CASE THREE

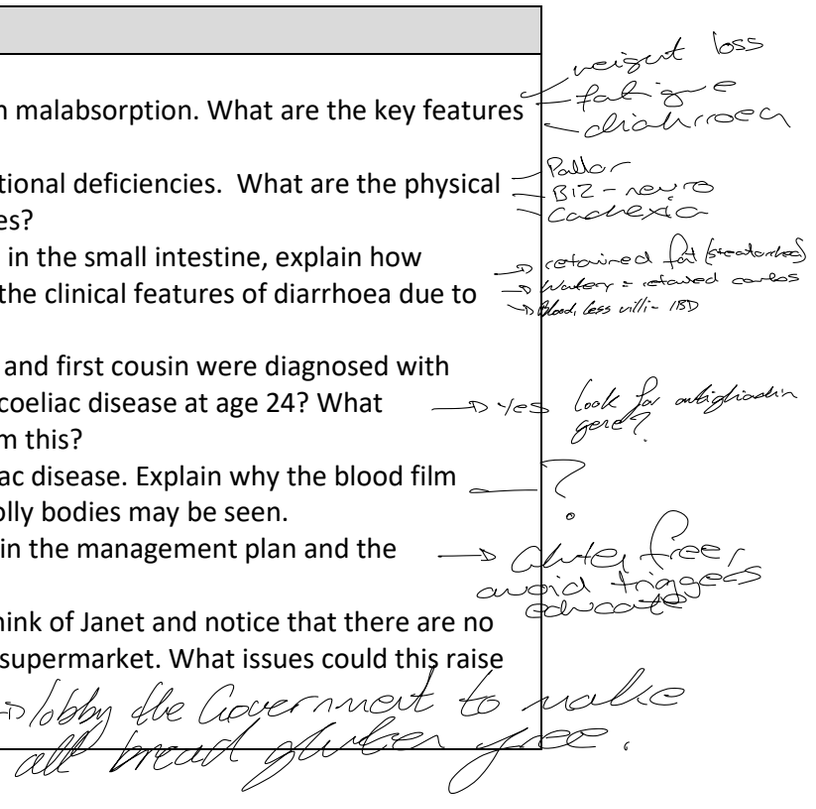
Short case number: 3_21_3
Category: Gastrointestinal and Hepatobiliary systems
Discipline: Medicine
Setting: General Practice_rural
Topic: Malabsorption_Coeliac Disease [SDL]

Case

Janet Evans, a 24 year local school teacher, presents to you, her general practitioner. She states the she has had 'problems with her gut for several years'. She often experiences abdominal pain and diarrhoea, which is better for a while then flares again. She has stopped having dairy products because they make her feel worse and she also cannot tolerate a lot of wheat. She has always been thin but lately finds it hard to 'keep weight on' and she is feeling very tired.

Questions

1. You think that Janet may have a problem with malabsorption. What are the key features of history that would support this?
2. Often malabsorption problems result in nutritional deficiencies. What are the physical examination findings of nutritional deficiencies?
3. In reviewing the physiology of the absorption in the small intestine, explain how malabsorption results in diarrhoea. Describe the clinical features of diarrhoea due to malabsorption from the small intestine.
4. Janet's medical history reveals that her sister and first cousin were diagnosed with coeliac disease as children. Could Janet have coeliac disease at age 24? What investigations would you undertake to confirm this?
5. Anaemia is frequently a complication of coeliac disease. Explain why the blood film shows a dimorphic picture and why Howell-Jolly bodies may be seen.
6. Janet is diagnosed with coeliac disease; explain the management plan and the importance of adhering to a gluten-free diet.
7. While doing your weekly grocery shop, you think of Janet and notice that there are no gluten-free breads or cereals available in the supermarket. What issues could this raise for Janet? What could you do about this?



Suggested reading:

- Kumar P, Clark ML, editors. Kumar & Clark's Clinical Medicine. 8th edition. Edinburgh: Saunders Elsevier; 2012.

