A Preliminary Analysis of Oral Edaravone-Treated Patients With Amyotrophic Lateral Sclerosis Enrolled in a US-Based Administrative Claims Database

Malgorzata Ciepielewska, MS[1]; Jeffrey Zhang, PhD[2]; Ying Liu, PhD[2]; Polina Da Silva, MSc[1]

[1]Mitsubishi Tanabe Pharma America, Inc., Jersey City, New Jersey, USA; [2]Princeton Pharmatech, LLC, Princeton, New Jersey, USA

CO-151

Introduction

- Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative condition that causes neuron cell death, progressive muscular weakness, and paralysis[1]
- Radicava® (edaravone) injection was approved by the US Food and Drug Administration (FDA) in 2017 for the treatment of ALS and has been shown in clinical trials to slow the rate of physical functional decline[2]
  - In a phase 3 trial, intravenous (IV) edaravone was shown to slow down the rate of functional decline by 33% (*P*=0.0013), as measured by the ALS Functional Rating Scale-Revised (ALSFRS-R), compared with placebo at 24 weeks[3]
- Subsequently, Radicava ORS® (edaravone) oral suspension was FDA approved for use in patients with ALS in May 2022[2]
- At the time of this study, the FDA had approved riluzole, edaravone (IV and oral suspension), and the combination of sodium phenylbutyrate and taurursodiol for the treatment of patients with ALS[2,4,5]
- ALS clinical trials present a challenge due to disease heterogeneity; therefore, although randomized controlled trials are considered the gold standard, research studies employing real-world evidence can provide supplemental data[6]

Objective

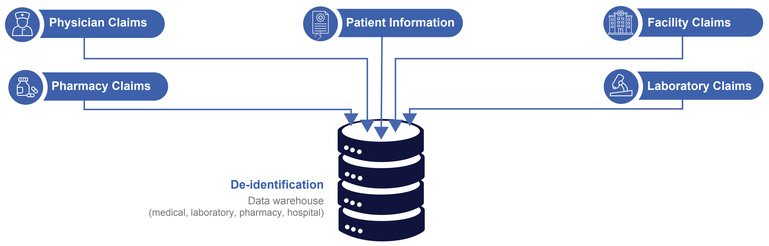
- To characterize oral edaravone-treated patients with ALS in this observational, US-based administrative claims analysis

Methods

Study Design

- The Optum Clinformatics® Data Mart (CDM) is statistically de-identified under the expert determination method consistent with the Health Insurance Portability and Accountability Act of 1996, and is managed according to Optum customer data use agreements
- The database includes approximately 17 to 19 million annual covered lives, for a total of more than 65 million unique lives over a period ranging from January 2007 through December 31, 2022. The population is geographically diverse, spanning all 50 states
- CDM administrative claims submitted for payment by providers and pharmacies are verified, adjudicated, and de-identified prior to inclusion. These data, including patient-level enrollment information, are derived from claims submitted for all medical and pharmacy healthcare services with information related to healthcare costs and resource utilization (Figure 1)
- Patients with ALS who were continuously enrolled in Optum's CDM from June 15, 2022, through June 30, 2023, were included and divided into 2 groups:
  - Group 1 initially received IV edaravone and switched to oral edaravone
  - Group 2 received oral edaravone and was previously edaravone-naïve
- The index date was the first dosing date of oral edaravone

Figure 1. Optum Clinformatics® Data Mart



Statistical Analyses

Descriptive Analysis

- Assessed descriptively using counts and percentages for categorical variables and measures of central tendency (mean/median/standard deviation/interquartile range) for continuous variables

Patient Demographic and Clinical Characteristics

- Demographic and clinical characteristics are reported for oral edaravone–treated patients with ALS (n=375), which included 69 patients who initially received IV edaravone and switched to oral edaravone, and 306 patients who received oral edaravone and were previously IV edaravone–naïve (Table 1)

