SYSTEMATIC REVIEW

Guide to managing persistent upper gastrointestinal symptoms during and after treatment for cancer

H Jervoise N Andreyev,1 Ann C Muls,1 Clare Shaw,1 Richard R Jackson,1 Caroline Gee,1 Susan Vyoral,1 Andrew R Davies2

ABSTRACT

Background Guidance: the practical management of the gastrointestinal symptoms of pelvic radiation disease was published in 2014 for a multidisciplinary audience. Following this, a companion guide to managing upper gastrointestinal (GI) consequences was developed.

Aims The development and peer review of an algorithm which could be accessible to all types of clinicians working with patients experiencing upper GI symptoms following cancer treatment.

Methods Experts who manage patients with upper GI symptoms were asked to review the guide, rating each section for agreement with the recommended measures and suggesting amendments if necessary. Specific comments were discussed and incorporated as appropriate, and this process was repeated for a second round of review.

Results 21 gastroenterologists, 11 upper GI surgeons, 9 specialist dietitians, 8 clinical nurse specialists, 5 clinical oncologists, 3 medical oncologists and 4 others participated in the review. Consensus (defined prospectively as 60% or more panellists selecting ‘strongly agree’ or ‘agree’) was reached for all of the original 31 sections in the guide, with a median of 90%. 85% of panellists agreed that the guide was acceptable for publication or acceptable with minor revisions. 56 of the original 61 panellists participated in round 2. 93% agreed it was acceptable for publication after the first revision. Further minor amendments were made in response to round 2.

Conclusions Feedback from the panel of experts developed the guide with improvement of occasional algorithmic steps, a more user-friendly layout, clearer time frames for referral to other teams and addition of procedures to the appendix.

INTRODUCTION

This guide is designed for all clinicians who look after people who have been treated for upper gastrointestinal (GI) cancer. It is also designed for patients who are experiencing upper GI symptoms following any cancer treatment. Some of these will be doctors, others may be senior nurses and increasingly, other allied health professionals.

Some lower GI symptoms are also included because these are common after treatment for upper GI cancers. However, for more detailed advice about managing lower GI symptoms please refer to Guidance: The practical management of the gastrointestinal symptoms of pelvic radiation disease.1

The GI consequences of chemotherapy, radiotherapy and resectional surgery are not that different. Historically, clinicians have associated specific clusters of symptoms with typical diagnoses especially in patients who have been treated for upper GI and hepatopancreatobiliary cancer. Research increasingly suggests that specific symptoms are not reliable indicators of the underlying cause, hence, this algorithmic approach.

This guide defines best practice although not every investigation modality or treatment may be available in every hospital.

Those using the guide, especially if non-medically qualified, should identify a senior gastroenterologist or other appropriately qualified and experienced professionals whom they can approach easily for advice if they are practicing in an unsupervised clinic.

Practitioners should not use this guide outside the scope of their competency.
and must identify from whom they will seek advice about abnormal test results which they do not fully understand before using the guide.

Specific therapies are usually not listed by name but as a ‘class’ of potential drugs as different clinicians may have local constraints or preferences as to the medications available.

Arranging all first line suggested investigations required by the symptom(s) at the first consultation reduces follow-up and allows directed treatment of all causes of symptoms at the earliest opportunity. Timely review of requested investigations is required so that further investigations can be requested if required. If worrying symptoms are elicited or potentially abnormal findings are present on clinical examination, then the order of investigations suggested in the algorithm may no longer be appropriate.

Practitioners seeing these patients are encouraged to consider providing patients with symptom questionnaires including nutritional screening questions to complete before or during the consultation as this may help improve the choice of investigations and identify when referral is required.

This guide has three parts:
1. An introduction, instructions how to use the algorithm, guide to blood tests and taking a history.
2. An algorithm detailing the individual investigations and treatment of each of the 28 GI symptoms.
3. Appendices with brief descriptions of the diagnosis, treatment and management techniques available.

HOW TO USE THE ALGORITHM
1. Up to 28 symptoms have been described in this patient group.
2. Each symptom may have more than one contributing cause.
3. Symptoms must be investigated systematically otherwise causes will be missed.
4. Identify the symptoms by systematic history taking.
5. Examine the patient appropriately.
6. Use the algorithm to plan investigations.
7. Most patients have more than one symptom and investigations need to be requested for each symptom.
8. Usually all investigations are requested at the same time and the patient reviewed with all the results.
9. When investigations should be ordered sequentially, the algorithm indicates this by stating first line, second line, etc.
10. Treatment options are generally offered sequentially but clinical judgement should be used.

GUIDE TO USING BLOOD TESTS
Routine blood tests include: full blood count, urea and electrolytes, liver function, glucose, calcium (Table 1).

Additional blood tests are indicated depending on the presenting GI symptoms and differential diagnoses as outlined in the algorithm (Table 2).

Table 1 Routine blood tests: responding to results

| Anaemic and symptomatic          | Consider blood transfusion (checking ferritin, transferrin saturation, RBC folate and vitamin B12 before transfusion). |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------|
|                                  | If iron deficient: consider iron supplements and coeliac screen (te tissue transfuglaminase and IgA levels), OGD, SI biopsy, colonoscopy and renal tract evaluation. |
| Anaemic but not symptomatic      | Check ferritin, transferrin saturation, RBC folate and vitamin B12. Replace if necessary, monitor response. If unexplained consider coeliac screen, OGD, SI biopsy and colonoscopy and renal tract evaluation. |
| Abnormal urea, electrolytes      | Urine dipstick.                                                                                                       |
|                                  | Discuss with supervising clinician within 24 hours.                                                                               |
|                                  | Consider appropriate intravenous fluid therapy/oral replacement.                                                                    |
|                                  | If K+ <3 mmol/L or >6 mmol/L, this is an emergency.                                                                               |
|                                  | If Na+ <120 or >150 mmol/L, this is an emergency.                                                                                   |
| Abnormal liver function tests    | Discuss with supervising clinician within 24 hours.                                                                               |
| (new onset)                      | Check thyroid function                                                                                                          |
|                                  | Patient will need a liver ultrasound and liver screen including hepatitis A, B, C and E serology, EBV and CMV, ferritin, adult protein, α 1 antitrypsin, coeliac serology, liver autoantibodies, total lgs, cholesterol, triglycerides, caeruleplasmin (<50 years old only). |
| Abnormal liver function tests    | Refer for further evaluation to a hepatologist.                                                                               |
| (long standing)                  |                                                                                                                                    |
| Abnormal glucose level           | If no history of diabetes:                                                                                                        |
|                                  | Between 7–11 mmol/L: refer to GP.                                                                                                 |
|                                  | >11 mmol/L and ketones in urine: this is an emergency.                                                                                |
|                                  | >11–20 mmol and no ketones in urine: discuss with supervising clinician within 24 hours.                                          |
|                                  | >20 mmol/L and no ketones in urine: this is an emergency.                                                                             |
|                                  | If known diabetic: Do not check glucose levels.                                                                                    |
|                                  | Consider checking glycosylated haemoglobin (HbA1C). adamthese                                                                 |
| Abnormal corrected calcium level  | If 2.6–2.9 mmol/L: discuss with supervising clinician within 24 hours.                                                               |
|                                  | If <1.8 mmol/L or >3.0 mmol/L: this is an emergency.                                                                                |
|                                  | Check parathyroid hormone levels.                                                                                                 |

CMV, cytomegalovirus; EBV, Epstein-Barr virus; GP, general practitioner; K, potassium; Na, sodium; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); RBC, red blood cell; SI, small intestine.

Andreyev HJN, et al. Frontline Gastroenterology 2017;8:295–323. doi:10.1136/flgastro-2016-100714
Severe acute abdominal pain

Table 2  Additional blood tests: responding to results

| Condition                                      | Actions/Considerations                                                                 |
|------------------------------------------------|----------------------------------------------------------------------------------------|
| Elevated ESR/CRP                              | Consider the following possibilities: - Infection. - Inflammation (including IBD). - Recurrent malignancy. - Non-GI causes (eg, rheumatoid arthritis, vasculitis, connective tissue disorders). |
| RBC folate deficiency                         | Consider referral to dietitian for dietary advice/supplementation.                      |
| Iron deficiency: ferritin, % transferrin       | If iron is low and iron saturation is low, discuss with supervising clinician and oncology team within 2 weeks. |
| saturation, red cell indices                   | If intolerant of oral iron: consider intravenous iron infusion.                        |
| If excess iron-raised ferritin with transferrin| Consider haemochromatosis: Discuss with supervising clinician and consider genetic testing. |
| saturation>45%                                  |                                                                                       |
| Low vitamin B12                                | Exclude the possibility of inadequate dietary intake (especially vegans)—if this is the probable cause, consider trial of oral vitamin B12 supplements. Dietetic referral. |
|                                               | Consider possibility of pernicious anaemia—check parietal cell and intrinsic factor antibodies. |
|                                               | Exclude SIBO (p. 27). Recheck result after treatment with antibiotics.                  |
|                                               | Check coeliac screen.                                                                   |
|                                               | If confirmed on repeat testing and not treatable with oral replacement, eg, after gastrectomy, ask GP to arrange lifelong intramuscular replacement. |
|                                               | Metformin therapy.                                                                     |
| Abnormal thyroid function tests                | If TSH suppressed (<0.5 mIU/L), recheck result with thyroid auto antibodies.           |
|                                               | If TSH suppression confirmed, request GP to organise/refer for radiological imaging and treatment. |
|                                               | If TSH elevated (>4.0 mIU/L), recheck result. Also check 09:00 cortisol if Na ≤135 mmol/L and K+ >4 mmol/L or raised urea or creatinine. |
|                                               | If TSH elevation confirmed: start thyroid replacement medication. Request GP to monitor long-term. Review bowel function after 6–8 weeks. |
| Abnormal coeliac serology                      | If IgA deficient, request IgG coeliac screen.                                           |
|                                               | If TTG elevated, confirm with SI biopsy.                                                |
|                                               | Refer for dietetic advice once diagnosis is confirmed.                                  |
|                                               | Refer to coeliac clinic.                                                                |
| Serum Mg2+                                     | If <0.3 mmol/L, this is an emergency.                                                  |
|                                               | Check K+ and Ca2+, if low, will also need replacement.                                  |
|                                               | If 0.3–0.5, consider intravenous replacement if symptomatic or fall in Mg2 level has been acute. If oral replacement is given, check for response after 5–7 days with repeat blood tests. |
|                                               | If oral replacement is used, Mg Oxide or Mg aspartate provide better bioavailability and cause less diarrhoea than other Mg preparations. |
|                                               | If associated with refeeding syndrome, also monitor PO4 and K+ closely and give intravenous vitamin replacement. |

Ca, calcium; CRP, C reactive protein; ESR, erythrocyte sedimentation rate; GI, gastrointestinal; GP, general practitioner; IBD, inflammatory bowel disease; K, potassium; Mg, magnesium; Na, sodium; PO4, phosphate; RBC, red blood cell; SIBO, small intestinal bacterial overgrowth; TSH, thyroid stimulating hormone; TTG, tissue transglutaminase.