ANSWERS

1. Regardless of the cause, the common presenting features of small bowel disease are:

- *Diarrhoea.* Common feature but approximately 10-20 % will have no diarrhoea or any other symptoms. Steatorrhoea is occasionally present.
- *Abdominal pain and discomfort.* Abdominal distension can cause discomfort and flatulence. The pain has no specific character or periodicity and is not usually severe.
- *Weight loss.* This is due to the anorexia that invariably accompanies small bowel disease. Although malabsorption occurs, the amount is small relative to intake.
- *Weakness and fatigue* are usually related to general poor nutrition. In some patients, severe anaemia can contribute to fatigue. Occasionally, severe hypokalaemia due to potassium loss in the stool can cause muscle weakness.
- *Nutritional deficiencies* may present as fatigue and weakness due to anaemia from the deficiencies of iron, B_{12}, folate. These are the most common but others to consider include, tetany, motor weakness, paraesthesia, ataxia (calcium deficiency), bone pain from osteopenia/osteoporosis (calcium/vitamin D deficiency) or stomatitis, sore tongue and aphthous ulceration (multiple vitamin deficiencies). Ankle oedema may be seen and is partly nutritional and partly due to intestinal loss of albumin.

2. Abdominal examination is usually normal. There may be:

- a protuberant and tympanic abdomen due to distension of intestinal loops with fluids and gas.
- Ascites occasionally can be detected in patients with severe hypoproteinaemia.
- Bruising (vitamin K deficiency), motor weakness, ataxia (calcium deficiency),
- stomatitis, aphthous ulceration (multiple vitamin deficiencies), pallor (iron, B_{12}, folate deficiency)
- Evidence of weight loss including muscle wasting and loose skin folds.
- Orthostatic hypotension.
- Dermatitis herpetiformis (a pruritic papulovesicular skin lesion involving the extensor surfaces of the extremities, trunk, buttocks, scalp and neck).
- Evidence of peripheral neuropathy.
- Chvostek sign (gentle tapping over the facial nerve causes twitching of the ipsilateral facial muscles) or Trousseau sign (inflation of the sphygmomanometer cuff above systolic pressure for 3 minutes induces tetanic spasm of the fingers and wrists) due to hypocalcaemia.

3. The small intestine is the site where most of the nutrients from ingested food is absorbed. The inner wall, or mucosa, of the small intestine is lined with simple columnar epithelial tissue. Structurally the mucosa is covered in folds called plicae circulares, from these project finger-like pieces of tissue called villi. The individual epithelial cells also have finger-like projections called microvilli. The function of the plicae circulares, the villi and the microvilli is to increase the surface area available for the absorption of nutrients. The epithelial cells of the villi transport

nutrients from the lumen of the intestine to the capillaries (amino acids and carbohydrates) and lacteals (lipids).

Absorption of the majority of the nutrients takes place in the jejunum with the following notable exceptions:-

- iron is absorbed in the duodenum
- Vitamin B_{12} and bile salts are absorbed in the terminal ileum
- water and lipids are absorbed by passive diffusion throughout the small intestine
- sodium is absorbed by active transport and glucose and amino acid co-transport
- fructose is absorbed by facilitated diffusion.

The mucosal phase of absorption relies on the integrity of the brush-border membrane of intestinal epithelial cells to transport digested products from the lumen into the cells. Impaired hydrolase activity results in disaccharidase deficiency.

Diarrhoea frequently is watery, reflecting the osmotic load received by the intestine. Bacterial action producing hydroxy fatty acids from undigested fat also can increase net fluid secretion from the intestine, further worsening the diarrhoea.

Steatorrhoea is the passage of pale, bulky, malodorous stools due to fat malabsorption. Such stools float on the surface of the water and are hard to flush.

4. Coeliac disease can present at any age. The peak incidence in adults is in the fifth decade, with a female preponderance.

