorticotrophin by a primary tumour in the lung.
3 Ectopic secretion of adrenocorticotrophin leads to Cushing's syndrome and apparent mineralocorticoid excess.
4 Measurement of serum and urinary cortisol together with adrenocorticotrophin concentrations (both baseline values and after a low dose (and sometimes high dose) dexamethasone suppression test).
5 Definitive treatment of ectopic adrenocorticotrophin production is by resection of the causative tissue. However, as in this case, if resection is not possible, a multifaceted approach including metyrapone, electrolyte replacement, spironolactone or amiloride (or both), together with oncological input should be used.