GUIDELINES

Diagnosis and management of idiopathic childhood constipation: summary of NICE guidance

Lauren Bardisa-Ezcurra,1 Roz Ullman, Jenny Gordon,2 on behalf of the Guideline Development Group

Constipation is described as “the subjective complaint of passage of abnormally delayed or infrequent passage of dry, hardened faeces, often accompanied by straining and/or pain.”

Constipation is common in childhood, is rarely life threatening, and therefore might be expected to have little effect on healthcare provision. The reality is somewhat different, however. Symptoms become chronic in more than a third of patients, causing great discomfort, and many children need medical treatment and nursing care.1-2 Lack of understanding about the condition, delayed diagnosis, and suboptimal treatment and support contribute to ongoing symptoms and multiple medical consultations.3 Social costs include children missing school, being excluded from peer group activities, and feeling that they cannot tell their friends about their condition. This article summarises the most recent recommendations from the National Institute for Health and Clinical Excellence (NICE) on the care and management of children and young people with idiopathic constipation.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 bmj.com.

**Establishing the presence of constipation**

Establish whether constipation is present during history taking. Two or more of the following findings indicate constipation:

- Children under 1 year: fewer than three complete stools a week (fig 1; this does not apply to exclusively breast fed babies after 6 weeks of age), hard large stools, “rabbit droppings” or “nuts” (type 1, fig 1), distress on defecating, bleeding associated with hard stools, straining, previous episode(s) of constipation, and previous or current anal fissure.

- Children or young people over 1 year: fewer than three complete stools per week (see Bristol stool form scale), overflow soiling, rabbit droppings or nuts (fig 1), large infrequent stools that can block the toilet, poor appetite that improves with passage of a large stool, waxing and waning of abdominal pain with passage of stools, evidence of retentive posturing, anal pain, previous episode(s) of constipation, previous or current anal fissure, painful bowel movements, and bleeding associated with hard stools.

**Diagnosing idiopathic constipation**

If the child or young person has constipation take a history and exclude underlying causes.

- “Red flag” findings and diagnostic clues to an underlying condition: constipation reported from birth or first few weeks of life, failure to pass meconium or delay in passing meconium (more than 48 hours after birth in term baby), long narrow ribbon-like stools (more likely in a child under 1 year), previously unknown or undiagnosed weakness in legs, locomotor delay, and abdominal distension with vomiting.

- Diagnostic clues to idiopathic constipation: constipation that starts after a few weeks of life with obvious precipitating factors (fissure, change of diet, or infections in children under 1 year; fissure, change of diet, timing of potty or toilet training, and an acute event such as infection, moving house, starting nursery or school, fears and phobias, major change in family, taking medicine in children over 1 year); normal passage of meconium (within 48 hours after birth in term baby); child generally well, with normal weight and height; no neurological problems in legs; normal locomotor development; history of poor diet or insufficient fluid intake (or both); and changes in infant formula or weaning in child under 1 year.

Perform a physical examination and exclude underlying causes.

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**Table:**

| Type 1 | Separate hard lumps, like nuts (hard to pass) |
| Type 2 | Sausage shaped but lumpy |
| Type 3 | Like a sausage but with cracks on its surface |
| Type 4 | Like a sausage or snake, smooth and soft |
| Type 5 | Soft blobs with clear cut edges (passed easily) |
| Type 6 | Fluffy pieces with ragged edges, a mushy stool |
| Type 7 | Watery, no solid pieces; entirely liquid |

**Fig 1** Bristol stool form scale. Adapted, with permission, from the NICE guidelines."
Laxatives

**Recommended doses (all drugs listed below are given by mouth unless stated otherwise)**

### Macrogols

<table>
<thead>
<tr>
<th>Macrogol</th>
<th>Paediatric formula</th>
<th>Adults formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol 3350 + electrolytes</td>
<td>Oral powder, Macrogol 3350 (polyethylene glycol 3350) 6.563 g, sodium bicarbonate 89.3 mg, sodium chloride 175.4 mg, potassium chloride 25.1 mg in each sachet (unflavoured)</td>
<td>Oral powder, Macrogol 3350 (polyethylene glycol 3350) 13.125 g, sodium bicarbonate 178.5 mg, sodium chloride 350.7 mg, potassium chloride 46.6 mg in each sachet (unflavoured)</td>
</tr>
</tbody>
</table>