Table 3  Specific blood tests: responding to the results

| Condition                                      | Actions/Considerations                                                                 |
|------------------------------------------------|----------------------------------------------------------------------------------------|
| Any malabsorptive syndromes, eg, Pancreatic    | Check vitamin D, trace elements (selenium, copper and zinc) and INR (for vitamin K).  |
| insufficiency, BAM                             | If deficient: start appropriate supplementation and recheck levels in 3 months          |
| Short bowel syndrome                           | Request yearly monitoring via GP.                                                     |
|                                               | Check vitamin D, trace elements (selenium, copper and zinc) and INR (for vitamin K).  |
|                                               | Spot urine sodium.                                                                    |
|                                               | If deficient: start appropriate supplementation and recheck levels in 3 months          |
|                                               | Request yearly monitoring via GP.                                                     |
| If bleeding                                    | Check full blood count and INR.                                                      |
|                                               | Discuss immediately with supervising clinician and gastroenterologist/GI surgeon/haematologist. |
| When on a bile acid sequestrant                | Check triglyceride levels annually.                                                  |
|                                               | Check vitamin D and INR (for vitamin K) annually.                                    |
|                                               | Check trace elements (selenium, zinc, copper) annually.                               |
| Cortisol level                                 | 09:00 am level needed. If low, arrange synacthen test. If abnormal, needs immediate discussion with endocrinologist. |
| Severe acute abdominal pain                    | Amylase. If elevated this is an emergency.                                            |
| Neuroendocrine tumour                          | Urinary 5HIAA.                                                                        |
|                                               | Chromogranin A+B.                                                                    |

5HIAA, 5-hydroxyindole acetic acid; BAM, bile acid malabsorption; GI, gastrointestinal; GP, general practitioner; INR, international normalised ratio.
They potentially include: erythrocyte sedimentation rate, C reactive protein, red cell folate, iron studies, vitamin B₁₂, thyroid function test, coeliac serology (tissue transglutaminase IgA), magnesium, amylase (table 2).

Specific tests are indicated depending on the symptoms/diagnosis as outlined in the algorithm. They may include fat soluble vitamins, trace elements, fasting gut hormones, international normalised ratio, haematinics (table 3).

TAKING AN APPROPRIATE HISTORY
Patients cannot be helped without an accurate history being taken.

- Taking a history of GI symptoms is a skill that must be learnt.
- Specialist units find that symptom questionnaires completed by the patient before the consultation often help clarify which issues are really troubling the patient.
- Take a broad approach: for example, after treatment for upper GI cancer, patients also frequently develop troublesome lower GI symptoms.

Taking a history needs to elicit

- What was GI function like before the cancer emerged?
- How have the symptoms changed over time and how severe are they?
- If the patient has received multimodality treatment, how did symptoms change after each treatment component was delivered?
- Are key features indicative of potentially serious underlying pathology present, for example:
  - Rapid progressive worsening of symptoms?
  - Rapid weight loss?
  - Has the patient noticed any masses?
  - Are there key features possibly indicative of reversible underlying pathology present, for example,
    - Sudden onset symptoms?
    - Nocturnal waking from the symptom?
    - Development of steatorrhoea?
  - Is there a consistent impact of a specific component of diet on their symptoms, especially:
    - Alcohol intake?
    - Are they eating/drinking too much at each sitting?
    - Are they eating erratically?
    - Fat intake?
    - Fibre: how much are they eating—to too much/too little?
    - Gluten-containing foods?
    - Lactose-containing foods?
    - Other carbohydrates intake?
  - Are there key features possibly indicative of reversible underlying pathology present, for example,
    - Sudden onset symptoms?
    - Nocturnal waking from the symptom?
    - Development of steatorrhoea?
  - Is there an association between the start of specific medication or increase in its dose and their symptoms—for example, metformin, lansoprazole, β-blockers?
  - Ask specifically about the presence of intermittent steatorrhoea (see p. 22). After upper GI cancer, this commonly indicates the development of one or more of the following:
    - Small intestinal bacterial overgrowth.
    - Pancreatic insufficiency.
    - Severe bile acid malabsorption (BAM).

THE GI SYMPTOMS
APPETITE: POOR/REDUCED (anorexia) (supplementary figure 1 and table 4)

### Table 4 Investigation and management of anorexia

| Investigations | Potential results | Clinical management plan |
|---------------|------------------|-------------------------|
| **Actions from history, medication and dietary assessment** |                   |                         |
| History findings | Weight loss/sweats/fatigue | Routine and additional blood tests. CT chest, abdomen, pelvis. Refer for diabetic advice. |
| Depression, sadness, anxiety | | Refer for psychological support. |
| Underlying eating disorder | | Refer for psychological assessment. |
| Pre-existing comorbidities, eg, cardiac failure, COPD, chronic kidney disease, chronic liver disease, constipation | | Refer for diabetic advice and appropriate GP/specialist advice to optimise these conditions. |
| Medication findings | Antibiotics, eg, cotrimoxazole, metronidazole, chemotherapy, eg, cytarabine, hydroxyurea, opioids, metformin, NSAID | See management of constipation (p. 26). Discuss possible alternative medications and adequate antiemetics while on treatment. |
| **First line** | | Treat with antibiotics within level of confidence or discuss with microbiologist/supervising clinician within 24 hours. Refer the patient to the GP or endocrinology team for further management. |
| Routine and additional blood tests | Infection | Follow treatment for abnormal blood results (p. 2). |
| Endocrine dysfunction | | |
| Other abnormalities | | |

Continued
Table 4  Continued

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| **Second line** |                   |                         |
| OGD and SI aspirate (p. 25) | Inflammation (acid/bile) Gastric dysmotility | See management of acid or bile related inflammation (p. 25). Consider prokinetic medication (p. 26). ± pyloric dilatation. |
| SIBO | Malignancy/tumour recurrence | Management of SIBO (p. 27). |
| Glucose hydrogen methane breath test | SIBO | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. Refer for dietetic advice. |
| CT/MRI/PET | Malignancy/tumour recurrence | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. Refer for dietetic advice. |
| Infection | | Treat with antibiotics within level of confidence or discuss with a microbiologist and supervising clinician immediately. |
| Small bowel obstruction | | If acute, this is an emergency. Discuss immediately with a GI surgeon. If subacute/chronic discuss immediately with supervising clinician. |
| **Third line** | | Reassure. |
| If normal investigations/no response to intervention | | |

CT, computerised tomography; GI, gastrointestinal; GP, general practitioner; MDT, multidisciplinary team; NSAID, non-steroidal anti-inflammatory drug; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); MRI, magnetic resonance imaging; PET, position emission tomography; SI, small intestine; SIBO, small intestinal bacterial overgrowth.

**BELCHING/BURPING (eructation)** (Supplementary figure 2 and table 5)

Table 5  Investigation and management of belching/burping

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| History findings | Aerophagia (excessive swallowing of air) Carbohydrate sensitivity | Eat slowly. Reduce chewing gum and temperature of hot drinks. Assess for carbohydrate malabsorption (p. 26). Psychological support. |
| Medication findings | Use of effervescent medications Sedatives, eg, temazepam Metformin | Discuss alternatives available. Discuss alternatives available. Change to long-acting preparation. |
| Dietary findings | Excessive use of carbonated drinks Eating/drinking too much in one sitting | Advise regarding reducing carbonated drinks intake. Eat/drink little and often. |
| **First line** | | |
| OGD and SI aspirate (p. 25) | Malignancy/tumour recurrence SIBO Stricture formation | Refer to appropriate MDT requesting an appointment within 2 weeks. Management of SIBO (p. 27). Dilatation of anastomosis (p. 25)=dilatation of pylorus (if evidence of delayed gastric emptying) with careful biopsy. |
| Glucose hydrogen methane breath test | SIBO | Management of SIBO (p. 27). |
| **Second line** | | |
| If normal investigations/no response to intervention | | ▶ Refer to dietitian for trial of low FODMAPs diet. ▶ Reassure. |

FODMAPs, fermentable oligo-di-monosaccharides and polyols; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); SI, small intestine; SIBO, small intestinal bacterial overgrowth.
BLOATING
An uncomfortable feeling that the abdomen is full or distended or visibly swells (Supplementary figure 3 and table 6).

### Table 6 Investigation and management of bloating

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| History findings | Constipation | See management of constipation (p. 26). |
| | Dumping syndrome | See p. 20 (postprandial symptoms). |
| Medication findings | Opioids | Consider stopping or alternative medications. |
| | Metformin | |
| | Statins | |
| | NSAIDs | |
| Dietary findings | Eating/drink too much in one sitting | 1. Dietary advice. |
| | Inadequate/excessive fluid or fibre intake | 2. Referral to a dietitian with a 7-day food diary. |
| | Excessive sorbitol | |
| | Excessive caffeine | |
| **First line** | | |
| Routine and additional blood tests | Abnormal results | Follow treatment for abnormal blood results (p. 2). |
| In women, also check Ca 125 AXR | | |
| | Raised | Refer to gynaecology requesting an appointment within 2 weeks. |
| | Faecal loading | See management of constipation (p. 26). |
| | Ileus/obstruction | This is an emergency. Discuss immediately with GI surgeon and arrange urgent CT scan. |
| Bone fracture | | Discuss with supervising clinician within 24 hours. |
| Gall stones | | |
| Air in biliary tree | | |
| Pleural effusion | | |
| **Second line** | | |
| OGD and SI aspirate and SI biopsies (p. 25) | SIBO | Management of SIBO (p. 27). |
| | Inadequate gastric emptying | Prokinetics (p. 26). Consider formal gastric emptying studies. |
| Glucose hydrogen methane breath test | Coeliac disease | Refer to coeliac clinic/dietitians/gastroenterology. |
| Stool sample for faecal elastase | SIBO | Management of SIBO (p. 27). |
| Carbohydrate challenge | Carbohydrate intolerance/malabsorption | Management of EPI (p. 26). |
| CT/MRI abdomen and pelvis | Intra-abdominal pathology, eg, ascites | Discuss with supervising clinician within 24 hours. |
| | Malignancy/tumour recurrence | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| **Third line** | | |
| US biliary tree and Doppler | Suggestive of gallstones, tumour recurrence | Discuss with supervising clinician and refer as clinically appropriate to a GI surgeon/gastroenterologist/oncology team. |
| | Malignancy/tumour recurrence | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| MRI small bowel/enteroclysis/enterogram | Ascsites | Discuss with supervising clinician within 24 hours. |
| | Small bowel disease | Discuss with supervising clinician and refer as clinically appropriate to a GI surgeon/gastroenterologist/oncology team. |
| **Fourth line** | | |
| If normal investigations | | Refer to dietitian for a trial of low FODMAPs diet. |
| **Fifth line** | | |
| If no response to intervention | | Referral for gastroenterology for small bowel motility studies. |
| | | Reassure. |

AXR, abdominal X-ray; CT, computerised tomography; EPI, exocrine pancreatic insufficiency; FODMAPs, fermentable oligo-di-monosaccharides and polyols; GI, gastrointestinal; MDT, multidisciplinary team; MRI, magnetic resonance imaging; NSAID, non-steroidal anti-inflammatory drug; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); SI, small intestine; SIBO, small intestinal bacterial overgrowth; US, ultrasound.
**BORBORYGMI**
Rumbling/gurgling noises in the abdomen (Supplementary figure 4 and table 7).

