Paediatrics SAQ

3-month-old girl presents with increasing vomiting since the first week of life. After initially gaining weight, she has fallen back to her birth weight of 2.9kg. Her vomits are milky, she is usually hungry for feeds but today she is lethargic. She saw her GP and a paediatrician last month and was commenced on omeprazole 10mg bd. On examination she is cachectic with sunken eyes but normal capillary refill.

Venous blood gas shows:

pH	**7.8**		**(7.35-7.45)**
PCO2	**51**	**mmHg**	**(32-45)**
HCO	**79.8**	**mmol/L**	**(24-31)**
B.E.	**30**	**mmol/L**	**(-3-3)**
Na	**135**	**mmol/L**	**(137-146)**
K	**2.0**	**mmol/L**	**(3.5-5.0)**
Cl	**<60**	**mmol/L**	**(98 – 106)**
Glucose	**3.3**	**mmol/L**	**(3.0 – 7.8)**
Lactate		**3.7 mmol/L**	**(0.5 – 2.2)**

List and interpret 5 abnormalities in this baby's blood gas analysis.

	Abnormality	Interpretation
1	Metabolic acidosis	Due to loss of gastric HCl from vomiting from pyloric obstruction. Profound. Obstruction has been significant for many weeks.
2	Hypercapnia	Respiratory compensation for metabolic alkalosis. Level of compensation can vary. Compensation is lost with anything that causes hyperventilation eg crying.
3	Hypokalaemia	Kidneys attempt to correct alkalosis and K+ is shed in exchange for H+. Consistent with vomiting has been going on for several weeks.
4	Hypochloraemia	Chloride is lost with H+ in the gastric acid (HCl) vomiting
5	Elevated lactate	There must be some degree of hypoperfusion, most likely due to hypovolaemia.

You strongly suspect that the baby has hypertrophic pyloric stenosis.
List and discuss 5 differential diagnoses you would consider in this case.

	Differential diagnoses	Discussion
1	Gastro-oesophageal reflux	Usually effortless regurgitation in otherwise healthy baby Chronic rather than progressive Doesn't cause weight loss Doesn't cause electrolyte abnormalities
2	Cow's milk protein intolerance	Usually notice blood in stools, particularly in such significant weight loss. Shouldn't cause metabolic alkalosis
3	Adrenal crisis	Should cause hyperkalaemia Look for virulisation of genitalia in this girl
4	Other intestinal obstruction	Consider malrotation, hirschprung's and intussusception. Vomiting usually bilous. Abdomen usually distended Stools may be blood stained Abnormal bowel function in history Plain Xray or UGIT contrast study may be required if diagnosis in doubt
5	Liver disease	Unconjugated hyperbilirubinaemia is associated with hypertrophic pyloric stenosis and usually resolves after surgery and may be an initial manifestation of Gilbert's syndrome. The bilirubin level needs to be measured and assessed for conjugated bilirubin, as liver disease such as biliary atresia, can present with vomiting and jaundice.
6	Sepsis	History and examination Urine culture Blood culture Lactate Consider LP, CXR if clinical indication Consider broad spectrum antibiotic therapy in a baby this unwell, while awaiting culture results

List 10 features of management in this case.

1. Stop feeds.
2. Fluid bolus with 10 – 20mL/kg 0.9% Sodium Chloride only if shocked – eg. delayed capillary refill time. Fluid bolus may push hypokalaemia down further. Abnormalities and compensation have been developing over many weeks.
3. Replace potassium IV as per local IV fluid guidelines, usually KCL 20mmol/L is used in fluid deficit replacement and maintenance fluids.
4. Replace fluid deficit over 24 hours, for example, using 0.9% sodium chloride + glucose 5% + 20mmol/L KCl.
5. Ultrasound to confirm diagnosis.
6. Surgical consultation. Surgery (pyloromyotomy) is usually delayed until fluid deficit and electrolyte derangement have been corrected.
7. Monitor electrolytes in HDU/PICU setting.
8. Consider broad spectrum antibiotics (cefotaxime) if sepsis suspected while awaiting culture results.
9. Encourage mother to express milk to maintain supply if she wants to breast feed.
10. Contact paediatrician and GP.
11. Discuss case in M&M and use for teaching medical and nursing staff.