### Osmotic laxatives

| Lactulose | Bisacodyl
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Non-BNF recommended doses</td>
<td>Non-BNF recommended doses</td>
</tr>
<tr>
<td>Elixir (5 mg/5 ml)</td>
<td>By mouth</td>
</tr>
<tr>
<td>• Child 1 month to 1 year: 2.5 ml twice daily, adjusted according to response</td>
<td>• Child/young person 5–18 years: 1–3 sachets daily in divided doses adjusted according to response; maintenance, 1–2 sachets daily</td>
</tr>
<tr>
<td>• Child 1–5 years: 2.5–10 ml twice daily, adjusted according to response (non-BNF recommended dose)</td>
<td>• Child/young person 12–18 years: 1–4 tablets once daily</td>
</tr>
<tr>
<td>• Child/young person 5–18 years: 5–20 ml twice daily, adjusted according to response (non-BNF recommended dose)</td>
<td>• Child/young person 4–18 years: 2.5–20 mg once a day</td>
</tr>
</tbody>
</table>

### Stimulant laxatives

| Senna | Docusate sodium
<table>
<thead>
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<tbody>
<tr>
<td>Non-proprietary</td>
<td>Non-proprietary</td>
</tr>
<tr>
<td>Senna syrup (7.5 mg/5 ml)</td>
<td>By rectum (suppositories)</td>
</tr>
<tr>
<td>• Child 1 month to 4 years: 2.5–10 ml once daily</td>
<td>• Child/young person 2–18 years: 5–20 mg once daily</td>
</tr>
<tr>
<td>• Child/young person 4–18 years: 2.5–20 ml once daily</td>
<td>• Child/young person 6–18 years: 1–4 ml tablets once daily</td>
</tr>
</tbody>
</table>

### Polyethylene glycol

- **Child 6 months–2 years:** 12.5 mg three times daily (use paediatric oral solution)
- **Child 2–12 years:** 12.5–25 mg three times daily (use paediatric oral solution)

### Perles

- **Child 1 month to 1 year:** ½ to 1 sachet daily (non-BNF recommended dose)
- **Child 1–6 years:** 1 sachet daily, adjust dose to produce regular soft stools (maximum 4 sachets daily) (for children under 2, non-BNF dose)
- **Child 6–12 years:** 2 sachets daily; adjust dose to produce regular soft stools (maximum 4 sachets daily)

### Dulcolax tablets

- **Child 6 months–2 years:** 12.5 mg three times daily (use paediatric oral solution)

### Dulcolax perles

- **Child 1 month to 1 year:** ½ to 1 perles daily (non-BNF recommended dose)

### Ongoing maintenance

- **Child under 1 year:** ½ to 1 sachet daily (non-BNF recommended dose)
- **Child 1–6 years:** 1 sachet daily, adjust dose to produce regular soft stools (maximum 4 sachets daily) (for children under 2, non-BNF dose)
- **Child 6–12 years:** 2 sachets daily; adjust dose to produce regular soft stools (maximum 4 sachets daily)

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**Fig 2** | **Recommended doses of laxatives for the treatment of idiopathic constipation in children**

- **Red flag findings and diagnostic clues to an underlying condition:** abnormal appearance, position, or patency of anus (fistulas, bruising, multiple fissures, tight or patulous anus, anteriorly placed anus, absent anal wink); gross abdominal distension; asymmetry or flattening of the gluteal muscles; evidence of sacral agenesis; discoloured skin, naevi, or sinuses; hairy patch; lipoma; central pit (dimple that you cannot see the bottom of); scoliosis; deformity in lower limbs, such as talipes; abnormal neuromuscular signs in lower limbs not explained by any existing condition (such as cerebral palsy); and abnormal lower limb reflexes.

