Recombinant Growth Hormone Treatment in Children with Chronic Kidney Disease (GROW-CKD)

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Background

- Growth impairment is a major complication in children with chronic kidney disease (CKD)
- Recombinant human growth hormone (rhGH) has been shown to support linear growth in this population
- Underlying etiology of renal disease may impact the degree of growth impairment, and is thought to influence patient response to rhGH
- There is limited evidence on the comparative effectiveness of rhGH with respect to primary renal disease
- Comparisons of optimal dosing, duration, and long term response to rhGH therapy between primary renal disease states are poorly described in the literature

Objectives

Primary Objective:

- To describe the differences in effectiveness of rhGH therapy on height velocity and height standard deviation score (SDS) between primary renal disease states in children with CKD

Secondary Objectives:

- To describe dose requirements of rhGH for children receiving care through BC Children's Hospital (BCCH) Nephrology Clinics
- To describe the prevalence of adverse effects associated with rhGH treatment in children with CKD

Methods

- **Design:** Retrospective cohort chart review
- **Inclusion:** Patients aged 1– 20 years, who received rhGH treatment for at least 6 months between January 2001 and August 2018, and were managed through BCCH Nephrology Clinics
- **Exclusion Criteria:** Other medical causes of growth failure; use of sex steroids or anabolic steroids
- **Statistical Analysis:** Sample size of convenience; descriptive statistics

Results

Table 1: Patient Characteristics

	N = 29
Males, n (%)	19 (66)
Age, years (Median, IQR)	6.2 (2.5– 9.6)
Total duration of rhGH, months (Median, IQR)	24 (12 - 36)
Primary Renal Disease	
Dysplasia/Hypoplasia, n (%)	19 (66)
Tubulopathy/Ciliopathy, n (%)	5 (17)
Glomerular disease, n (%)	6 (20)
Other primary renal disease, n (%)	1 (6)
CKD Treatment Modality	
Non-dialysis CKD, n (%)	17 (59)
Hemodialysis, n (%)	0 (0)
Peritoneal dialysis, n (%)	10 (34)
Post-renal transplant, n (%)	2 (7)

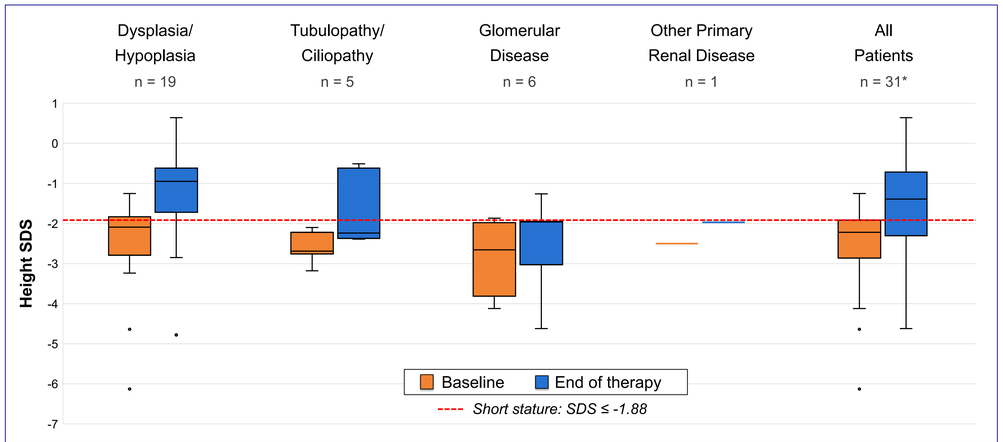

Figure 1: Height SDS at Baseline and End of rhGH Therapy

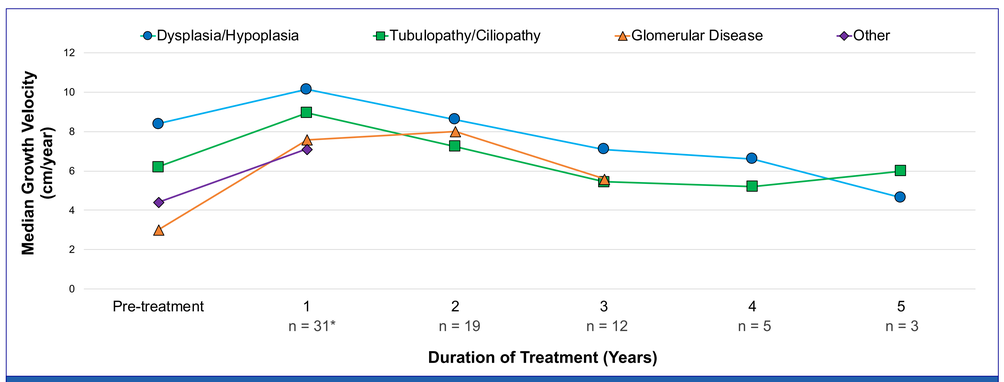

Figure 2: Growth Velocity Before and During rhGH Therapy

* 2 patients had two separate trials of rhGH therapy

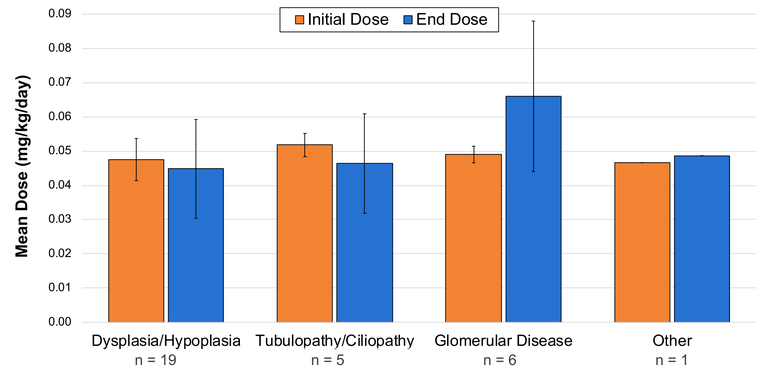

Figure 3: Dose at Initiation and Cessation of rhGH Therapy

Table 2: Adverse Effects

Outcome, n (%)	N=29
Insulin-dependent diabetes after onset of rhGH therapy	0 (0)
Pseudotumor cerebri	0 (0)
Avascular necrosis	1 (3)
Slipped femoral epiphysis	0 (0)

Limitations

- Unbalanced primary renal disease groups
- No control group for comparison
- Age and renal function at initiation may have been confounders due to inherent differences in growth velocity

Conclusions

- Greatest improvement in height SDS and growth velocity occurred in the first year of rhGH therapy
- Height SDS was improved in all primary renal disease groups
- Children with dysplasias, hypoplasias, tubulopathies and ciliopathies may respond better to rhGH and require lower doses relative to those with glomerular diseases
- rhGH was well tolerated overall
- Further studies are required to evaluate differences in growth outcomes between primary renal disease states to better inform practice