Table 1. Demographic and Clinical Characteristics of Patients With ALS

	Switched From IV to Oral Edaravone (N=69)	Initiated With Oral Edaravone (N=306)	Total (N=375)
Age Group, n (%)			
18–39	4 (5.8)	2 (0.7)	6 (1.6)
40–49	9 (13.0)	16 (5.2)	25 (6.7)
50–59	13 (18.8)	63 (20.6)	76 (20.3)
60–69	30 (43.5)	110 (35.9)	140 (37.3)
70–79	10 (14.5)	98 (32.0)	108 (28.8)
80+	3 (4.3)	17 (5.6)	20 (5.3)
Age (years)			
Mean (SD)	60.9 (11.9)	65.2 (9.87)	64.4 (10.4)
Median [min, max]	62.0 [30.0, 83.0]	66.0 [34.0, 87.0]	65.0 [30.0, 87.0]
Sex, n (%)			
Male	39 (56.5)	165 (53.9)	204 (54.4)
Female	30 (43.5)	141 (46.1)	171 (45.6)
Race, n (%)			
White	52 (75.4)	233 (76.1)	285 (76.0)
Black	2 (2.9)	21 (6.9)	23 (6.1)
Other	12 (17.4)	27 (8.8)	39 (10.4)
Unknown	3 (4.3)	25 (8.2)	28 (7.5)
Region, n (%)			
Midwest	16 (23.2)	68 (22.2)	84 (22.4)
Northeast	10 (14.5)	47 (15.4)	57 (15.2)
South	29 (42.0)	118 (38.6)	147 (39.2)
West	14 (20.3)	72 (23.5)	86 (22.9)
Unknown	0	1 (0.3)	1 (0.3)
Payer, n (%)			
Medicare	46 (66.7)	214 (69.9)	260 (69.3)
Commercial	23 (33.3)	92 (30.1)	115 (30.7)
Riluzole, n (%)			
Yes	65 (94.2)	266 (86.9)	331 (88.3)
No	4 (5.8)	40 (13.1)	44 (11.7)
Sodium phenylbutyrate-taurursodiol, n (%)			
Yes	29 (42.0)	179 (58.5)	208 (55.5)
No	40 (58.0)	127 (41.5)	167 (44.5)
Overall treatment duration (months)			
Mean (SD)	27.0 (16.8)	4.26 (3.44)	8.45 (11.8)
Median [min, max]	21.3 [3.07, 67.8]	3.92 [0.0331, 12.4]	4.73 [0.0331, 67.8]

ALS, amyotrophic lateral sclerosis; IV, intravenous; SD, standard deviation.

- The percentage of patients who reached specific disease progression milestones before the index date are listed in Table 2

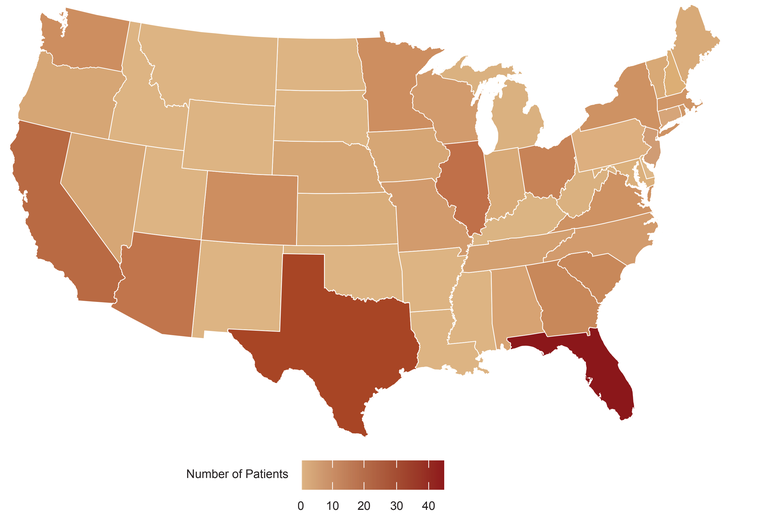
Table 2. Pre-index Disease Progression Milestones in Patients With ALS*

	Switched From IV to Oral Edaravone (N=69)	Initiated With Oral Edaravone (N=306)	Total (N=375)
Pre-index use of canes/walkers/wheelchairs, n (%)			
Yes	27 (39.1)	54 (17.6)	81 (21.6)
No	42 (60.9)	252 (82.4)	294 (78.4)
Pre-index use of artificial nutrition, n (%)			
Yes	22 (31.9)	50 (16.3)	72 (19.2)
No	47 (68.1)	256 (83.7)	303 (80.8)
Pre-index use of non-invasive ventilation, n (%)			
Yes	27 (39.1)	63 (20.6)	90 (24.0)
No	42 (60.9)	243 (79.4)	285 (76.0)
Pre-index use of invasive ventilation, n (%)			
Yes	1 (1.4)	4 (1.3)	5 (1.3)
No	68 (98.6)	302 (98.7)	370 (98.7)
Pre-index hospitalization, n (%)			
Yes	25 (36.2)	80 (26.1)	105 (28.0)
No	44 (63.8)	226 (73.9)	270 (72.0)
Pre-index use of gastrostomy tube, n (%)			
Yes	14 (20.3)	36 (11.8)	50 (13.3)
No	55 (79.7)	270 (88.2)	325 (86.7)

*The index date was the first dosing date of oral edaravone.
ALS, amyotrophic lateral sclerosis; IV, intravenous.