- **Diagnostic clues to idiopathic constipation:** normal appearance of anus and surrounding area, soft flat abdomen or distension that can be explained because of age or excess weight, normal appearance of the skin and anatomical structures of lumbarosacral and glutal regions, normal gait, normal tone and strength in lower limbs, and normal lower limb reflexes (perform only if red flags in history or examination suggest new onset neurological impairment).

If any red flag findings are present, do not treat for constipation. Instead, refer urgently to a healthcare professional with experience in the specific aspect of child health that is causing concern.

Do not perform a digital rectal examination unless you are a healthcare professional competent to interpret features of anatomical abnormalities.

In the absence of red flags, inform the child or young person and his or her parents or carers of a positive diagnosis of idiopathic constipation and also that underlying causes have been excluded by the history and physical examination. Reassure them that a suitable treatment is available, but that it may take several months for the condition to resolve.

**Treatment of faecal impaction (disimpaction)**

Assess all children with idiopathic constipation for faecal impaction, including those who were referred to the relevant services because of red flags but who had no findings of concern on further investigation. Use both history taking and physical examination to diagnose faecal impaction—looking for overflow soiling, faecal mass palpable abdominally, and, if indicated, rectally. The presence of one or both of these on physical examination together with the history is indicative of impaction.

If indicated, offer this oral regimen for disimpaction:

- **Polyethylene glycol 3350 plus electrolytes (which may be mixed with a cold drink), using an escalating dose regimen (see fig 2) as first line treatment.**
  - **Child 1 month to 1 year:** ½ to 1 sachet daily (non-BNF dose)
  - **Child 1–6 years:** 1–4 tablets daily (non-BNF dose)
  - **Child 6–12 years:** 2 tablets daily; adjust dose to produce regular soft stools (maximum 4 tablets daily)
  - **Child 12–18 years:** up to 500 mg daily in divided doses

If this does not lead to disimpaction after two weeks, add a stimulant laxative.

- **If the first line treatment is not tolerated, substitute a stimulant laxative singly or with an osmotic laxative such as lactulose (fig 2).**
- **Inform families that treatment can initially increase symptoms of soiling and abdominal pain.**

**Ongoing maintenance treatment**

Offer the following treatments:

- **Polyethylene glycol 3350 plus electrolytes (fig 2) as the first line treatment; adjust the dose according to symptoms and response.**

- **If this does not work, add a stimulant laxative (fig 2).**
  - **If the first line treatment is not tolerated, substitute a stimulant laxative. Add another laxative such as lactulose or docusate (fig 2) if stools are hard.**

- **Continue laxatives at maintenance dose for several weeks after regular bowel habit is established.**
this may take several months. Children who are undergoing toilet training should remain on laxatives until toilet training is well established.

- Do not stop laxatives abruptly: gradually reduce the dose over a period of months in response to stool consistency and frequency. Some children and young people may require laxatives for several years.

Diet and lifestyle interventions
Do not use dietary interventions alone as first line treatment for idiopathic constipation.

- Treat with laxatives and a combination of the following:
  - Negotiated and non-punitive behavioural interventions suited to the child’s stage of development. These could include scheduled toileting and support to establish a regular bowel habit, maintenance and discussion of a bowel diary, information on constipation, and use of encouragement and reward systems.
  - Dietary modifications to ensure a balanced diet and a sufficient intake of fluids.

Information and support
Offer children and young people and their families a point of contact with specialist healthcare professionals, including school nurses, who can give ongoing support.

Overcoming barriers
Improving awareness and understanding among healthcare professionals, children with constipation, and their families about the condition and its management will reduce misconceptions and negativity about diagnosis and treatment. An emphasis on recommended regimens for disimpaction and maintenance, how to reduce medication, and simple behaviour and lifestyle interventions, together with a reduction in the use of invasive investigations and interventions, will help to improve outcomes, reduce discomfort, and refocus on the positive results of optimal treatment and care.

