A multidisciplinary renal genetics clinic improves patient diagnosis

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Developments in genomic science are disproportionately in advance of their translational clinical application. Multidisciplinary clinics are proposed to overcome this[1] in many medical fields.[2] This is especially so in nephrology, which is typified by significant community disease burden[3] and heritability.[4] Several renal genetics clinics (RGCs) operate overseas, although their models and outcomes are largely unreported. The first multidisciplinary RGC in Australasia commenced at the Royal Brisbane and Women's Hospital in August 2013, involving a clinical geneticist, nephrologist, genetic counsellor, and ancillary clinical and diagnostic services. The departments of clinical genetics and nephrology jointly operate the RGC. The clinical geneticist and nephrologist see families in the same appointment, maximising use of time. In this article, we report this clinical service's initial outcomes and model for mainstreaming genetic medicine.

We undertook a retrospective cohort study of patients who attended the Royal Brisbane and Women's Hospital Renal Genetics Clinic during its first 2 years of operation (1 August 2013 to 31 August 2015; ethics approval reference, HREC/14/QRBW/187). During this period, 108 patients from 100 families were seen; the median age was 41 years (range, 13–86 years). Most patients were referred by a public or private sector nephrologist (47% [51/108] and 28% [30/108], respectively), and 81% (87/108) had an existing genetic renal diagnosis, 45% (49/108) had extra-renal clinical features and 65% (70/108) had a family history of renal disease. Existing renal diagnoses were diverse, and the most common were autosomal dominant polycystic kidney disease (34% [37/108]), Alport syndrome (17% [18/108]) and focal segmental glomerulosclerosis (7% [8/108]).

The overlapping reasons for referral were for a diagnosis (67% [72/108]), a discussion about a diagnosis (27% [29/108]) and genetic counselling (81% [87/108]). Clinical and family histories and results of clinical investigations were reviewed. Differential diagnoses were discussed for 68% of patients (73/108), disease information was provided to

Changes in clinical diagnosis at the Royal Brisbane and Women's Hospital Renal Genetics Clinic (green, unchanged diagnosis; blue, changed diagnosis)

Referral diagnosis	Number of patients		Final diagnosis	Number of patients
Alport syndrome	18	→	X-linked Alport syndrome	15
		→	Autosomal recessive Alport syndrome	1
		→	Focal segmental glomerulosclerosis (podocytopathy)	1
		→	Unclear	1
Thin basement membrane nephropathy	4	→	Thin basement membrane nephropathy	3
		→	Alport syndrome	1
Focal segmental glomerulosclerosis	10	→	Focal segmental glomerulosclerosis	6
		→	X-linked Alport syndrome	3
		→	Unclear	1
Tubulointerstitial disease	8	→	Autosomal dominant tubulointerstitial kidney disease	2
		→	Nephronophthisis	4
		→	Renal cysts and diabetes syndrome	1
		→	Other	1
Unclear	9	→	Unclear	4
		→	Nephronophthisis	2
		→	Tubulointerstitial disease (other)	1
		→	Focal segmental glomerulosclerosis (podocytopathy)	1
		→	Autosomal dominant tubulointerstitial kidney disease	1
Autosomal dominant polycystic kidney disease	37	→	Autosomal dominant polycystic kidney disease	33
		→	Renal cysts and diabetes syndrome	2
		→	Other cystic disease	2
Autosomal recessive polycystic kidney disease	2	→	Autosomal recessive polycystic kidney disease	2
Renal cysts	8	→	Other cystic disease	2
		→	Autosomal dominant polycystic kidney disease	6
Atypical haemolytic uraemic syndrome	3	→	Atypical haemolytic uraemic syndrome	2
		→	C3 glomerulonephritis	1
Congenital anomalies of the kidney and urinary tract	2	→	Congenital anomalies of the kidney and urinary tract	1
		→	Renal cysts and diabetes syndrome	1
Tubular and metabolic dysfunction (unclear)	3	→	Tubular and metabolic dysfunction (diagnosed)	3
Other	4	→	Other	3
		→	C3 glomerulonephritis	1
Total	108		Total changed diagnoses	27

89% (96/108), and genetic counselling provided to 67% (72/108).

Genetic testing was ordered for 69% of patients (75/108). Of a total of 83 tests, results were positive for 39% (32/83), negative for 30% (25/83), "variant of uncertain significance" for 7% (6/83) and pending for 24% (20/83). Negative genetic test results have enabled 12 of the families to enrol in a research study.[5] To date, the clinical diagnosis has changed for 27 of the 108 patients (25%) (Box), enabling correct diagnosis, accurate genetic counselling, identification of at-risk individuals, access to assisted reproductive technologies and altered medical management.

This RGC model is novel in Australasia and its results are among the first to be reported internationally. In its first 2 years of operation, patients underwent clinical appraisal and a tailored combination of differential diagnosis discussion, disease information provision and genetic counselling. Genetic testing was often, but not always, used, with results confirming or clarifying a diagnosis for about half of the patients. Overall, the diagnosis was changed in a quarter of patients.

This clinic model is inclusive, flexible and multidisciplinary while demonstrably improving patient diagnosis and care. We believe that it is a viable, translational and patient-focused clinical template for effective introduction of genetics and genomics into everyday clinical practice.

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References are available online at www.mja.com.au.

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