



THE BARRIERS OF PANCREATIC EXOCRINE INSUFFICIENCY



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Dietitians play an important role in supporting patients with pancreatic exocrine insufficiency (PEI). This article will address the potential barriers that may be faced.

The pancreas – a small organ found behind our stomach and below our ribcage – has two main functions, which allow for the release of enzymes and hormones to aid the digestion of food. The exocrine function produces enzymes to break down carbohydrates, proteins and fats, and the endocrine function homes the islet cells responsible for the release of the hormones insulin and glucagon, to maintain blood glucose levels. In PEI, the pancreas loses its ability to produce enough of the enzymes: lipase (for the breakdown of fats), protease (for the breakdown of protein) and amylase (for the breakdown of carbohydrates).

PEI can occur for a number of reasons, most commonly seen in:

- chronic pancreatitis
- pancreatic cancer
- surgery of the pancreas
- cystic fibrosis

But also can be linked to:¹

- coeliac disease
- diabetes mellitus

Due to the lack of digestive enzymes produced by the pancreas in PEI, malabsorption of nutrients is the main consequence for patients with PEI. Symptoms of this include weight

loss and steatorrhea – loose, frequent bowel movements that are often pale in colour, float, foul smelling and may have an oily residue. These symptoms usually arise once PEI has been occurring for some time. Earlier signs of PEI include:

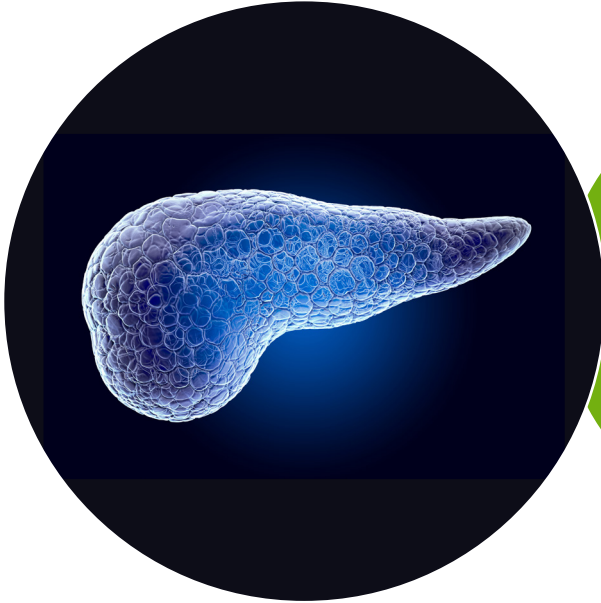
- diarrhoea
- bloating
- abdominal discomfort

These, as we know, are common gastrointestinal symptoms, and so can often lead to PEI being undiagnosed in its early stages.

DIAGNOSIS AND MANAGEMENT OF PEI

The diagnosing of PEI often involves the whole clinical picture of a patient. This includes taking a detailed history of the patient's symptoms, weight and past medical history, as well as the use of tests such as faecal elastase, which assess the amount of pancreatic enzymes in the stools, and scans such as x-rays, ultrasounds, CT and Magnetic Resonance Cholangiopancreatography (MRCP) to look at any damage to the pancreas and its ducts.²

The treatment for PEI – pancreatic enzyme replacement therapy (PERT) – requires lifelong replacement of the enzymes that the pancreas is no longer able to produce enough of. The



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treatment goals of PERT are to treat symptoms of PEI and improve nutritional status. This includes increasing fat absorption and reducing steatorrhea, and reducing stool frequency and improving stool consistency.³ PERT works by mimicking the physiological conditions of a healthy pancreas, allowing the correct amount of enzymes to be delivered to the duodenum, where they are activated with food, allowing it to be absorbed.⁴

BARRIERS TO CONSIDER

Religious/ethical reasons

There are several different brands of PERT available in the UK, with slightly different variations of the enzymes. However, all brands available in the UK are manufactured from pork,⁵ therefore, it is essential that if a patient is to be started on PERT, they are made aware of this. Some patients may choose not to consume pork products due to religious, ethical or moral reasons. Patients are encouraged to speak with their religious community/families prior to prescription, and most imams or rabbis deem the prescription as a special exception, as not taking it would be detrimental to health.¹ Patients should be discouraged from taking vegetarian/vegan alternatives, such as papaya enzymes,

as these do not contain the correct digestive enzymes. This often poses the biggest barrier to commencing PERT for patients, particularly with the rising population choosing to follow vegetarian or vegan diets.

Pill burden

PERT is usually recommended to be prescribed as a starting dose of around 50,000 lipase with meals and 25,000 lipase units per snack.⁶ This is normally the equivalent of two capsules with meals and one with snacks; however, this dose is often titrated to higher doses, depending on symptom control. It is estimated that a healthy human pancreas produces around 720,000 units of lipase with each meal,⁴ so, really, the usual starting dose of PERT is low in comparison. However, this titrating dose can result in patients being on high doses of PERT, resulting in a considerable number of tablets having to be taken with every meal and (most) snacks. One of the manufacturers of PERT, Creon (Mylan), previously produced a larger capsule containing 40,000 units of lipase; however, this was discontinued in 2019 due to manufacturing difficulties. Although the 40,000 capsules were larger and, therefore, not suitable for all patients who may have struggled with swallowing them, they were used by some patients to

reduce the number of daily tablets they needed to take. The regularity and consistency of taking PERT may seem overwhelming for patients and, therefore, education on the importance of PERT is essential.