| Table 7 | Investigation and management of borborygmri |
|---------|------------------------------------------|
| **Actions from history, medication and dietary assessment** | | |
| **History findings** | Faecal loading | Plain AXR. |
| | Obstruction | CT scan. |
| | Mass | Refer for dietetic advice. |
| | Fibre excess/inadequacy | |
| **First line** | | |
| Routine and additional blood tests | Abnormal results | Follow treatment for abnormal blood results (p. 2). |
| Glucose hydrogen methane breath test | SIBO | Management of SIBO (p. 27). |
| OGD and SI aspirate (p. 25) and biopsies | Enteric infection | Treat as recommended by microbiologist. |
| | SIBO | Management of SIBO (p. 27). |
| | Coeliac disease | Refer to coeliac clinic/dietitians/gastroenterology. |
| **Carbohydrate challenge** | Carbohydrate malabsorption | Management of carbohydrate malabsorption (p. 26). |
| **Second line**, if borborygmri are present in combination with other symptoms: flushing, abdominal pain, diarrhoea, wheezing, tachycardia or fluctuations in BP | | |
| Fasting gut hormones | Functioning NET eg, carcinoid syndrome or pancreatic NET | Discuss and refer urgently to the appropriate neuroendocrine MDT requesting an appointment within 2 weeks. |
| Chromogranin A+B | | |
| Urinary 5-HIAA | | |
| CT chest, abdomen, pelvis | | |
| Plain AXR | Ileus/obstruction | This is an emergency. Discuss immediately with a GI surgeon and arrange urgent CT scan. |
| | Faecal loading | See management of constipation (p. 26). |
| **Third line** | | |
| Colonoscopy | Inflammatory bowel disease | Send stool culture. If mild or moderate, refer urgently to gastroenterology. If severe, this is an emergency. Discuss immediately with a gastroenterologist. |
| **Fourth line** | | |
| If normal investigations/no response to intervention | Reassure. | |

5HIAA, 5-hydroxyindole acetic acid; AXR, abdominal X-ray; CT, computerised tomography; GI, gastrointestinal; MDT, multidisciplinary team; NET, neuroendocrine tumour; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); SIBO, small intestinal bacterial overgrowth.

**CHANGE IN SENSE OF SMELL** (hyposmia, anosmia or parosmia)
The reduced ability, inability or distortion of sensation of odour (Supplementary figure 5 and table 8).

| Table 8 | Investigation and management of change in smell |
|---------|------------------------------------------|
| **Actions from history, medication and dietary assessment** | | |
| **Medication findings** | Chemotherapy related | 1. Reassure. |
| | Opioid related | 2. Consider alternative medications. |
| | | 3. Consider referral to psychological medicine. |
| | | 4. Inform patient about the charity Fifth Sense.2 |
| **First line** | | |
| Testing of the olfactory nerve | Neurological defect | Refer to neurology team. |
| | Olfactory hallucinations | 1. Consider neurological referral. |
| | | 2. Consider referral to psychological medicine. |
| Blood test for zinc and vitamin B12 | Deficient | Arrange replacement. |
| **Second line** | | |
| Refer to ENT team | Eg, nasal polyps, sinus infection | |

Continued
**Table 8** Continued

| Investigations       | Potential results | Clinical management plan |
|----------------------|-------------------|-------------------------|
| CT/MRI head/PET      | Base of skull disease | Refer to the appropriate MDT requesting an appointment within 2 weeks. |
| **Third line**       |                   |                         |
| If normal investigations/no response to intervention | Reassure. | |

CT, computerised tomography; ENT, ear, nose and throat; MDT, multidisciplinary team; MRI, magnetic resonance imaging; PET, positron emission tomography.

**CHANGE IN SENSE OF TASTE** (hypogeusia, ageusia or dysgeusia)
The reduced ability, inability or distortion of sensation of taste (Supplementary figure 6 and table 9).

**Table 9** Investigation and management of change in taste

| Investigations                                      | Potential results                                             | Clinical management plan |
|-----------------------------------------------------|---------------------------------------------------------------|--------------------------|
| **Actions from history, medication and dietary assessment** |                                                              |                          |
| History findings                                    | Smoking                                                       | Smoking cessation advice. |
| Medication findings (see p. 80)                     | Chemotherapy/radiotherapy induced                             | 1. Reassure patient.     |
|                                                     |                                                               | 2. Refer for dietetic advice around appropriate foods. |
|                                                     |                                                               | 3. Inform patient about the charity Fifth Sense.²       |
| Medication induced                                  |                                                               |                          |
|                                                     |                                                               |                          |
| Dietary findings                                    | Nutritional compromise                                        | Refer for dietetic advice. |
| **First line**                                      |                                                               |                          |
| Visual inspection of mouth                          | Oral candidiasis                                              | Antifungal therapy.      |
|                                                     | Dental problems/poor oral hygiene                            | Refer to dentist/oral hygienist. |
| Blood test for vitamin B₁₂, zinc and selenium      | Deficient                                                     | Arrange replacement.     |
| **Second line**                                     |                                                               |                          |
| OGD                                                 | GORD                                                          | Start PPI or H₂ antagonist. If following oesophagectomy, consider promotility agents (see p. 26). |
|                                                     | Candidiasis                                                   | Antifungal therapy.      |
| If rapid/progressive unexplained changes, then CT/MRI head/PET | Base of skull disease                                        | Refer to the appropriate MDT requesting an appointment within 2 weeks. |
| **Third line**                                      |                                                               |                          |
| If normal investigations/no response to intervention| Reassure.                                                     |                          |

CT, computerised tomography; GORD, gastro-oesophageal reflux disease; H₂, histamine receptor 2; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PET, positron emission tomography; PPI, proton pump inhibitor.

**CHRONIC COUGH** (*tussis*) lasting longer than 3 weeks (Supplementary figure 7 and table 10)

**Table 10** Investigation and management of chronic cough

| Investigations                      | Potential results                                      | Clinical management plan |
|-------------------------------------|-------------------------------------------------------|--------------------------|
| **Actions from history, medication and dietary assessment** |                                                              |                          |
| History findings                    | After food                                             | Follow guideline for dysphagia (see tables 14 and 16). |
| Allergic rhinitis                   |                                                        | Refer the patient to GP for further management. |
| Smoking                             |                                                        | Advise smoking cessation. |
| COPD                                |                                                        | Refer the patient to the GP for further management. |
| Obstructive sleep apnoea            |                                                        | Refer to the ENT team. |
| Upper airway conditions:            |                                                        |                          |
| Chronic tonsil enlargement          |                                                        |                          |
| Irritation of external meatus       |                                                        |                          |
| Laryngeal problems                  |                                                        |                          |

Continued
| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| Medication findings | ACE inhibitors | Reassure patient and suggest discussing possible alternatives with the GP or cardiology team. |
| **First line** | | |
| Auscultation chest and heart | Cardiac conditions e.g., left ventricular failure, tachycardia | Discuss immediately with supervising clinician. |
| Respiratory conditions: | Aspiration | Refer to GP/cardiology/acute medicine. |
| Other respiratory causes | | Refer to cardiothoracic surgery. |
| Routine and additional blood tests | Abnormal results | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| CXR | Cardiac causes: | Refer to ENT. |
| ▶ Left ventricular failure | | If following oesophagectomy, consider promotility agents (see p. 26). |
| ▶ Thoracic aortic aneurysm | | Consider dilatation (p. 25) with careful biopsy only after agreement from the appropriate MDT. |
| Malignancy/tumour recurrence | | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| Aspiration | | Treat with PPI or ablation. |
| Radiation pneumonitis | | Consider GORD |
| Pulmonary embolism | | Consider prokinetics (p. 26). |
| Other respiratory causes | | |
| **Second line** | | |
| OGD | Vocal cord abnormality, e.g., polyp | This is an emergency. Contact the on-call medical team. |
| GORD | Start PPI or H2 antagonist. If following oesophagectomy, consider promotility agents (see p. 26). | |
| Anastomotic stricture ± pyloric stenosis | Consider dilatation (p. 25) with careful biopsy only after agreement from the appropriate MDT. | |
| Malignancy/tumour recurrence | Refer to appropriate MDT requesting an appointment within 2 weeks. | |
| Cervical inlet patch | | |
| GORD | | Consider GORD |
| Trial of PPI | | Consider prokinetics (p. 26). |
| Trial of mucaine/sucralfate | Bile reflux | |
| **Third line** | | |
| CT chest/CTPA | Pulmonary embolism | This is an emergency. Contact the on-call medical team. |
| Cardiac causes: | | Refer to GP/cardiology/acute medicine. |
| ▶ Left ventricular failure | | Refer to cardiothoracic surgery. |
| Thoracic aortic aneurysm | | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| Malignancy/tumour recurrence | | Discuss with supervising clinician within 24 hours. |
| Other respiratory causes | | |
| **Fourth line** | | |
| Oesophageal manometry/pH/impedance studies | Spasm | 1. Start PPI or H2 antagonist. |
| | | 2. Calcium antagonist. |
| | | 3. Low dose antidepressant, e.g., citalopram. |
| | | 4. Refer to gastroenterology. |
| Scleroderma | | 1. Start PPI or H2 antagonist. |
| | | 2. Refer to rheumatology. |
| **Fifth line** | If normal investigations/no response to intervention | Reassure. |

ACE, angiotensin converting enzyme; COPD, chronic obstructive pulmonary disease; CT, computerised tomography; CTPA, CT pulmonary angiography; CXR, chest X-ray; ENT, ear, nose and throat; GORD, gastro-oesophageal reflux disease; GP, general practitioner; H2, histamine -2; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor; SLT, speech and language therapy.

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## DIARRHOEA

Stool type 6–7 on the Bristol stool chart.\(^3\) Not increased frequency of type 1–5 (Supplementary figure 8 and table 11).