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Key points
Simply giving patients advice to change is often unrewarding and ineffective
Motivational interviewing uses a guiding style to engage with patients, clarify their strengths and aspirations, evoke their own motivations for change, and promote autonomy in decision making
You can learn motivational interviewing in three steps: practise a guiding rather than directing style; develop strategies to elicit the patient’s own motivation to change; and refine your listening skills and respond by encouraging change talk from the patient
Motivational interviewing has been shown to promote behaviour change in various healthcare settings and can improve the doctor-patient relationship and the efficiency of the consultation

Outperformed traditional advice giving in 80% of studies.

With practice, time can be saved by avoiding unproductive discussion and by using rapid engagement to focus on the changes that make a difference.

COMPETENT NOVICE
Motivational interviewing

Stephen Rollnick,1 Christopher C Butler,1 Paul Kinnersley,1 John Gregory,2 Bob Mash3

Motivational interviewing has been shown to promote behaviour change in a wide range of healthcare settings

Discussion about change occurs in almost every branch of medicine, and goes beyond the “big four” lifestyle habits (smoking, excessive drinking, lack of exercise, and unhealthy diet), to also include the use of aids, devices, or medicines. Patients often seem ambivalent or unmotivated, and clinicians typically try to advise them to change, using a directing style, which in turn generates resistance or passivity in the patient (see box 1).

Motivational interviewing is an alternative approach to discussing behaviour change that fosters a constructive doctor-patient relationship and leads to better outcomes for patients.

Motivational interviewing involves helping patients to say why and how they might change, and is based on the use of a guiding style. A recent systematic review that included 72 studies found that motivational interviewing outperformed traditional advice giving in 80% of studies. With practice, time can be saved by avoiding unproductive discussion and by using rapid engagement to focus on the changes that make a difference.
Box 1: Contrasting styles

Directing style: "OK, so your weight is putting your health at serous risk. You already have early diabetes. (Patient often resists at this point.) . . . Overweight is conceptually very simple, if you think about it. Too much in, not enough out. So you need to eat less and exercise more. There no way you can get around that simple fact." (Patient replies with a "yes, but . . ." argument.)

Guiding style: "OK, let’s have a look at this together and see what you think. From my side, losing some weight and getting more exercise will help your diabetes and your health, but what feels right for you? (Patient often expresses ambivalence at this point.) . . . So you can see the value of these things, but you struggle to see how you can succeed at this point in time. OK. It’s up to you to decide when and how to make any changes. I wonder, what sort of small changes might make sense to you?" (Patient says how change might be possible.)

How best to do it

Step 1: practise the guiding style

Among the broad communication styles commonly used to address patients’ problems are directing, guiding, and following. Although each is appropriate to certain situations in everyday practice, a guiding style is best suited to consultations about change. When this topic comes up, shift your stance from that of a director to that of a well informed guide, and follow three principles: engage with and work in collaboration with patients, emphasise their autonomy over decision making, and elicit their motivation for change. You retain control over the direction and structure of the consultation and provide information as needed, but you ensure that your patients retain responsibility for change. Box 1 shows the contrast in styles between directing and guiding.

Use three core skills—asking, listening, and informing—in the service of this guiding style to draw out your patients’ ideas and solutions. This shows that you want to know about and respect their ability to make sound decisions.

• “Ask” open ended questions—invite the patient to consider how and why they might change;
• “Listen” to understand your patient’s experience—“capture” their account with brief summaries or reflective listening statements such as “quitting smoking feels beyond you at the moment”; these express empathy, encourage the patient to elaborate, and are often the best way to respond to resistance;
• “Inform”—by asking permission to provide information, and then asking what the implications might be for the patient.

Once you have practised these three skills, and once you feel comfortable with the shift from director to guide, you can add to your toolbox a set of strategies containing specific questions that are suited to different circumstances.

