Biochemical monitoring for babies on parenteral nutrition

Investigation	Neonatal reference range	Before clinical and metabolic stabilisation		Once clinically and metabolically stable		
		Every 1–2 days	As required*	Every 1–2 weeks	After one month on PN, then monthly	As required*
Glucose	2.6–6.5 mmol/L	X		X		
Blood gases (capillary)	pH 7.35–7.45, PCO_2 4.7–6.0 kPa, HCO_3 22–26 mmol/L	X		X		
Sodium	134–148 mmol/L	X		X		
Potassium	4.5–6.0 mmol/L	X		X		
Chloride	90–114 mmol/L	X				X
Calcium	Total 1.8–2.1 mmol/L, Ionised 1.15–1.45 mmol/L	X			X	
Phosphorus	1.4–2.5 mmol/L (see footnote for frequency)	X			X	
Magnesium	0.7–1.0 mmol/L		X			X
Zinc	9–17 µmol/L		X			X
Total protein	45–75 g/L		X			X
Albumin	25–40 g/L		X			X
Urea	1.0–4.0 mmol/L		X			X
Creatinine	<95 µmol/L		X			X
Triglycerides	<3 mmol/L		X			X
Bilirubin (conjugated)	<20 µmol/L		X		X	
AST	<80 U/L		X		X	
ALT	<45 U/L		X		X	
GGT	<150 U/L		X		X	
ALP	80–600 U/L (up to 1000 U/L in growth phase)		X		X	
PTH	1.7–7.3 pmol/L		X		X	
Vitamin A	0.7–1.5 µmol/L (200–430 µg/L)		X		X	
Vitamin B12	170–800 pmol/L		X		X	
Vitamin D	50–150 nmol/L		X		X	
Vitamin E	11–46 µmol/L Auckland; 5–50 µmol/L Waikato; 23–70 µmol/L Christchurch		X		X	
INR	Lab-dependent norm		X		X	
Trace elements: Se, Zn, Cu	Lab-dependent norms					X
C-reactive protein	0–5 mg/L		X			X
Iron	10–31 µmol/L		X			X
Ferritin	15–400 µg/L		X			X
Urine electrolytes	Urinary Na >30 mmol/L adequate for growth					X

AST aspartate aminotransferase, ALT alanine aminotransferase, GGT gamma-glutamyl transferase, ALP alkaline phosphatase, INR International normalised ratio (an elevated INR may indicate vitamin K deficiency), PTH parathyroid hormone, PN parenteral nutrition

**no routine monitoring is recommended. Individualised monitoring may be needed based on the clinical situation.*