### Table 11  Investigation and management of diarrhoea

| Investigations | Potential results                                                                 | Clinical management plan                                                                 |
|----------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| **Actions from history, medication and dietary assessment** |                                                                                      |                                                                                          |
| History findings | Smoking                                                                          | Lifestyle advice about smoking cessation. Consider referral for psychological support. See p. 20. |
|                  | Anxiety                                                                           |                                                                                          |
|                  | Dumping syndrome                                                                  |                                                                                          |
| Medication findings | Drug induced: eg, PPIs, laxatives, β blockers, Metformin | Medications advice.                                                                      |
| Dietary findings | Low/high fibre intake, high fizzy drink intake, high use of sorbitol containing chewing gum or sweets, high caffeine intake, high alcohol intake | 1. Dietary advice about healthy fibre and dietary fat intake.  
2. Referral to diettitian and ask patient to complete 7-day dietary diary beforehand.  
3. Lifestyle advice about smoking cessation and alcohol/caffeine reduction. |
| **First line** |                                                                                      |                                                                                          |
| Routine and additional blood tests | Abnormal results                                                                 | Follow treatment for abnormal blood results (p. 2).                                       |
|                  | Mg\(^{2+}\) low                                                                    | Follow treatment for abnormal blood results (p. 2).                                       |
|                  | Coeliac disease                                                                    | Refer to coeliac clinic/dietitians/gastroenterology.                                     |
| Stool sample for microscopy, culture and *Clostridium difficile* toxin | Stool contains pathogens                                                           | Treat as recommended by the microbiologist and local protocols.                           |
| Stool sample for faecal elastase | EPI                                                                              | Management of EPI (p. 26).                                                               |
| OGD and SI aspirate (p. 25) and SI biopsies | Coeliac disease                                                                  | Management of SIBO (p. 27).                                                             |
|                  | Giardiasis                                                                        | Refer to coeliac clinic/dietitians/gastroenterology.                                     |
|                  | Other GI pathology                                                                 | Metronidazole.                                                                          |
| Glucose hydrogen methane breath test | SIBO                                                                            | Discuss with supervising clinician within 24 hours.                                       |
| Carbohydrate challenge | Carbohydrate intolerance/malabsorption                                           | Management of SIBO (p. 27).                                                             |
| SeHCAT scan      | SIBO                                                                              | Management of carbohydrate malabsorption (p. 26).                                        |
| Colonoscopy with biopsies (if frail, consider flexible sigmoidoscopy instead of colonoscopy) | Macroscopic colitis                                                               | Management of BAM (p. 25).                                                              |
|                  | Microscopic colitis                                                                | Send stool culture.                                                                     |
|                  | Malignancy                                                                         | If mild or moderate, refer urgently to gastroenterology.                                  |
|                  |                                                                                   | If severe, this is an emergency. Discuss immediately with a gastroenterologist.          |
|                  |                                                                                   | Refer to gastroenterology.                                                              |
|                  |                                                                                   | Refer urgently to the appropriate MDT requesting an appointment within 2 weeks.           |
| **Second line** |                                                                                      |                                                                                          |
| Gut hormones | Functioning NET                                                                    | Refer to the appropriate NET team requesting an appointment within 2 weeks.            |
| **Third line** |                                                                                      |                                                                                          |
| If normal investigations/no response to intervention |                                                                                      | Refer to gastroenterology.                                                              |

BAM, bile acid malabsorption; EPI, exocrine pancreatic insufficiency; GI, gastrointestinal; MDT, multidisciplinary team; Mg\(^{2+}\), magnesium; NET, neuroendocrine tumour; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor; SeHCAT, 23-seleno-25-homotaurocholic acid; SI, small intestine; SIBO, small intestinal bacterial overgrowth.

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DRY MOUTH (xerostomia) (Supplementary figure 9 and table 12)

Table 12  Investigation and management of a dry mouth

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|--------------------------|
| **Actions from history, medication and dietary assessment** | | |
| **History findings** | Cancer related | **General advice** |
| | ▶ Tumour infiltration | Oral hygiene: refer to dentist/oral hygienist. |
| | ▶ Paraneoplastic syndrome | Use fluoridated toothpaste—all dentate patients should use toothpaste with at least 1000 ppm fluoride, while dentate patients with radiation-induced salivary gland dysfunction should use specialist toothpaste with 5000 ppm fluoride. |
| | Cancer treatment related: | Limit acidic and sugary drinks/foods/medication and rinse mouth after these products. |
| | ▶ Irradiation to the head and neck/salivary glands | Symptomatic management:
| | ▶ Iodine-131 | 1. Consider saliva substitutes, eg, artificial saliva spray or lozenges (mucin based) or a non-porcine alternative, if required for cultural reasons. |
| | ▶ Surgery | Note: Glandosane spray, Salivix pastilles and SST tablets are acidic products and may demineralise tooth enamel. |
| | ▶ Chemotherapy | 2. Consider mechanical salivary stimulants:
| | ▶ Biological treatment (interleukin 2) | ▶ Sugarless chewing gum/mints. |
| | ▶ Graft vs host disease | ▶ Pilocarpine 5 mg three times a day in patients treated with radiotherapy to the head and neck. |
| | | Consider referral for acupuncture. |
| **Medication findings** | Antidepressants: | |
| | ▶ SSRI’s | Many other medications can cause dry mouth. Check, if any doubt, using an Electronic Medicines Compendium. |
| | ▶ Tricyclic antidepressants | |
| | Ace inhibitors | |
| | Antiemetics | |
| | Antihypertensives | |
| | Antimuscarinics | |
| | Antipsychotics | |
| | Calcium antagonists | |
| | Opioids | |
| | Oral infection | Treat according to local guidelines. |
| | Inadequate fluid intake/dehydration | Encourage oral fluid intake and oral hygiene. |
| | Decreased mastication (liquid/soft diet) | Refer for dietetic assessment and advice. |
| | Diabetes mellitus | Refer to a speech and language therapist. |
| | Sjögren’s syndrome | Refer to a GP. |
| | | Refer to the rheumatology team. |
| | Oral infection | |
| | Inadequate fluid intake/dehydration | |
| | Decreased mastication (liquid/soft diet) | |
| | Diabetes mellitus | |
| | Sjögren’s syndrome | |
| | Medication findings | |
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Table 14  Investigation and management of high dysphagia

| Investigations                      | Potential results                   | Clinical management plan                              |
|------------------------------------|-------------------------------------|-------------------------------------------------------|
| **Actions from history, medication and dietary assessment** |                                      |                                                       |
| History findings                   | Dysphagia present                   | Refer for dietetic support.                           |
|                                    |                                     | Refer for SLT assessment.                             |
|                                    | Neurological findings               | Refer to neurology.                                   |
| Medication findings                | Bisphosphonates                      | Discuss possible alternative medications.             |
|                                    | NSAID                               |                                                       |
|                                    | Potassium supplements               |                                                       |
|                                    | Tetracyclines                        |                                                       |
|                                    | Theophyllines                        |                                                       |
| **First line**                     |                                      |                                                       |
| Contrast swallow/fluoroscopy       | Fistula with aspiration              | This is an emergency. Discussion with thoracic surgery |
|                                    | Stricture, if <6 months after GI surgery | OGD±dilatation (p. 25).                             |
|                                    | Stricture, if after radiotherapy or >6 months after upper GI surgery | Consider treatment for acid/bile reflux (p. 25). |
|                                    | Malignancy/tumour recurrence         | OGD with careful biopsy and consider treatment for acid/bile reflux (p. 25). |
|                                    | Inflammation (acid/bile)             | CT±PET scan.                                           |
|                                    | Pharyngeal dysfunction               | These are OGD±dilatation (p. 25).                    |
|                                    | Local infection (viral/fungal)       | Refer to appropriate MDT requesting an appointment within 2 weeks. |
|                                    |                                      |                                                       |
| **Second line**                    |                                      |                                                       |
| OGD under GA                       | Inflammation (acid/bile)             | See management of acid or bile related inflammation (p. 25). |
| (no endoscopic intervention until discussed at the MDT) | Malignancy/tumour recurrence         | Refer to appropriate MDT requesting an appointment within 2 weeks. |
|                                    | Vocal cord palsy                     | CT scan and refer to cancer MDT within 2 weeks.     |
|                                    | Malignancy/tumour recurrence         | Referral to SLT.                                      |
| **Third line**                     |                                      |                                                       |
| Referral to ENT                    | Head and neck pathology              | ENT team management.                                  |
| **Fourth line**                    |                                      |                                                       |
| If normal investigations/no response to intervention |                                      | Reassure.                                             |

CT, computerised tomography; ENT, ear, nose and throat; GI, gastrointestinal; MDT, multidisciplinary team; NSAID, non-steroidal anti-inflammatory drug; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PET, positron emission tomography; SLT, speech and language therapy.

**DYSPHAGIA—LOW** (oesophageal dysphagia)
Difficulty with swallowing/sensation of food sticking (Supplementary figure 11, tables 15 and 16).

Table 15  Swallowing score

| Grade | Swallowing score                      |
|-------|---------------------------------------|
| 0     | Normal eating                         |
| 1     | Difficulty swallowing solids          |
| 2     | Difficulty swallowing semi solids     |
| 3     | Difficulty swallowing liquids         |
| 4     | Unable to swallow solids or liquids   |
| Investigations | Potential results | Clinical management plan |
|---------------|------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| History findings | Dysphagia present | Refer for dietetic support. |
| Medication findings | Bisphosphonates, NSAID, Potassium supplements, Tetracyclines, Theophyllines | Discuss possible alternative medications. |
| **First line** | | |
| If fistula unlikely OGD (no endoscopic intervention until discussed at the MDT) | Stricture, if <6 months after upper GI surgery | OGD±dilatation (p. 25). Consider treatment for acid/bile reflux (p. 25). |
| | Stricture, if after radiotherapy or >6 months after upper GI surgery | OGD with careful biopsy and consider treatment for acid/bile reflux (p. 25). CT±PET scan. Then review in MDT before any further treatment/stent/dilatation (p. 25). |
| Inflammation (acid/bile) | | See management of acid or bile related inflammation (p. 25). |
| Local infection (viral/fungal) | | Treat infection appropriately. |
| Eosinophilic oesophagitis | | Refer to gastroenterology. |
| No obvious cause | | Take SI aspirate (p. 25) to exclude SIBO. Arrange glucose hydrogen methane breath test. |
| **Second line** | | |
| Contrast swallow/CT | Fistula with aspiration | This is an emergency. Discuss with gastroenterology. |
| | Stricture | OGD with careful biopsy. Refer to appropriate MDT requesting an appointment within 2 weeks to consider dilatation (p. 25)/stent insertion/other management. |
| | Malignancy/tumour recurrence | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| CT/MRI/PET | Achalasia | Refer to gastroenterology. |
| | Malignancy/tumour recurrence Other | Refer to appropriate MDT requesting an appointment within 2 weeks. Discussion supervising clinician within 24 weeks. |
| **Third line** | | |
| Oesophageal manometry/pH/impedance studies | Acid/bile reflux | See management of acid/bile related inflammation (p.25). |
| | Bile reflux | Calcium antagonist. Low dose antidepressant, eg, citalopram. Refer to gastroenterology. |
| | Spasm | Scleroderma | Start PPI or H2 antagonist. Refer to rheumatology. |
| **Fourth line** | | |
| If normal investigations/no response to intervention | Psychological factors | Refer to psychology. |

CT, computerised tomography; GI, gastrointestinal; H2, histamine receptor 2; MDT, multidisciplinary team; NSAID, non-steroidal anti-inflammatory drug; OGD, upper GI endoscopy (oesophage-gastroduodenoscopy); PET, positron emission tomography; PPI, proton pump inhibitor; SIBO, small intestinal bacterial overgrowth; SLT, speech and language therapy.
EARLY SATIETY
Feeling full after eating a small amount of food (Supplementary figure 12 and table 17).

Table 17 Investigation and management of early satiety

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
|                |                   |                         |
| **Actions from history, medication and dietary assessment** | | |
| History findings | After gastrectomy or oesophagectomy | 1. Reassure in the postoperative period. |
|                 | History of diabetes and high blood sugar levels | 2. Refer for dietetic advice. |
|                 | Constipation | 1. Refer the patient to the GP for further management. |
|                 | Anticholinergic drugs | 2. Refer for dietetic advice. |
| Medication findings | | See management of constipation (p. 26). |
| **First line** | | |
| OGD and SI aspirate (p. 25) | SIBO | Management of SIBO (p. 27). |
| Glucose hydrogen methane breath test | Malignancy/tumour recurrence | Discuss and refer to appropriate MDT requesting an appointment within 2 weeks. |
| CT chest, abdomen, pelvis | Biliary gastritis | See management of bile related inflammation (p. 25). |
| Routine blood tests | Delayed gastric emptying | ▶ Consider gastric emptying studies. |
| Second line | | ▶ Assess for SIBO |
| Barium meal | Pyloric spasm/stricture | ▶ Consider pyloric dilatation if after oesophagectomy. |
| Third line | | ▶ Refer to dietitian. |
| Gastric emptying study | Sugestion of SIBO | Consider dilatation (p. 25) with careful biopsy only agreement from the appropriate MDT. |
| Fourth line | If normal investigations/no response to intervention | Reassure. |

CT, computerised tomography; GP, general practitioner; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); SI, small intestine; SIBO, small intestinal bacterial overgrowth.