Step 2: add useful strategies to your toolbox

Motivational interviewing aims to elicit the motivation to change from the patient, rather than to try to instil this in them; it also aims to work with their strengths rather than just talk about problems and weaknesses. Different strategies are available to achieve these aims in a guiding style, eliciting the what, why, and how of change from the patient. This “menu of strategies” has been used successfully among college students to reduce use of alcohol, tobacco, and cannabis.5

Agenda setting (what to change?)

Patients often face more than one option for change. In agenda setting, rather than impose your priority on patients, you conduct an overview by inviting them to select an issue or behaviour that they are most ready and able to tackle, feeling free also to express your own views.2 For example, to reach agreement about what to deal with in the consultation you might say: “That’s very helpful. Are you more ready to focus on eating or on increased activity? Or is there some other topic that you would prefer to talk about? I’d like to talk about those test results at some point, but what makes sense to you right now?”

Pros and cons (why change?)

It is normal and common for patients to feel in two minds about both the status quo and change. It can be helpful to invite them to say how they see the pros and cons of a situation. Then your next step is to ask them to clarify whether change is a possibility (box 2).

Assess importance (why) and confidence (how)

To be efficient you need to spend time where it is most needed. Those who are not convinced of the importance of change are unlikely to benefit from advice about how to change, and a focus on the why of change is pointless if the main issue is how to achieve it. This focused strategy (box 3) has produced successful outcomes in the smoking field, where a recent review also provides support for the efficacy of motivational interviewing.1

Exchange information

One of the first successful studies of motivational interviewing placed listening at the centre during feedback of test results.4 This gave rise to the “elicit-provide-elicit” strategy (box 4), in which a guiding style is used to encourage patients to clarify the personal implications of information that you provide.

Box 2 | Seeing the pros and cons

“I want to try to understand your smoking better from your perspective, both the benefits for you and the drawbacks. Can I ask you firstly what you like about your smoking?” (Patient responds. Use your curiosity to elicit a good understanding.)

“How can I ask you what you don’t like about your smoking?” (Patient responds. Remember it’s their experience that counts, so avoid offering your perspective for the time being.)

(Then you summarise both sides, as briefly as possible, capturing the words and phrases that the patient came up with.) “OK, so let’s see if I have this right? You like the fact that smoking helps you unwind and, addicted or not, you like that first smoke in the morning. On the other hand, your main concern is about its effect on your health. Is that about right? OK.”

(Then you invite the patient to consider the next step.) “So where does that leave you now?” (Patient usually describes readiness and any need for advice or information.)

Box 3 | Assessing importance and confidence

“Would you mind if we took a moment to see exactly how you feel about using these tablets?” (An invitation promotes collaboration and patient autonomy.)

“How important is taking this medicine for you right now?” (Elicit a brief review of patient’s feelings, fears, and aspirations, then ask) “How confident do you feel about taking these tablets regularly?” (Elicit, and then summarise patient’s view of importance and confidence.)

(Then tailor your next step accordingly—for example, if importance is low, consider something like) “Well, do you mind if I just give you some information about how these tablets might help, but it will be up to you to decide in the end.” (Emphasising autonomy always helps.)
Make decisions about change (setting goals)

Goals and targets for change that come only from your side are often met with “Yes, but…” explanations about why they will not work from the patient. Box 5 shows how you can, if the patient is ready for it, use a guiding style to elicit practical solutions from the patient and offer suggestions from your side as well.

Step 3: respond skilfully to patients’ language

You can refine your skills further by paying attention to the language that patients use. You will notice that they talk about why or how they might change (this is called change talk)—“I guess I should take my medicine more regularly”; “I want to quit smoking”; “I am going to eat less fried food”—or about the opposite: “I don’t like tablets”; “I enjoy my smoking”; “I’ve never succeed in losing weight.” You can choose whether to elicit change talk or not. The assumption is that if you do, motivation to change will be enhanced, and subsequent change is more likely to take place. Box 6 shows how a doctor elicits change talk and responds to it with further listening. Many of the questions shown in step 2 are useful because they elicit change talk—for example, “How important is it for you to take this medicine?”

