Tubulopathies

THE GENOMIC INSTITUTE

Step 1

Document the following clinical information to assist in phenotyping:

- Blood biochemistry and predominant electrolyte anomaly (e.g. K^+, Cl^-, Mg^{2+}, Ca^{2+}, HCO_3^-)
- 24hr urine electrolytes
- Kidney function
- Kidney imaging
- Extrarenal features
- Family history of kidney disease, including kidney phenotype

For patients with a negative or unknown family history:
If possible, assess the phenotype of both parents with blood biochemistry and urine electrolyte testing.

For patients with a positive family history:
If a family member has had genetic testing and a disease-causing variant has been identified:

- Do not proceed to genomic testing.
- Refer to Genetic Health Queensland to discuss targeted confirmatory genetic testing

Consider genomic testing if there are any of the following indications for testing:

- Diagnostic uncertainty
- Genotype-specific management
- Family planning
- Risk clarification for family
- Transplant planning (particularly if donor is a blood relative)

Step 2

The following pathway guides genomic testing based on suspected clinical diagnosis. Key clinical features for each diagnosis are listed.

Bartter syndrome	Blood	High HCO_3^-, low K^+
	Urine	Normal or high Ca^{2+} except Type 3
Gitelman syndrome	Blood	High HCO_3^-, low K^+
	Urine	Normal or low Ca^{2+}
Dent disease	Blood	Low PO_4^{2-}, normal or low K^+
	Urine	High beta-2 microglobulin and low molecular weight proteins, high amino acids, high Ca^{2+}
	Other	Nephrocalcinosis, kidney stones
Proximal renal tubular acidosis	Blood	High Cl^-, low HCO_3^-, low K^+
Distal renal tubular acidosis	Blood	High Cl^-, low HCO_3^-, low K^+
Fanconi tubulopathy	Blood	High Cl^-, low HCO_3^-, low K^+
Nephrogenic diabetes insipidus	Blood	Normal or high Na^+
	Other	Rapid dehydration propensity, autonomic hypotension
Cystinuria	Urine	High cystine
	Other	Frequent cystine kidney stones
Pseudohypoaldosteronism	Blood	Low HCO_3^-, high K^+
	Urine	High Na^+ (Type 1a/1b)
	Other	Hypertension
Familial hypercalcaemia	Blood	High Ca^{2+}, normal or high parathyroid hormone
	Urine	Low Ca^{2+}
Familial hypocalcaemia	Blood	Low Ca^{2+}, normal or low parathyroid hormone
	Urine	High Ca^{2+}
	Other	Nephrocalcinosis, kidney stones
Hypophosphataemic rickets	Blood	Low PO_4^{2-}, normal or high alkaline phosphatase, normal or high parathyroid hormone
	Other	Rickets, osteomalacia, enthesopathy, nephrocalcinosis

Request 'Renal Tubulopathies' panel

Although the same genomic test is requested for these diseases, detailed phenotype information is crucial for analysing and interpreting the genomic test.

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For further specialist advice, email Renal Genetics MDT at Renal_Genetics_MDT@health.qld.gov.au