EPIGASTRIC PAIN CHRONIC (>2 weeks)
Pain localised to the region of the upper abdomen immediately below the ribs (Supplementary figure 13 and table 18).

Table 18 Investigation and management of chronic epigastric pain

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
|                |                   |                         |
| **Actions from history, medication and dietary assessment** | | |
| History findings | Neuropathic postoperative pain | Refer to the pain team. |
| Routine and additional blood tests | Abnormal results | Follow treatment for abnormal blood results (p. 2). |
| OGD and SI aspirate (p. 25) | Inflammation/ulceration | See management of acid or bile related inflammation (p. 25). |
| | Local fungal infection | Consider treatment with nystatin or fluconazole. |
| | Oesophageal or pyloric stricture | Consider dilatation (p. 25) with careful biopsy only after discussion with cancer MDT. |
| | Spasm | 1. Start PPI or H2 antagonist. |
| | | 2. Calcium antagonist. |
| | | 3. Low dose antidepressant. |
| Malignancy/tumour recurrence | | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
| Benign peptic ulceration | | 1. Treat with PPI. |
| | | 2. Arrange follow-up endoscopy if oesophageal or gastric in 6 weeks. |
| | | 3. Consider *Helicobacter pylori* eradication. |

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Table 18  Continued

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| US             | Biliary tree obstruction | This is an emergency if any fever. Otherwise discuss with the supervising clinician within 24 hours. |
|                | Gallstones        | Discuss with the supervising clinician within 24 hours. |
|                | Pancreatic duct problems | |
|                | Renal stones      | |
|                | Ascites           | Discuss with the supervising clinician and the oncology team within 24 hours. |
|                | Mesenteric ischaemia | This is an emergency. Discuss with the on-call surgical team immediately. |
|                | Malignancy/tumour recurrence/lymphadenopathy | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
|                | Pancreatitis      | Refer to the appropriate MDT |
| ECG            | Acute cardiac ischaemia | This is an emergency. Discuss with cardiology. |
|                | Normal resting ECG but cardiac aetiology suspected | Urgent referral to cardiology. |
| Glucose hydrogen methane breath test | SIBO | Management of SIBO (p. 27). |

**Second line**

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| AXR            | Faecal loading    | See management of constipation (p. 26). |
|                | Ileus/obstruction | This is an emergency. Discuss immediately with the on-call surgical team and arrange urgent CT scan. |
| CXR            | Infection         | Discuss with the supervising clinician within 24 hours and treat appropriately. |
| CT/MRI/PET     | Malignancy/tumour recurrence/lymphadenopathy | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
|                | Consider also     | These are emergencies. Refer to the upper GI surgical team |
|                | 1. Internal hernia (if Roux-en-Y) | |
|                | 2. Jejunal tube complication, eg, volvulus (if still in situ) | |
|                | 3. Pancreatitis   | |
|                | Mesenteric ischaemia | This is an emergency. Discuss with the on-call surgical team immediately. |
|                | Ascites           | Discuss with the supervising clinician and the oncology team within 24 hours. |

**Third line**

If normal investigations/no response to intervention | Reassure. |

AXR, abdominal X-ray; CT, computerised tomography; CXR, chest X-ray; GI, gastrointestinal; H2, histamine receptor 2; MDT, multidisciplinary team; MRI, magnetic resonance imaging; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PET, positron emission tomography; PPI, proton pump inhibitor; SIBO, small intestinal bacterial overgrowth; US, ultrasound.

**GI BLEEDING** (haematemesis and/or melena)

Vomiting blood or ‘coffee grounds’ and/or black ‘tarry’ faeces associated with upper GI bleeding (Supplementary figure 14 and table 19).

Table 19  Investigation and management of upper GI bleeding

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| Actions from assessments | This is an emergency. Speak immediately to the on-call GI bleeding team and also to the upper GI surgeon if <4 weeks from GI surgery. Routine blood tests. Clotting and crossmatch. |

GI, gastrointestinal.
**HALITOSIS**
An unpleasant odour emitted from the mouth (Supplementary figure 15 and table 20).

| Table 20 | Investigation and management of halitosis |
|----------|------------------------------------------|
| **Investigations** | **Potential results** | **Clinical management plan** |
| **Actions from history, medication and dietary assessment** | | |
| History findings | Smoking | Smoking cessation advice. |
| | Absence of saliva | Follow guidelines for dry mouth (p. 11). |
| Medication findings | Nitrates | Consider possible alternative options. |
| | Phenothiazines | |
| Dietary findings | Strong smelling food | Encourage dental hygiene. Reduce dietary foods containing hydrogen sulphide. |
| **First line** | | |
| Visual inspection of mouth | Gum disease | Encourage patient to visit a dentist. |
| | Tooth decay | |
| | Hairy tongue | |
| | Candida infection | Antifungal therapy. |
| | Dry mouth | See page 11. |
| **Second line** | | |
| OGD and SI aspirate (p. 25) | Gastric dysmotility | Consider a prokinetic (p. 26). |
| | Ulceration | Benign: 6 weeks PPI then reassess. Malignant: as below. |
| | Malignancy/tumour recurrence | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
| | Duodenal obstruction | Discuss with the supervising clinician and refer as clinically appropriate to a GI surgeon/gastroenterologist/oncology team within 24 hours. |
| Glucose hydrogen methane breath test | SIBO | Management of SIBO (p. 27). |
| **Third line** | | |
| Contrast swallow | Pharyngeal pouch | Refer to the ENT/oesophageal surgeon. |
| **Fourth line** | | |
| If normal investigations/no response to intervention | | Refer to oral medicine. |

ENT, ear, nose and throat; GI, gastrointestinal; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor; SIBO, small intestinal bacterial overgrowth.

**HICCUPS** *(singultus)* (Supplementary figure 16 and table 21)

| Table 21 | Investigation and management of hiccups |
|----------|------------------------------------------|
| **Investigations** | **Potential results** | **Clinical management plan** |
| **Actions from history, medication and dietary assessment** | | |
| History findings | Short-term hiccups | Reassure patient. |
| | Long-term hiccups | Investigate as outlined below. |
| Medication findings | Corticosteroids | Discuss possible alternative medications. |
| | Benzodiazepines | |
| | Barbiturates | |
| | Opioids | |
| | Methyldopa | |
| **First line** | | |
| Routine blood tests | Infection with vagal irritation: | Treat infection as appropriate. |
| | ▶ Pleuritis | |
| | ▶ Pharyngitis | |
| | Metabolic: | Treat underlying condition. |
| | ▶ Diabetes | |
| | ▶ Hypokalaemia | |
| | ▶ Hypercalcaemia | |
| | ▶ Uraemia | |
| Physical examination | Meningitis | This is an emergency. Refer immediately to the acute medicine on-call team. |
| CT chest/abdomen | Acute gastric distension | This is an emergency. Discuss immediately with an upper GI surgeon. |
| | Small bowel obstruction | This is an emergency. Discuss immediately with GI surgeon. |

Continued
**Table 21** Continued

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| Malignancy/tumour recurrence | | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
| Chest pathology | | Discuss with supervising clinician within 24 hours. |
| Intra-abdominal infection | | This is an emergency. Discuss immediately with the on-call surgical team. |

**Second line**

| OGD | GORD | |
|------|------|-------------------|
| | | Start PPI or H2 antagonist. If following oesophagectomy, consider promotility agents (see p. 26). |

**Third line**

| If normal investigations/no response to intervention | Consider empirical baclofen, PPI, chlorpromazine, haloperidol, gabapentin, pregabalin. Ask for support from palliative care team. Refer to ENT team. Reassure. |

CT, computerised tomography; ENT, ear, nose and throat; GI, gastrointestinal; GORD, gastro-oesophageal reflux disease; H2, histamine -2; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor.

**HOARSE VOICE (dysphonia)** (Supplementary figure 17 and table 22)

**Table 22** Investigation and management of hoarseness

| Investigations | Potential results | Clinical management plan |
|----------------|-------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| History findings | Hoarseness | Voice hygiene advice: 1. Adequate hydration. 2. Avoid vocal strain (shouting, throat clearing, excessive voice use). 3. Smoking cessation advice if a smoker. 4. Alcohol reduction (alcohol is an irritant and dehydrating). 5. Refer to SLT. |
| | Dysphagia/aspiration | Discuss with supervising clinician within 24 hours. This is an emergency. Refer to ENT team immediately. |
| | Presence of laryngeal obstruction | |
| | Dyspnoea, stridor, wheeze, exertional dyspnoea, anxiety or signs of hypoxia | |
| | Dysphagia or drooling | |
| | Facial or oral oedema | |
| | Presence of other ENT symptoms | Refer to the ENT team requesting an appointment within 2 weeks. |
| | Throat or ear pain | |
| | Nasal blockage | |
| **First line** | | |
| Laryngoscopy | Vocal cord palsy | CT scan and refer to cancer MDT within 2 weeks. Referral to SLT. Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. This is an emergency. Contact acute oncology service immediately. |
| CT chest, abdomen, pelvis | Malignancy/tumour recurrence | |
| | Superior vena cava obstruction | |
| **Second line** | | |
| OGD | GORD | Start PPI or H2 antagonist. If following oesophagectomy, consider promotility agents (see p. 78). |
| | Cervical inlet patch | Treat with PPI or ablation. |
| **Third line** | | |
| If normal investigations/no response to intervention | Reassure. |

CT, computerised tomography; ENT, ear, nose and throat; GORD, gastro-oesophageal reflux disease; H2, histamine receptor 2; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor; SLT, speech and language therapy.
**HYPER SALIVATION/DROOLING** *(sialorrhoea)* present longer than 3 weeks
Production of excessive oral secretions which are not swallowed (Supplementary figure 18 and table 23).

**Table 23** Investigation and management of hypersalivation

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| **History findings** | Problems swallowing saliva | Follow guideline for dysphagia on tables 14 and 16. Consider referral to a speech and language therapist. |
| Neurological disorders | Problems closing mouth | Refer to neurology. Establish underlying cause: stroke, jaw fracture or dislocation, facial nerve palsy, Parkinson’s disease. |
| Infection: | | |
| Tonsillitis | | |
| Mumps | | |
| **Medication findings** | | Discuss possible alternative medications. |
| | | |
| **First line** | OGD | GORD Start PPI or H2 antagonist. If following oesophagectomy, consider promotility agents (see p. 78). |
| **Second line** | If normal investigations/no response to intervention | 1. Advice on oral hygiene. 2. Consider treating with an antimuscarinic mediation:10 Amitriptyline. Glycopyrronium bromide (glycopyrrolate): oral, nebulised and subcutaneous. Hyoscine hydrobromide (scopolamine hydrobromide): oral, topical, subcutaneous and nebulised. 3. Consider referral to psychological support team. |

GORD, gastro-oesophageal reflux disease; H2, histamine receptor 2; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor.