   INVESTIGATIONS

   For establishing a diagnosis: (NB these are unreliable if the patient is on a reduced gluten diet)

   - Endomysial (EMA) and tissue transglutaminase (tTG) antibodies (IgA) have a high sensitivity and specificity for the diagnosis of untreated coeliac disease and can also be used as screening tests. They are the investigations of first choice.
   - Duodenal/jejunal biopsy prior to commencing a gluten-free diet. This should reveal a 'flat' mucosa with an absence of villi. Other causes of a flat mucosa in a\ adults are rare. It is possible but rare for a patient with coeliac disease to have normal mucosal histology on standard duodenal/jejunal biopsies.
   - For close to certain diagnosis, the patient should have a clinical and histological response to a gluten-free diet followed by clinical and histological relapse to a 'gluten challenge'. However, this is rarely regarded as necessary in clinical practice.

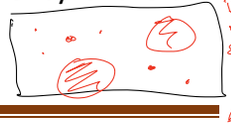
   Not often done

   For assessing severity and complictions:

   - Haematology - discussed below
   - Biochemistry - to assess the degree of malabsorption and other biochemical abnormalities e.g. low albumin, protein, calcium, potassium, magnesium, cholesterol.
   - Radiology – CT enterography and MRI enterography provide excellent images of the small intestinal mucosa but are expensive and usually not necessary. They are mainly used when a complication, e.g., lymphoma, is suspected. A Ba small bowel series has a very low diagnostic yield and is now rarely performed.
   - Bone densitometry should be performed on all patients because of the risk of osteoporosis.

5. A mild or moderate anaemia is present in 50% of cases. Folate deficiency is almost invariably present in coeliac disease, giving rise in most instances to a high MCV. B_{12} deficiency is rare but

Coeliac → Folate Deficiency → Macrocytic Anaemia ∴
→ Iron Deficiency → Microcytic Anaemia



Blood Film shows both macrocytes & microcytes. + Howell Jolly bodies due to splenic atrophy.

iron deficiency due to malabsorption of iron and increased loss of desquamated cells in common.

A blood film may therefore show microcytes and macrocytes as well as hypersegmented polymorphonuclear leucocytes and Howell-Jolly bodies due to splenic atrophy which is coincidentally found in most patients. Hyposplenism fluctuates with disease activity, splenic function improves after withdrawal of gluten from the diet. The severity increases with advancing age and prolongation of exposure to dietary gluten.

6. Treatment with a gluten-free diet usually produces a rapid (2-4 weeks) clinical and morphological improvement. The diet consists of no wheat, barley, rye or any food containing them (cakes, pies etc). Replacement haematinics, iron, folic acid as well as calcium are given initially to replace body stores.

Mx =
• GF diet
• Replace Haematinics
- Iron
- folate
+ - Calcium

The usual cause for failure to respond to the diet is poor compliance, range from 45 – 87% If clinical progress is suboptimal then a repeat intestinal biopsy should be taken. Patients should have pneumococcal vaccinations because of splenic atrophy.

A small percentage of patients fail to respond to a gluten-free diet. In some patients who are refractory, corticosteroids might be helpful. In patients who fail to respond corticosteroids, other comorbid conditions, such as lymphomas of the small intestine, have to be ruled out.

The long term health risks of patients who comply poorly with a gluten-free diet include nutritional deficiency, reduced bone mineral density, hyposplenism and an increased incidence of a variety of malignancies, especially intestinal lymphoma.

7. Janet may become less adherent to a strict gluten-free diet and accept mild symptoms in an attempt to make her diet more varied. She may suffer the potential complications despite the relative lack of symptoms. She may be forced to obtain her groceries from further away depending on access and availability or source ingredients to make her own bread, pasta etc. She may need to be more creative with her shopping eg starting with small amounts of oats and increasing as tolerated.

Inform Janet of the benefits of the Coeliac Society and the available information re diet and access to appropriate ingredients although with the family history (sister, cousin) this should be information already known. It may also be possible to arrange with the local shops other than the supermarket to have gluten-free products available.

References

1. Kumar P, Clarke M. Clinical Medicine. 6th Ed. Elsevier 2005. Gastrointestinal Disease, Chap 6 Pp 294 – 307
2. Klapproth J-M, Yang V, Celiac sprue. eMedicine. Gastroenterology Update Sep. 2, 2009