**ELEVATED PHENYLALANINE**

**PHENYLKETONURIA / BIOPTERIN DEFECTS**

- Why does the baby need a second test?

  The newborn metabolic screen result shows an increased level of phenylalanine and a repeat blood spot is required to rule out the possibility of a metabolic disorder. It is possible for phenylalanine to be raised in the newborn and not be significant in which case the repeat test will be normal and no further action required. However, in those cases where the phenylalanine remains elevated (or the initial result indicates), further samples will be required to determine whether the baby has a metabolic disorder or not.

- What can an elevated phenylalanine indicate?

  Phenylketonuria (PKU)
  Hyperphenylalaninaemia (Mild PKU)
  Biopterin Defect
  Liver Disease

  In PKU phenylalanine cannot be converted to tyrosine due to a deficiency of phenylalanine hydroxylase. Hyperphenylalanine patients are effectively mild PKU. Biopterin defects arise from a deficiency in tetrahydrobiopterin (BH4) a co-factor to PAH and other key enzymes involved in synthesis of neurotransmitters. A deficiency in one of the enzymes involved in the biosynthesis or regeneration of this co-factor will cause a biopterin defect.

- Clinical Symptoms

  Usually asymptomatic in neonates, however, if left untreated will cause irreversible mental retardation, hyperactivity, spasticity and seizures. Biopterin defects will cause early severe neurological disease.
**Treatment**

PKU is treated with a low phenylalanine diet supplemented with artificial amino acids. The indication for diet depends upon the level of blood phenylalanine. Hyperphenylalanine patients will require a less restricted diet than classical PKU. Patients with biopterin defects will require BH4 and replacement of brain amines with L-dopa and 5-hydroxytryptophan. Some individuals with PKU will also respond to BH4.

**Diagnostic Evaluation**

The initial confirmation of an elevated phenylalanine is through plasma amino acids. To differentiate between PKU and biopterin defects, blood and possibly urine pterin/DHPR analysis is required. It may also be necessary to analyse CSF neurotransmitters.

**What to do after receiving the elevated phenylalanine result?**

a) Contact the family to inform them of the screening result and ascertain the clinical status of the baby.

b) Consult a metabolic clinician for advice if baby is unwell.

c) Collect repeat blood spot or additional diagnostic samples as recommended in the screening report or by the metabolic clinician.

d) If the baby develops symptoms, advise the family to go to the emergency department with the covering letter.