**JAUNDICE**
Yellowish pigmentation of the skin, the conjunctival membranes over the sclerae and other mucous membranes caused by high blood bilirubin levels (Supplementary figure 19 and table 24).

**Table 24** Investigation and management of jaundice

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| If there is fever | Blood for FBC, U&E, LFTs, INR, viral serology, glucose, plus full liver screen (p. 2) and amylase. Urgent US abdomen plus Doppler of the portal vein. | This is an emergency. Discuss with the on-call gastroenterology team immediately. |
| If there is no fever | | Discuss with the gastroenterology or hepatology team within 24 hours. Warn the patient that if they develop a fever they need to seek immediate medical help. |

FBC, full blood count; INR, international normalised ratio; LFTs, liver function tests; U&E, urea and electrolytes; US, ultrasound.
NAUSEA WITHOUT DYSPHAGIA
Feeling of sickness in the stomach marked by an urge to vomit. If dysphagia is present with nausea, follow dysphagia guidance in tables 14 and 16.

### Table 25 Investigation and management of nausea

| Investigations                  | Potential results                                      | Clinical management plan |
|--------------------------------|--------------------------------------------------------|--------------------------|
| **Actions from history, medication and dietary assessment** |                                                        |                          |
| History findings               | Symptoms of heart burn/acid/bile reflux                 | 1. See management of acid or bile related inflammation (p. 25).  
With dizziness/sweating/palpitations |                                                    |
| Headache/neurological symptoms | present                                                 | 2. Reassess after 2–4 weeks as clinically indicated.  
Poor fluid intake                  | Neurological examination. Funduscopy and CT/MRI head.    |
| Constipation/impaction         |                                                        | AXR. See management of constipation (p. 26).            |
| Medication findings            | Opiates                                                 | Contact team to change antiemetics urgently. If multiple vomiting daily this is an emergency. Contact the on-call acute oncology team. |
|                               | Chemotherapy                                            |                          |
| Dietary findings               | Nutritional compromise                                  | Refer for dietetic advice.                                   |
| **First line**                 |                                                        |                          |
| Funduscopy                     | Raised ICP                                             | This is an emergency. Discuss immediately with the supervising clinician and oncology or neurology team. |
| Routine and additional blood tests | Metabolic abnormality                                   | Discuss immediately with the supervising clinician.         |
| Liver/biliary abnormality      |                                                        |                          |
| Suggestive of infection        |                                                        |                          |
| Urine analysis                 | Metabolic abnormality, eg, glucosuria, ketonuria        | Discuss immediately with supervising clinician.             |
| Infection                      |                                                        |                          |
| **Second line**                |                                                        |                          |
| OGD and SI aspirate (p. 25)    | Upper GI inflammation/ulceration                        | See management of acid or bile related inflammation (p. 25). |
| Gastric dysmotility            |                                                        | Consider prokinetic medication (p. 26).                    |
| Pyloric stenosis               |                                                        | Refer urgently to the appropriate cancer MDT.               |
| Bleeding peptic ulcer          |                                                        | This is an emergency. Discuss immediately with the supervising clinician/gastroenterologist. |
| SIBO                           |                                                        | Management of SIBO (p. 27).                                 |
| Glucose hydrogen methane breath test | SIBO                                                   | Management of SIBO (p. 27).                                 |
| US liver and pancreas          | Biliary/hepatic/pancreatic aetiology                    | See management of jaundice on p. 18.                        |
| Cortisol level                 | Addison’s disease                                       | Confirm with the Synacthen test, start on hydrocortisone and refer to endocrinology. |
| US/CT/MRIPET                   | Malignancy/tumour recurrence/lymphadenopathy           | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. These are emergencies. Refer to upper GI surgical team. |
| Consider also                  |                                                        |                                                                 |
| 1. Internal hernia (if Roux-en-Y) |                                                        |                                                                 |
| 2. Jejunal tube complication, eg, volvulus (if still in situ) |                                                        |                                                                 |
| 3. Pancreatitis                |                                                        |                                                                 |
| Mesenteric ischaemia           |                                                        |                                                                 |
| Ascites                        |                                                        |                                                                 |
| **Third line**                 |                                                        |                          |
| If normal investigations/no response to intervention | 1. Consider contributing psychological factors.  
2. Consider referral for psychological support if there is a possible underlying eating disorder.  
3. Consider a routine referral to gastroenterology for further management. | |
PAIN ON SWALLOWING (odynophagia) (Supplementary figure 21 and table 26)

Table 26

| Investigations | Potential results | Clinical management plan |
|----------------|------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| **History findings** | Previous upper GI stent | Start simple analgesia. Refer to the pain team. |
| **Medication findings** | Bisphosphonates NSAID | Discuss alternative medication. |
| **Dietary findings** | Nutritional compromise | Refer for dietetic advice. |
| **First line** | OGD (do not biopsy obvious radiation change/ulceration) | | |
| | Stricture Candidiasis Viral ulceration | See the guidance in tables 14 and 16. Antifungal therapy. Consider antiviral therapy, eg, Aciclovir for HSV. Ganciclovir for CMV. |
| | Radiotherapy induced ulceration | 1. Pain control, eg, fentanyl patch. 2. Regular mucaine/oxetacaine/sucralfate. 3. PPI. 4. Consider low dose of SSRI. 5. Refer to the pain team. 6. Refer for dietetic advice. |
| | Other causes of ulceration | Malignancy: refer to the appropriate MDT within 24 hours. Acid/bile reflux (p. 25). |
| **Second line** | Oesophageal manometry/pH/impedance studies | Spasm Calcium antagonist. Low dose antidepressant, eg, citalopram. Refer to gastroenterology. |
| | Scleroderma | 1. Start PPI or H2 antagonist. 2. Refer to rheumatology. |
| **Third line** | If normal investigations/no response to intervention | Reassure. |

CMV, cytomegalovirus; GI, gastrointestinal; H2, histamine receptor 2; HSV, herpes simplex virus; MDT, multidisciplinary team; NSAID, non-steroidal anti-inflammatory drug; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor; SSRI, selective serotonin reuptake inhibitor.

POSTPRANDIAL DIZZINESS/SWEATING/PALPITATIONS/SOMNOLENCE AFTER OESOPHAGECTOMY/GASTRECTOMY/PANCREATECTOMY (Supplementary figure 22 and table 27)

Table 27 Investigation and management of potential dumping

| Investigations | Potential results | Clinical management plan |
|----------------|------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| **History findings** | History of upper GI resectional surgery 30–60 min after eating with sweating, dizziness, tachycardia | Refer for dietetic advice. Refer for dietetic advice: 1. Eat smaller, more frequent meals. 2. Eat slowly. 3. Avoid a lot of fast-acting sugars, eg, cakes, chocolate, sugary drinks and sweets. 4. Advise more longer-acting carbohydrate foods. 5. If no response, trial acarbose/octreotide. 6. Trial of low dose β blocker. |
| **Somnolence 1–3 hours after eating** | | |
| | Cardiac disease | Discuss with the supervising clinician within 24 hours. |
| | SIBO | Management of SIBO (p. 27). |

First line

ECG/24 hour tape OGD and SI aspirate (p. 25) Cardiac disease SIBO

Discuss with the supervising clinician within 24 hours. Management of SIBO (p. 27).
REFLUX (acid/bile)/heartburn
If dysphagia is present with reflux, follow dysphagia guidance in tables 14 & 16 instead.

In gastro-oesophageal reflux, acid refluxes from the stomach into the oesophagus. In duodenogastric reflux, bile refluxes from the duodenum into the stomach and oesophagus (Supplementary figure 23 and table 28).

**Table 27** Continued

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| Glucose hydrogen methane breath test | SIBO | Management of SIBO (p. 27). |
| Monitor blood glucose | If abnormally high | Refer to GP/endocrinology. |
| If abnormally low | | Refer for dietetic advice |

**Second line**

Persisting unexplained symptoms

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| If normal investigations/no response to intervention | | Reassure. |

ECG, electrocardiogram; GI, gastrointestinal; GP, general practitioner; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); SI, small intestine; SIBO, small intestinal bacterial overgrowth.

**REFLUX (acid/bile)/heartburn**
If dysphagia is present with reflux, follow dysphagia guidance in tables 14 & 16 instead.
In gastro-oesophageal reflux, acid refluxes from the stomach into the oesophagus. In duodenogastric reflux, bile refluxes from the duodenum into the stomach and oesophagus (Supplementary figure 23 and table 28).

**Table 28** Investigation and management of reflux

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| Actions from history, medication and dietary assessment | | |
| History findings | Previous upper GI surgery | 1. Refer to dietitian.  
Avoid eating late at night.  
Raise head of the bed.  
Reduce smoking, alcohol, caffeine, fat.  
Reduce weight if high BMI.  
Avoid large portions. 
2. Assess for SIBO. 
3. Trial of PPI (unless after total gastrectomy) 
4. Trial of agents to reduce biliary reflux. (p. 25). 
5. Trial of prokinetics. (p. 26). |
| Stress related | | 1. Consider stress management techniques. 
2. Consider referral for psychological support. |
| First line | | |
| OGD | Inflammation/ulceration | See management of acid or bile related inflammation (p. 25).  
Lifestyle changes: reduce smoking, alcohol, chocolate, caffeine, fatty food, carbonated drinks, citrus.  
Assess weight and BMI. |
| Malignancy/tumour recurrence | | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
| Pyloric stenosis (after upper GI surgery) | | Consider dilatation (p. 25) with careful biopsy only after agreement from the appropriate MDT. |
| Barium swallow | Oesophageal stricture | See the guidance in tables 14 and 16. |
| Delayed emptying | | 1. Assess for SIBO (p. 21). 
2. Prokinetics (p. 26). 
3. Consider formal gastric emptying studies. 
4. Consider dilatation (p. 25) with careful biopsy only after agreement from the appropriate MDT. |
| Oesophageal spasm | | 1. Start PPI or H2 antagonist. 
2. Calcium antagonist. 
3. Low dose antidepressant, eg, citalopram. 
4. Confirm with oesophageal manometry, pH/impedance studies. |
| ECG/exercise test | Cardiac related | This is an emergency. Refer to cardiology. |
| Second line | | |
| Oesophageal manometry/pH/impedance studies | Spasm | Calcium antagonist.  
Low dose antidepressant, eg, citalopram.  
Refer to gastroenterology. |
| Scleroderma | | 1. Start PPI or H2 antagonist. 
2. Refer to rheumatology. |
| Third line | | |
| If normal investigations/no response to intervention | | Reassure. |

BMI, body mass index; GI, gastrointestinal; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PPI, proton pump inhibitor; SIBO, small intestinal bacterial overgrowth.
REGURGITATION

The expulsion of material from the mouth, pharynx or oesophagus, usually characterised by the presence of undigested food (Supplementary figure 24 and table 29).

