Evaluating the Impact of Luxturna Gene Therapy on Vision Improvement & Disease Progression in Patients with RPE65 Mutation-Associated Inherited Vision Loss

Sachdev A, Kukreja I, Tanwar K, Nayyar A, Daral S, Verma V, Markan R, Roy A, Goyal R, Brooks L, Seligman M

Background & Objective

- Hereditary retinal dystrophies (HRD), including retinitis pigmentosa (RP) and Leber congenital amaurosis (LCA), are genetic disorders causing night blindness and vision loss from childhood. Biallelic mutations in the RPE65 gene account for 3-16% of LCA cases in the US. Luxturna, approved by the FDA on December 18, 2017, delivers a normal RPE65 gene to retinal cells.
- This study aims to elucidate the significance of real-world evidence and unstructured clinical notes in evaluating the clinical outcomes of gene therapy. Additionally, it compares healthcare resource utilization (HCRU) between HRD patients treated with Luxturna and those not receiving the therapy.

Methodology

Figure 1. Database and Time Periods

Database: Optum® Market Clarity

Study Period: Dec 2017 – Sep 2024

B6 | Identification period | F1 | F2

6 months each

Data Collection:

Patients with ≥1 claim or Electronic Health Record (EHR) for HRD (ICD10 H35.5*) were identified. Patients were divided into:

- Cases: Treated with Luxturna identified using specific NDC codes (71394006501, 71394041501, 71394071601) and HCPCS codes (J3398) (index - Luxturna administration date).
- Controls: No Luxturna treatment (index - HRD diagnosis date).

Exact case-controls match (1:2) performed using age, sex, race/ethnicity, and baseline Charlson Comorbidity Score.

Analysis:

Natural language processing (NLP) was used to extract key terms 'Luxturna', 'Retinitis Pigmentosa', 'RP', 'Leber congenital amaurosis', 'LCA', 'RPE65' for patients with ≥2 clinical notes to assess changes in vision pre & post Luxturna based on outcomes of visual acuity testing and visual field testing.

Results

- A total of 57 patients represent cases and 114 represent controls, with a mean age of 16.44 years, 52% females, and 44% Caucasians.

[1]VA: Visual Acuity | [2]PPPM: Per Patient Per Month

- Cases: Increase in HCRU, ambulatory (AMB), outpatient (OP), and office visits (OV), and visits to specialty, Ophthalmology (OPTHAL), Allied Health Professional (AHP), and General Practice (GP) observed in F1 compared to B6 to mitigate potential complications, followed by a significant decrease in visits in F2, dropping below B6 (**Figure 3, 4**).
- Controls: Increase in HCRU, AMB, OP, OV, and visits to specialty, OPTHAL, AHP, GP observed in F1 compared to B6 to monitor disease progression and manage complications, followed by an insignificant decrease in visits in F2, staying above B6 (**Figure 3, 6**).

Figure 2. Cases: Clinical Notes Analysis (patients %)

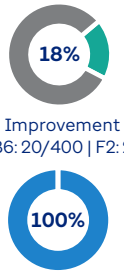


Figure 3. Average PPPM[2] HCRU Counts*

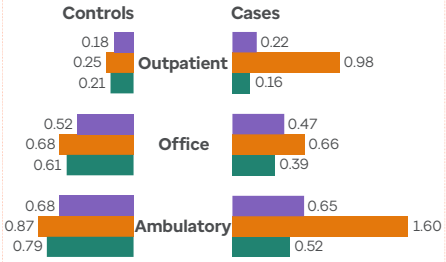


Figure 4. Cases: Provider Specialty Visits*

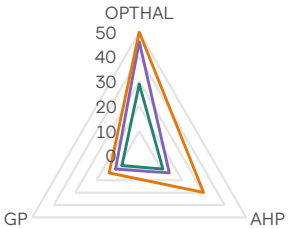
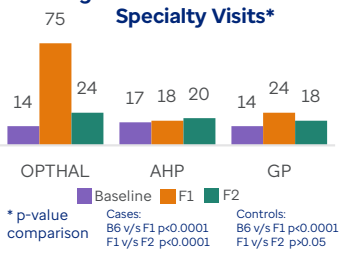


Figure 5. Cases: Patient Reported Outcomes (PROs)

Figure 6. Controls: Provider Specialty Visits*



Conclusions

- Successful treatment with Luxturna could lead to significant improvements in the quality of life for individuals affected by this disorder (**Figure 5**).
- Limitation: Due to the limited availability of patients with unstructured clinical data, the analysis was conducted on a smaller sample size.
- Future research should include long-term follow-up studies to evaluate Luxturna's sustained efficacy and safety. Collecting real-world evidence through patient-reported outcomes (PROs) and caregiver feedback can further confirm improvements in quality of life and functional vision.

Optum