One line of research has been to examine whether motivational interviewing improves outcomes. A recent meta-analysis of 119 studies concluded that it exerts a small but positive effect across a wide range of problem domains, but not in all. Another line of research has been to study language and change talk. For example, if people struggling with alcohol and other drugs offer more change talk in counselling, their outcomes in regard to substance use are better; moreover, practitioners who are competent in motivational interviewing elicit more change talk, independent of the motivation of the patient.

What are the challenges?

Any skilful task in medicine takes time to learn. Training, supervision, and feedback on performance will allow you to save time by using efficient questions suited to your personality, the patient, and the setting (see box 6). Motivational interviewing has been shown to be effective in settings where time constraints are paramount, like accident and emergency departments.

The biggest challenge is usually with the shift in style and attitude involved. This includes letting go of what has been called the “righting reflex,” the tendency to identify a problem and solve it for the patient (see box 1), and instead, enabling the patient to do this work for themselves. This can leave you feeling that you will lose control of the consultation. We suggest that you retain control of the overall direction of the consultation, and hand over to the patient control about the what, why, and how of change. You certainly can and should offer your views and expertise, but within a style that is collaborative and emphasises the patient’s freedom to make any final decision.

Conclusion

Motivational interviewing is not a quick fix method, let alone a set of clever techniques for getting patients to do what they otherwise would not want to do. It is not done
“to” or “on” patients, but “with” or “for” them. It can be used in any consultation about change, and evidence of its effectiveness is growing. It is helpful to consider your patient as your teacher. If he or she responds positively, and becomes an active participant in talk about change, this feedback tells you that you are doing a good job.

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10 MINUTE CONSULTATION

Vitamin B-12 deficiency

Ben Hudson

An 85 year old man had a preoperative assessment for a knee replacement. His full blood count was normal apart from haemoglobin 95 g/l and mean corpuscular volume 105 fl. He drank no alcohol. Further testing showed that his vitamin B-12 was low: 90 pmol/l (reference range 160-800 pmol/l). Folate, ferritin, thyroid stimulating hormone, and liver function tests were normal. He had no other medical or surgical history and ate a balanced diet that includes meat.

Vitamin B-12 is found only in foods of animal origin. Dietary B-12 is freed from food protein by pepsin in the stomach and becomes an active participant in the creation of vitamin B-12. Vitamin B-12 is absorbed across the ileal absorptive surface of the gastrointestinal tract. The recommended daily allowance of B-12 is small (2 μg per day) in comparison to body stores (2-5 mg).

What you should cover

Assess clinical evidence of B-12 deficiency

Symptoms of B-12 deficiency include neurological changes such as paraesthesia, numbness, ataxia, and memory loss. Oropharyngeal ulceration and glossitis may occur.

Review the medical history and drugs for possible causes (figure). If suggested by the history, examine for impaired vibration, touch, pain, and position sense and for ataxia.

Review the results of blood testing for macrocytic anaemia and neutrophil hypersegmentation, which indicate B-12 deficiency. Patients may present with neurological changes of B-12 deficiency but with marginal or no haematological abnormalities. Coexisting iron deficiency may prevent the development of macrocytosis in a B-12 deficient patient; if iron deficiency is suspected then check ferritin.

At the BMJ, we welcome contributions from GPs

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Previous articles in this series

- Stridor in children (BMJ 2010;340:c193)
- “My baby keeps bringing up his feeds!” (BMJ 2010;340:c189)
- Hoarse voice (BMJ 2010;340:c522)
- Sexual health consultation for men who have sex with men (BMJ 2010;340:c958)
- Acute cough in adults (BMJ 2010;340:c574)

INFORMATION FOR PATIENTS

Vitamin B-12 deficiency anaemia—information and resources on the Patient UK website (www.patient.co.uk/health/Anaemia-(Pernicious)-and-Vitamin-B12-Deficiency.htm).