Table 29  Investigation and management of regurgitation

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| **Actions from history, medication and dietary assessment** | | |
| History findings | History of (partial) gastrectomy or oesophagectomy | 1. Small but frequent meals. |
| | | 2. Refer for dietetic advice. |
| | | 3. Consider starting prokinetic drugs. |
| | | 4. PPI/H2 antagonist±sucralfate. |
| Rumination (regurgitation with no obvious cause) | 1. Refer to gastroenterology. |
| | 2. Consider referral to psychological support. |
| **First line** | | |
| OGD | Oesophageal stricture | See the guidance in tables 14 and 16. |
| Malignancy/tumour recurrence | Refer to appropriate MDT requesting an appointment within 2 weeks. |
| Barium swallow | Pharyngeal pouch | Refer to ENT team. |
| Oesophageal stricture | See the guidance in tables 14 and 16. |
| Delayed emptying | 1. Assess for SIBO (p. 21). |
| | 2. Prokinetics (p. 26). |
| | 3. Consider formal gastric emptying studies. |
| | 4. Pyloric dilatation if after oesophagectomy. |
| Oesophageal spasm/motility disorder | 1. Start PPI or H2 antagonist. |
| | 2. Calcium antagonist. |
| | 3. Low dose antidepressant, eg, citalopram. |
| | 4. Confirm with oesophageal manometry, pH/impedance studies. |
| | 5. Refer to gastroenterology. |
| **Second line** | | |
| US/CT/MRI/PET | Malignancy/tumour recurrence/lymphadenopathy | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. |
| | Consider also | These are emergencies. Refer to upper GI surgical team |
| | 1. Internal hernia (if Roux-en-Y) | |
| | 2. Jejunal tube complication, eg, volvulus (if still in situ) | |
| | 3. Pancreatitis | |
| Mesenteric ischaemia | This is an emergency. Discuss with the on-call surgical team immediately. |
| Ascites | Discuss with the supervising clinician and the oncology team within 24 hours. |
| **Third line** | | |
| If normal investigations/no response to intervention | Reassure. |

ENT, ear, nose and throat; GI, gastrointestinal; H2, histamine receptor 2; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PET, positron emission tomography; PPI, proton pump inhibitor; SIBO, small intestinal bacterial overgrowth; US, ultrasound.

STEATORRHOEA

The presence of excess fat in the stool. Stools may float, be difficult to flush away and have an oily appearance. Sometimes pale (chalk/sand) in colour. Sometimes an oily film can be seen in the lavatory water after defaecation (Supplementary figure 25 and table 30).

Table 30  Investigation and management of steatorrhoea

| Investigations | Potential results | Clinical management plan |
|---------------|-------------------|-------------------------|
| **First line** | | |
| Stool sample for faecal elastase | Pancreatic insufficiency | Management of EPI (p. 26). |
| Routine and additional blood tests | Addison’s disease | Follow treatment for abnormal blood results (p. 2). |
| | Coeliac disease | |
| | Thyroid dysfunction | |
| Blood tests for malabsorptive symptoms | Malabsorptive pathology | Follow treatment for abnormal blood results (p. 2). |
VOMITING (emesis)

If dysphagia is present, follow dysphagia guidance in tables 14 and 16 instead (Supplementary figure 26 and table 31).

Table 30  Continued

| Investigations                              | Potential results | Clinical management plan |
|---------------------------------------------|-------------------|-------------------------|
| SeHCAT scan                                 | BAM               | Management of BAM (p. 25). |
| OGD and SI aspirate and biopsies (p. 25)    | SIBO              | Management of SIBO (p. 27). |
| Glucose hydrogen methane breath test        | SIBO              | Management of SIBO (p. 27). |
| Intestinal parasites                        | Intestinal parasites | Treat with antibiotics within level of confidence or discuss with microbiologists and supervising clinician. |
| Gut hormones (Chromogranin A and B, gastrin, substance P, VIP, calcitonin, somatostatin, pancreatic polypeptide) and urinary 5-HIAA and CT/MRI liver and abdomen | Neuroendocrine tumour | Discuss and refer urgently to the appropriate neuroendocrine MDT requesting an appointment within 2 weeks. |
| CT abdomen pelvis/capsule endoscopy/MRI enteroclysis | Small intestinal disease | Discuss immediately and refer to the appropriate MDT requesting an appointment within 2 weeks, or if no malignancy to a gastroenterologist. |

Third line

If normal investigations/no response to intervention

1. Trial of empirical antibiotics to exclude test negative SIBO.
2. Trial of low fat diet.

5HIAA, 5-hydroxyindole acetic acid; BAM, bile acid malabsorption; CT, computerised tomography; EPI, exocrine pancreatic insufficiency; MDT, multidisciplinary team; MRI, magnetic resonance imaging; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); SeHCAT, 23-seleno-25-homotaurocholic acid; SIBO, small intestinal bacterial overgrowth; VIP, vasoactive intestinal protein.

Table 31  Investigation and management of vomiting

| Investigations                              | Potential results | Clinical management plan |
|---------------------------------------------|-------------------|-------------------------|
| Actions from history, medication and dietary assessment
| History findings                            | Symptoms of heartburn/acid reflux: | 1. Trial of proton pump inhibitor/trial of antiemetic. |
| If within 2 weeks after surgery            | Discussion with the surgical team within 24 hours. |
| Chemotherapy related                       | Contact team to change antiemetics urgently. |
| Persistent vomiting                         | This is an emergency. Contact the on-call medical team. |
| Nutritional compromise                      | Refer for dietetic advice. |
| First line                                  | Fundoscopy Raised ICP | This is an emergency. Discuss immediately with the supervising clinician. |
| Routine and additional blood tests          | Metabolic abnormality | Discuss immediately with the supervising clinician. |
| Liver/biliary abnormality                   | Discuss with the supervising clinician within 24 hours. |
| Suggestive of infection                     | Treat with antibiotics within level of confidence or discuss with a microbiologist/supervising clinician. |
| Urine analysis                              | Metabolic abnormality, eg, glucosuria, ketonuria | Discuss immediately with the supervising clinician. |
| Infection                                   | Treat with antibiotics within level of confidence or discuss with a microbiologist/supervising clinician within 24 hours. |
| AXR (if with pain)                          | Small bowel obstruction | This is an emergency. Discuss immediately with a GI surgeon and arrange urgent CT scan. |
| Faecal loading                              | See management of constipation (p. 26). |
| Second line                                 | OGD and SI aspirate (p. 25) Upper Gl inflammation/ulceration | See management of acid or bile related inflammation (p. 25). Assess Helicobacter pylori and treat if positive. Discuss with the supervising clinician the need for future repeat endoscopy. |
| Gastric dysmotility                         | Consider prokinetic (p. 26). |
| Pyloric stricture                           | Consider dilatation (p. 25) with careful biopsy only after agreement from the appropriate MDT. |
| SIBO                                        | Management of SIBO (p. 27). |
| Glucose hydrogen methane breath test        | SIBO               | Management of SIBO (p. 27). |
WEIGHT LOSS (unintentional)
Reduction of the total body mass >5% in 3 months, due to a mean loss of fluid, body fat or lean mass (Supplementary figure 27 and table 32).

Table 31 Continued

| Investigations                        | Potential results                                                  | Clinical management plan                                                                 |
|--------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| US liver and pancreas                | Biliary/hepatic/pancreatic aetiology                               | See jaundice (p. 18).                                                                      |
| CT/MRI/PET (head/chest/ abdomen/ pelvis) | Malignancy/tumour recurrence/lymphadenopathy                       | Discuss and refer urgently to the appropriate cancer MDT requesting an appointment within 2 weeks. These are emergencies. Refer to the upper GI surgical team. |
|                                      | Consider also                                                     |                                                                                           |
|                                      | 1. Internal hernia (if Roux-en-Y)                                  |                                                                                           |
|                                      | 2. Jejunal tube complication, eg, volvulus (if still in situ)      |                                                                                           |
|                                      | 3. Pancreatitis                                                   |                                                                                           |
| Mesenteric ischaemia                  | Ascites                                                           |                                                                                           |
| Third line                            |                                                                    |                                                                                           |
| If normal investigations/no response to intervention |                                                                 |                                                                                           |
|                                      |                                                                    |                                                                                           |

AXR, abdominal X-ray; CT, computerised tomography; GI, gastrointestinal; ICP, intracranial pressure; MDT, multidisciplinary team; OGD, upper GI endoscopy (oesophago-gastroduodenoscopy); PET, positron emission tomography; SI, small intestine; SIBO, small intestinal bacterial overgrowth; US, ultrasound.

Table 32 Investigation and management of weight loss

| Investigations                        | Potential results                                                  | Clinical management plan                                                                 |
|--------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Actions from history, medication and dietary assessment |                                                                    |                                                                                           |
| History findings                     | No other GI symptoms present                                       | 1. Discuss with the supervising clinician.                                                |
|                                      |                                                                    | 2. Request blood tests.                                                                   |
|                                      |                                                                    | 3. Request OGD, colonoscopy, CT chest abdomen and pelvis.                                 |
|                                      |                                                                    | 4. If all investigations normal and appetite is poor, consider psychological support±appetite stimulant. |
| Dietary findings                     | Inadequate dietary intake/ malabsorption                           | Refer for dietary advice.                                                                 |
| First line                           |                                                                    |                                                                                           |
| Routine and additional blood tests   |                                                                    |                                                                                           |
| Stool for faecal elastase            | Abnormal results                                                   | Follow treatment for abnormal blood results (p. 2).                                       |
| US/CT/MRI/PET                        | Pancreatic insufficiency                                           | Management of EPI (p. 26).                                                                |
|                                      | Malignancy/tumour recurrence/lymphadenopathy                      |                                                                                           |
|                                      | Consider also                                                     |                                                                                           |
|                                      | 1. Internal hernia (if Roux-en-Y)                                  |                                                                                           |
|                                      | 2. Jejunal tube complication, eg, volvulus (if still in situ)      |                                                                                           |
|                                      | 3. Pancreatitis                                                   |                                                                                           |
| Mesenteric ischaemia                  | Ascites                                                           |                                                                                           |
| Second line                          |                                                                    |                                                                                           |
| OGD with SI biopsies                 | Upper GI tract inflammation (p.25)                                |                                                                                           |
|                                      | Malignancy/tumour recurrence                                      | 1. Proton pump inhibitor/H2 antagonist.                                                    |
|                                      |                                                                    | 2. Sucralfate suspension.                                                                 |
|                                      |                                                                    | 3. Prokinetics (p. 26).                                                                  |
|                                      |                                                                    |                                                                                           |

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APPENDICES

Guidelines for dilatation

For a stricture in the oesophagus that is anastomotic, a tumour or radiation-induced in nature.11

1. Should be performed only by experienced endoscopists.
2. If tumour is present, endoscopic intervention should only occur after multidisciplinary team (MDT) discussion.
3. Dilate to a maximum diameter 15–20 mm.
4. Dilate for 20–60 s if using a balloon.
5. Dilatation >12 mm not required for stent insertion.
6. Do not exceed diameter of the stricture by >7–8 mm/session.
7. Risks are increased after chemotherapy/radiotherapy/if tumour is present.

How to perform a small intestinal aspirate

1. On intubation with a gastroscope, avoid aspirating oral or oesophageal fluid.
2. Flush 100 mL of sterile saline into the small intestine via the endoscope channel.
3. Follow this by 20 mL of air to ensure no saline remains in the endoscope channel.
4. Turn down the suction.
5. Leave the fluid to equilibrate with the intestinal contents for a few seconds. Aspirate 20 mL of fluid into a sterile trap.
6. Send the aspirate sample directly to microbiology.

MANAGEMENT OF ACID OR BILE RELATED INFLAMMATION IN THE STOMACH

Lifestyle management advice

1. Avoid eating late at night.
2. Elevate the head of the bed.
3. Treat constipation. (p. 26).
4. Use of an alginate, for example, Gaviscon.

