A case of gas

HOSP #		WARD	
CONSULTANT	John Stanfliet / Heleen Vreede	DOB/AGE	52 y Female

Abnormal Result

Oral lactose tolerance test:

Time	Fasting	15’	30’	45’	60’	90’
Blood glucose (mmol/L)	4.3	4.3	4.2	4.5	□4.4	4.6

Presenting Complaint

Patient presented with bloating and abdominal pains.

History

The medical history is not known

Patient reported symptoms of bloating and abdominal pains. Upon further questioning it became known that she had been troubles by these symptoms especially severe after consuming dairy products.

Examination

Not known.

Signs and symptoms often associated with this condition are:

- Abdominal pain and bloating
- Gass / flatulence
- Diarrhoea
- Constipation

Laboratory Investigations

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Blood glucose (mmol/L)	4.3	4.3	4.2	4.5	□4.4	4.6

Other Investigations

No other investigations were done.

Final Diagnosis

Patient appears to be lactose intolerant since we expect a rise of >1.7 mmol/L in glucose when lactose is adequately digested and absorbed after a lactose load of 50g.

The following cut-offs are frequently used:

- Glucose rise > 1.7 mmol/L at any of the time points is a normal lactase response
- Glucose rise of 1.1-1.7 is equivocal
- Glucose increases < 1.1 is consistent with lactase deficiency

Take Home Message

Lactose consists of Glucose and Galactose.

The biochemical handling of oral lactose

The disaccharide cannot be absorbed and needs to be cleaved before absorbtion by the enterocyte. This happens by lactase, normaly present on the distal part of the brush border of the enterocyte. These enterocytes can become damaged by enteritis and loose activity of lactase partially. Lactase activity also decreases with age, hence elderly do develop partial

lactose intolerance. The transporter that carries glucose and galactose into the enterocyte is the sodium-dependent hexose transporter, **SGLT-1**. As the name indicates, this molecule transports both glucose and sodium ion into the cell and in fact, will not transport either alone.

SGLT1 shouldn't be confused with a GLUT.

Inhibition of **SGLT1** delays and reduces glucose absorption in the **small intestine**, thus improving post meal glycemic control. This is beneficial particularly in patients with declining renal function where **SGLT2** inhibition is less effective.

SGLT2 is the major transport protein and promotes reabsorption of glucose from the **glomerular filtration** back into circulation and is responsible for approximately 90% of the kidney's glucose reabsorption.

SGLT2 inhibitors, also called **gliflozins**, are a class of medications that alter essential physiology of the nephron; unlike SGLT1 inhibitors that modulate Sodium/Glucose channels in the **intestinal mucosa**.

Figure 1 – Picture illustrating a hexose binding to an SGLT protein

How does lactose intolerance normally present?

Bloating and abdominal cramps after dairy ingestion. (Bacteria metabolise disaccharides and produce H2, hence don't light your farts when lactose intolerant.) It is less pronounced with dairy which has a lot of lactobacilli (live cultures) in it since they can partially digest some of the lactose. Thus cheese and joghurt doesn't give such severe Sx as the raw milk products.Good. For your own education, think about sour milk

What is the difference between lactose intolerance, milk allergy and galactosaemia?

- Lactose intolerance is explained above, and can be either primary (defective enzyme) or secondary due to another condition as is the case in enteritis where the enterocytes are regenerating and temporarily expressing less enzyme on the apical brush border.
- Milk allergy is an abnormal response by the immune system to milk and products containing milk. It's one of the most common food allergies in children. Cow's milk is the usual cause of milk allergy, but milk from sheep, goats, buffalo and other mammals also can cause a reaction. The allergy is most likely to one of the exogenous proteins in animal origin milk. Milk allergy presents like any other allergy with hives and/or urticaria.
- Galactosemia is the inability to metabolise galactose to glucose for metabolism.

3 genes can contain a mutation (GAL**T**, GAL**K**1, and GAL**E**) coding for:

- Galactose-1-P-uridyl**T**ransferase
- Galacto**K**inase
- UDPGalactose **E**pimerase