Pernicious Anaemia Society—international society providing information, help, and support (www.pernicious-anaemia-society.org)

FURTHER READING


Hvas AM, Nexo E. Diagnosis and treatment of vitamin B12 deficiency—an update. Haematologica 2006;91:1506-12.
Myelodysplasia may present with macrocytosis and should be suspected if macrocytosis is accompanied by other haematological abnormalities, such as neutropenia, monocytosis, thrombocytopenia, or thrombocytosis. A blood film should be requested and a haematology referral made. Myeloma may also present with macrocytosis and should be considered when bone pain, recurrent infection, or hypercalcaemia are present; serum electrophoresis should be requested.

**What you should do**

**Decide whether your patient has clinical B-12 deficiency**

Interpreting B-12 levels is difficult. Concentrations of B-12 vary greatly between individuals and agreement between different commercial assays is poor; patients with clinical deficiency may have “normal” results on some assays and low results on others. Correlation between B-12 concentration and response to B-12 replacement is poor, so although a normal result does not rule out clinical deficiency, a low result does not necessarily indicate the need for treatment. Pregnancy and oral contraceptives can cause low B-12 levels without true deficiency, and patients with underlying haematological disorders may have artificially high levels (myeloproliferative disorders) or low levels (myeloma, severe neutropenia) that do not reflect true stores. Where there is neurological or haematological abnormality and low or borderline low B-12, give a course of treatment and reconsider ongoing replacement if there is no response.

**Consider the cause**

The first step in clarifying the cause of B-12 deficiency is to check for pernicious anaemia (figure). Intrinsic factor antibodies are highly specific (nearly 100%) but poorly sensitive (about 60%) for pernicious anaemia. Parietal cell antibodies lack specificity, so are less useful. The value of testing where there is a probable cause (gastric surgery or dietary deficiency, for example), or in elderly patients with clear B-12 deficiency, is debated, as treatment is the same regardless of the underlying cause. The Schilling test is no longer widely available.

**Assessing vitamin B-12 deficiency**

- **Macrocytosis or neurological symptoms raise the possibility of B-12 deficiency**
  - **Measure B-12 concentration**
    - **B-12 normal or high (B-12 deficiency unlikely): seek other causes for macrocytosis or symptoms**
    - **B-12 low or borderline low: check intrinsic factor**
      - **Intrinsic factor positive: confirms pernicious anaemia**
      - **Intrinsic factor negative: consider other causes**
      - **Patient pregnant and B-12 low: discuss with haematologist**
      - **Drug induced (proton pump inhibitors, H2 receptor agonists, metformin); chronic alcoholism**
      - **Dietary (strict vegan)**
      - **Biological competition (bacterial overgrowth, fish tapeworm infestation)**
    - **Treat B-12 deficiency and assess response**

**Consider referral**

Refer to a gastroenterologist if malabsorption due to inflammatory bowel disease or coeliac disease is suspected. Pregnant women with B-12 deficiency need urgent haematology advice, as interpreting B-12 levels in pregnancy is particularly difficult and B-12 deficiency is associated with pregnancy complications and birth defects.

**Treatment**

Hydroxocobalamin 1 mg by intramuscular injection three times a week for two weeks and then every three months.

**Monitoring**

Check a full blood count at eight weeks to confirm a return to normal haemoglobin values and cell volume. In anaemia needing urgent confirmation that the cause is B-12 deficiency, a reticulocyte count one week after start of treatment will be markedly raised if B-12 deficiency is the cause. Further monitoring is not needed after haematological or symptom response.

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

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**Endpiece**

“Big pharma”

“The young physician starts life with 20 drugs for each disease, and the old physician ends life with one drug for 20 diseases.”

Sir William Osler (1849-1919), Canadian born British physician and educator

Submitted by Thomas Ford, core medical trainee year 1, Royal Infirmary of Edinburgh, Edinburgh

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