Management of acid related inflammation

1. Assess for Helicobacter pylori.
2. Proton pump inhibitor.

Management of bile related inflammation

1. Fresh orange juice.
2. Mucaine/oxetacaine.
3. Sucralfate suspension.
4. Altacite.
5. Prokinetics (p. 26).

MANAGEMENT OF ACID OR BILE RELATED INFLAMMATION IN THE STOMACH

Lifestyle management advice

1. Avoid eating late at night.
2. Elevate the head of the bed.
3. Treat constipation. (p. 26).
4. Use of an alginate, for example, Gaviscon.

Management of acid related inflammation

1. Assess for Helicobacter pylori.
2. Proton pump inhibitor.

Management of bile related inflammation

1. Fresh orange juice.
2. Mucaine/oxetacaine.

Common causes of BAM/BAD

▸ Chemotherapy
▸ Ileal disease/resection
▸ Upper GI resectional surgery including cholecystectomy
▸ Pancreatic disease
▸ Pelvic radiotherapy
▸ Idiopathic

Diagnosis

▸ 23-seleno-25-homotaurocholic acid (SeHCAT) scan
▸ C4 blood test
▸ Trial of bile acid sequestrant

Severity scores of BAM/BAD when using SeHCAT

7 day SeHCAT retention BAM/BAD status
15–20% borderline BAM/BAD
10–15% mild BAM/BAD
5–10% moderate BAM/BAD
<5% severe BAM/BAD

Treatment

Options include:
1. Dietary fat reduction
2. Antidiarrhoeal medication
3. Bile acid sequestrant

Options 1 and 2 may be useful in mild BAM/BAD. Generally bile acid sequestrants are required for moderate BAM/BAD. For severe BAM/BAD, most patients...
need a bile acid sequestrant and advice about long-term reduction in dietary fat intake.\textsuperscript{13}

Drugs that may be helpful include aluminium hydroxide, budesonide, colesevelam, colestipol and colestyramine.

Patients with steatorrhoea usually require colesevelam. If dietary intervention is required, advice to reduce dietary fat intake to 20\% of total calories can be useful but requires dietetic expertise, patient education and supportive literature.

Many patients with moderate/severe BAM/BAD will be deficient in trace elements and fat soluble vitamins. These should be checked periodically and supplemented as appropriate.

**MANAGEMENT OF CARBOHYDRATE MALABSORPTION**

For example, lactose or other disaccharide intolerance.

**Definition**

Intolerance occurs from the inability to digest carbohydrates. Lactose, a component of milk and some other dairy products, is the intolerance most frequently recognised. It is due to lack of the enzyme lactase in the small intestine. Primary hypolactasia affects 70\% of the world’s population. Lactose or other disaccharide or monosaccharide (eg, fructose) malabsorption may occur de novo during cancer therapies (such as 5-fluorouracil chemotherapy or radiotherapy), due to damage to brush border enzymes and in some patients persists in the long term.\textsuperscript{14, 15}

**Diagnosis of carbohydrate intolerance**

- Trial of exclusion of products containing that specific carbohydrate in diet for 1–2 weeks. Patient to keep a record of symptoms before and during the exclusion.
- Specific carbohydrate breath test. Maybe falsely positive in the presence of small intestinal bacterial overgrowth (SIBO).
- Small intestine biopsies and assessment for the specific disaccharide or monosaccharide activity.

**Treatment**

- Long-term exclusion of products containing the carbohydrate in diet.
- Dietetic assessment to ensure diet remains balanced. With lactose intolerance special attention should be paid to calcium intake. Other bone health risk factors should also be considered and vitamin and mineral supplementation started as appropriate.\textsuperscript{14}
- Consideration of a low fermentable oligo-di-monosaccharides and polyols diet.
- Oral lactases for isolated lactose intolerance.

**MANAGEMENT OF CONSTIPATION**\textsuperscript{16}

1. Dietary advice about healthy fibre and fluid intake.
2. Making time to have a toileting routine, correct positioning on the lavatory.
3. Medications advice.
4. Rectal evacuant (eg, glycerine suppositories). More effective if used 30 min after a meal.
5. Non-fermented bulk laxative±rectal evacuant.

**Further options**

1. Consider referral for biofeedback therapy.
2. Consider use of probiotics.
3. Consider use of prucalopride\textsuperscript{17}/linaclotide.\textsuperscript{18}
4. Consider rectal irrigation.
5. Consider referral to specialist gastroenterology.

**MANAGEMENT OF EXOCRINE PANCREATIC INSUFFICIENCY**

**Definition**

Exocrine pancreatic insufficiency is the inadequate production and/or secretion of pancreatic enzymes and may occur after pelvic radiotherapy with para-aortic lymph node irradiation, cancer chemotherapy, acute pancreatitis, pancreatic cancer, upper GI or hepatobiliary surgery and in patients treated with a somatostatin analogue for a neuroendocrine tumour.

**Diagnosis**

Non-liquid stool sample for faecal elastase measurement (<200 \(\mu\)g FE1 per 1 g stool)—falsely low readings may be present in patients with small intestinal bacterial overgrowth.

Clinical response to pancreatic replacement.

**Treatment**

- Pancreatic enzyme replacement therapy: requires equivalent of at least 200 000 international units Creon per day (other available brands include Nutrizym, Pancrease HL, Pancrex).
- Starting dose 50 000–75 000 units of lipase with a meal and 25 000–50 000 units with a snack. The final dose of supplement will depend on type of food eaten and symptomatic response.
- Use pancreatic enzyme replacement therapy with all meals, drinks and snacks, except black tea, black coffee or water.
- Patients need written guidance on use of enzyme replacement.
- Consider long-term multivitamin and trace element supplementation.
- Consider dietary advice to optimise bowel function.
- Occasionally addition of proton pump inhibitor is required to reduce loss of replacement enzymes by gastric acid.

**Long-term management**

Ongoing treatment with pancreatic enzyme replacement medication.
MANAGEMENT OF GASTRIC DYSMOTILITY
May be more effective when used in combination or cyclically

Effects on stomach
- Erythromycin: largely ineffective after 4–8 weeks through tachyphylaxis. Recommended dose 250 mg twice daily as a syrup 30 min before food. Or consider azithromycin 250 mg on alternate days.19
- Domperidone: no tachyphylaxis for 8 weeks, may occur after longer use. Recommended dose 10 mg four times a day 30 min before food as a syrup orally or 30 mg four times a day as a rectal suppository. Small increased risk of cardiac arrhythmia. Current MHRA advice20 is that its use should be restricted to 1 week.
- Metoclopramide: risk of tardive dyskinesia with use >3 months.
- Naloxone by subcutaneous infusion.
- Paroxetine—stimulates small intestinal motility only.
- Consider gastric pacemaker.

Medicines & Healthcare Products Regulatory Agency (MHRA) has issued a number of warnings about the risks of using some of these medications for a longer period.20 Prescribers should be aware of local policies with regard to the use of these drugs.

MANAGEMENT OF SIBO

Definition
SIBO is the presence of excessive bacteria in the small intestine. Small bowel bacterial overgrowth is a common cause for any GI symptom after chemotherapy and upper GI surgery. For any symptom resistant to conventional treatment, consider the possibility of SIBO.

Diagnosis
- There is no gold standard for diagnosing SIBO.21 22
- Glucose hydrogen methane breath testing±small intestine aspirate (p. 25) via upper GI endoscopy.
- Red blood cell (RBC) folate and total serum bile acid levels may be elevated and vitamin B12 levels and faecal elastase may be low.
- 10–15% patients with negative tests still have SIBO.

Suggested antibiotic treatment options if no growth on culture to direct treatment
(If uncertain, discuss with gastroenterologist/microbiologist)
Seven days to 10 days treatment with:
- Ciprofloxacin 500 mg twice daily.
- Clarithromycin 500 mg twice daily.
- Co-amoxiclav 625 mg three times a day.
- Doxycycline 200 mg day 1, 100 mg days 2–7/10.
- Metronidazole 400 mg three times a day.
- Rifaximin 550 mg twice daily.
- Vancomycin 250 mg four times a day.
Symptoms can recur any time after antibiotics are stopped because the underlying cause of bacterial overgrowth cannot always be addressed. If symptoms return, repeat treatment with antibiotics for a few days every month or continually at the lowest effective dose may be helpful in managing symptoms in the long term. Some clinicians recommend rotating antibiotics but this may not be effective if the organisms involved are not sensitive to the antibiotics used.

Treatment decisions should be individualised and consider the risks of long-term antibiotic therapy such as Clostridium difficile infection, cumulative irreversible neuropathy with metronidazole, Achilles tendon rupture with ciprofloxacin, intolerance, side effects, bacterial resistance and costs.14 21–24

MEDICATIONS THAT MAY INDUCE MUCOSITIS OR CHANGE IN SENSE OF TASTE
Chemotherapy drugs that cause mucositis can cause development of mouth sores. Such drugs include:25
- Alemtuzumab (Campath)
- Bleomycin (Blenoxane)
- Capecitabine (Xeloda)
- Cetuximab (Erbitux)
- Docetaxel (Taxotere)
- Doxorubicin (Adriamycin)
- Epirubicin (Ellence)
- Fluorouracil (5-FU)
- Methotrexate (Rheumatrex)
- Vincristine (Oncovin)

Other medicines that have been linked to the development of mouth sores include:
- Aspirin
- Gold used to treat rheumatoid arthritis
- Nicorandil
- Penicillin
- Phenyltoin
- Sulfonamides (used in a variety of medications)
- Streptomycin

Many other medicines have been linked to taste changes:
- Antibiotics
  - Ampicillin
  - Bleomycin
  - Cefamandole (cephalosporin)
  - Levofloxacin (Levaquin)
  - Lincomycin (treatment for mycoplasma and plasmodium)
  - Metronidazole
  - Tetracyclines
- Antiepileptics
  - Carbamazepine
  - Phenyltoin
- Antifungals
  - Amphotericin B
- Antihistamines
  - Chlorpheniramine maleate
- Antipsychotics
OESOPHAGUS AND STOMACH

- Lithium
- Trifluoperazine (sometimes also used to treat nausea and vomiting)
- Asthma medicines
  - Bamifylline
- Biological agents
  - Erlotinib (Tarceva)
  - Sunitinib (Sutent)
- Bisphosphonates
  - Etidronate
- Blood pressure medications
  - Captopril
  - Diltiazem
  - Enalapril
- Blood thinners
  - Dipyridamole
- Cardiac medications
  - Nicorandil
  - Nitroglycerine patch
- Cancer chemotherapy agents
- Corticosteroids
  - Dexamethasone
  - Hydrocortisone
- Diabetes medications
  - Glipizide
  - Diuretics
    - Amiloride
    - Ethacrynic acid (loop diuretic)
- Glaucosa medications
  - Acetazolamide
- Gout medications
  - Allopurinol
  - Colchicine
- Immunosuppressants
  - Azathioprine
- Iron
  - Iron sorbitex (given by injection)
- Muscle relaxants
  - Baclofen
- Parkinson’s disease medications
  - Levodopa
- Smoking cessation products
  - Nicotine skin patch
- Thyroid medicines
  - Carbimazole
  - Methimazole

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