ASSESSMENT ALGORITHM FOR PAEDIATRIC PATIENTS WITH SUSPECTED X-LINKED HYPOPHOSPHATAEMIA (XLH)

This algorithm has been developed in collaboration with experts from the XLH Link Working Group.

SUSPECTED RICKETS
Bone deformity
Radiological findings

CONSIDER THE FOLLOWING TESTS

Blood

- **ALP**
- **Calcium**
- **Phosphate**
- **PTH**
- **Vitamin D (25[OH]D & 1,25[OH]$_2$D)**
- Creatinine
- Blood gases
- Na^+, K^+, Cl^-

Urine

- pH
- Glucose
- Creatinine
- Amino acids
- Protein
- Na^+, K^+, Cl^-
- Calcium
- Phosphate

ALP[1,2]	↓
P Calcium[2]	Normal/↑
P Phosphate[2]	Normal/↑
PTH[2]	Normal/↓
25(OH)D[1]	Normal
1,25(OH)$_2$D[3]	↓

CONSIDER
HYPOPHOSPHATASIA*

ALP	Normal
P Calcium	Normal
P Phosphate	Normal
PTH	Normal
25(OH)D	Normal
1,25(OH)$_2$D	Normal

CONSIDER OTHER
SKELETAL DYSPLASIA
Refer to bone specialist

ALP[3]	↑/↑↑
P Calcium[3]	Normal
P Phosphate[3]	↓
PTH[3]	Normal/↑
25(OH)D[3]	Normal
1,25(OH)$_2$D[3]	Normal

CONSIDER
PHOSPHOPAENIC RICKETS

ALP[3]	↑↑↑
P Calcium[3]	Normal/↓
P Phosphate[3]	Normal/↓
PTH[3]	↑↑↑
25(OH)D[3]	Normal/↓↓
1,25(OH)$_2$D[3]	Varies

CONSIDER
CALCIPAENIC RICKETS
(vitamin D deficient rickets)
Treat appropriately

CALCULATE

- TMP/GFR
- FEK^+
- Urinary protein/creatinine ratio

TmP/GFR[3]	↓
Other urine and plasma measures	Normal

CONSIDER **XLH**
Refer to bone disease expert

TmP/GFR[4]	↓
Urinary glucose[5]	↑
Urinary pH[6]	↑
Non-anion gap metabolic acidosis[5]	+
Hypokalemia with high FEK^+[7]	+

CONSIDER **Fanconi's syndrome**
Refer to nephrologist

↑, elevated; ↓, low; 1,25(OH)2D, 1,25-dihydroxyvitamin D (calcitriol); 25(OH)D, 25-hydroxyvitamin D (calcidiol); ALP, alkaline phosphatase; PTH, parathyroid hormone; TmP/GFR, ratio of tubular maximum reabsorption of phosphate to glomerular filtration rate; XLH, X-linked hypophosphataemia; P, plasma; +, present: FEK^+, fractional excretion of potassium

*Measurement of serum vitamin B6, urinary phosphoethalonamine (PEA), inorganic pyrophosphate (PPI) and genetic testing of the *ALPL* gene are required for a definitive diagnosis of hypophosphatasia.

References

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