Lack of education

Educating patients commencing PERT on the role of the medication and providing advice on how to take it, is so important. In addition to this, education and awareness within the clinical setting can ensure that patients receive the correct information and can commence the correct treatment without delay. Studies have shown that as little as 21% of patients with pancreatic cancer received PERT, despite 70% reporting symptoms of malabsorption.⁷ It is now in the reviewed guidance for pancreatic cancer that all patients have PERT considered on diagnosis.⁸ An example of lack of education in the clinical setting is something I have seen in practice first hand, where, for example, patients are started on too low a dose of PERT, such as 10,000 lipase units three times a day. This is not only too small a dose to replace the enzymes, but is also not prescribed regularly enough for the patient to take with all meals and snacks.

Ensuring the patient is aware of how to take their PERT, can have a huge impact on their treatment and response. Being educated on the need to take PERT with all meals and snacks (although it is typically not needed in drinks made with less than half milk, or snacks such as fruit, or an individual chocolate), splitting the dose throughout larger meals and increasing the dose for higher fat meals, will not only improve symptoms for patients with PEI, but overall quality of life. Patients should also be made aware that if taking the capsules whole is proving inefficient, most PERT capsules can be opened up and taken with an acidic food (for example, mixed with apple puree) and swallowed (ensuring the coated enzymes are not crushed in the mouth) to improve digestion. Ensuring that patients and clinicians are aware and fully educated on these points, can improve both timely symptom control for the patient and potentially avoid unnecessary investigations for ongoing symptoms.

SIDE EFFECTS OF PERT

PERT is generally well tolerated.⁹ It is thought that fibrosing colonopathy is a complication that has been reported in children with cystic fibrosis using large doses of PERT. However, the British Nutrition Foundation (BNF) states that frequency of this side effect is 'unknown'.^{10,11} Other common side effects are thought to be bloating, constipation, nausea and vomiting.¹¹

For those patients who do suffer from side effects, trialling different brands of PERT may help, as the coating and combinations of enzymes can vary slightly between manufacturers.

NO RESPONSE TO TREATMENT

If it is thought that the correct dosage, timings and compliance from the patient are all in place, but the patient continues to show signs of malabsorption, it is advised that the following conditions are investigated and treated if necessary:¹²

- bile acid malabsorption
- coeliac disease
- small intestine bacterial overgrowth
- inflammatory bowel disease
- lactose intolerance

The addition of proton pump inhibitors (acid suppressors) has also shown an improved response, as they help to increase gastric pH to ensure the coating of the capsules is dissolved prior to the enzymes reaching the duodenum.¹

Managing non-responsive patients is very important, as you can imagine. If patients have continuing symptoms of malabsorption, they will be at risk of nutritional deficiencies, weight loss and it will very much impact on their quality of life. This may in turn affect their willingness to comply with taking their PERT, likely still an essential part of their care, which again could lead to poorer outcomes.

ADDITIONAL LIFESTYLE FACTORS

Lastly, it is important to consider other lifestyle changes and, therefore, potential barriers, which patients with PEI may need to implement. The NICE guidance for pancreatitis advises avoiding alcohol – this is essential for pancreatitis caused by alcohol excess and may exacerbate symptoms in recurrent acute pancreatitis and chronic pancreatitis not caused by alcohol. Smoking cessation is also

advised for patients with chronic pancreatitis.¹³ For some patients, these changes may be difficult to make and, therefore, as a healthcare professional, we should ensure that the correct support is available to help break down these barriers.

For patients with PEI as a result of pancreatic cancer, being aware of the whole treatment plan – whether this be chemo/ radiotherapy or surgery – can help to provide the best individualised care plan for the patient. Patients may require additional dietary advice to support side effects such as

taste changes or increase in nutritional status prior to surgery. Addressing these can help with a patient's compliance of PERT, as well as overall wellbeing and feeling as though they are well supported throughout a difficult time.

CONCLUSION

Commencing any lifelong medication requires proper education, counselling and follow-up. It is important to consider the above points when seeing patients with PEI to provide the best individualised management of their condition.

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Q.1 What are the two main functions of the pancreas?

A

Q.2 Explain the signs and symptoms of pancreatic exocrine insufficiency (PEI).

A

Q.3 How would you diagnose a patient for PEI?

A

Q.4 What is PERT and how does it treat PEI?

A

Q.5 Explain the issue of pill burden in patients undergoing PERT.

A

Q.6 What important information should a patient receive in order to improve symptom control?

A

Q.7 Describe any side effects of treatment.

A

Q.8 What are the steps for managing patients who are non-responsive to treatment?

Q.9 Outline lifestyle factors that play a role in the management of symptoms.

A

Please type additional notes here . . .