- The US distribution of patients enrolled in the Optum CDM who received oral edaravone is presented in Figure 2

Figure 2. US Distribution of Patients With ALS Enrolled in the Optum CDM Who Were Prescribed Oral Edaravone

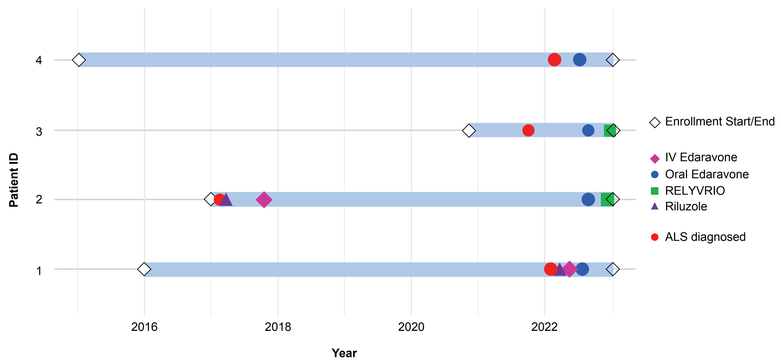


ALS, amyotrophic lateral sclerosis; CDM, Clinformatics® Data Mart; US, United States.

Treatment Timelines for Patients With ALS

- Treatment timeline examples for 4 patients with ALS enrolled in the CDM indicated that patients were prescribed and initiated FDA-approved treatments for ALS at various stages of their disease progression (Figure 3)

Figure 3. Examples of Treatment Timelines for CDM-Enrolled Patients With ALS

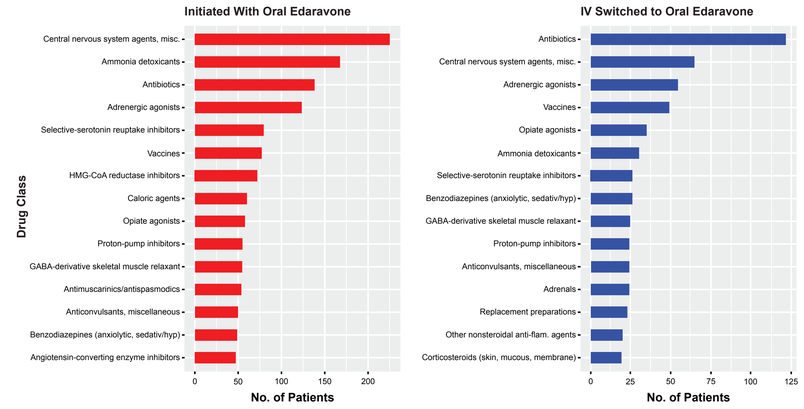


ALS, amyotrophic lateral sclerosis; CDM, Clinformatics® Data Mart; FDA, Food and Drug Administration; ID, identification; IV, intravenous.

Most Common Concomitantly Prescribed Drugs

- Patients who initiated treatment with oral edaravone were most frequently concomitantly prescribed central nervous system agents, while patients who initiated treatment with IV edaravone and switched to oral edaravone were most frequently concomitantly prescribed antibiotics (Figure 4)

Figure 4. Top 15 Drugs Concomitantly Prescribed After Initial Edaravone Dose



IV, intravenous.

Most Common Procedures After Initial Edaravone Dose

- The most common procedures after initiating edaravone[a] were routine venipuncture, complete blood count with automated differential, and comprehensive metabolic panel (Figure 5)

Figure 5. Top 15 Procedures After Initial Edaravone Dose

IV, intravenous.
[a]Includes patients who initiated treatment with oral edaravone, and patients who initiated treatment with IV edaravone and switched to oral edaravone.

Limitations

- This study was limited only to patients with ALS who had commercial health coverage or Medicare Advantage plans. Consequently, results of this analysis may not be generalizable to patients with ALS with other insurance plans or without health insurance coverage
- This study relied on administrative claims data, which are subject to coding limitations and entry error. The possibility of underdiagnosis of ALS may have led to a selection bias and/or smaller sample sizes, as patients with ALS who were untreated or who did not have a relevant diagnosis recorded on their medical claims were excluded
- Patients who were no longer enrolled in the Optum CDM database during the post-index period were excluded from the analysis. Therefore, the study population may appear to have been healthier than the total population of patients with ALS in the database

Conclusions

- This study is ongoing, with additional results expected in future analyses
- These real-world data may help clinicians and payers better understand the demographics, clinical characteristics, and healthcare utilization of patients with ALS treated with oral edaravone

References

1. Goutman SA, Hardiman O, Al-Chalabi A, et al. *Lancet Neurol*. 2022;21(5):465-479.
2. Radicava® (edaravone) injection and Radicava ORS® (edaravone) oral suspension Prescribing Information. Mitsubishi Tanabe Pharma Corporation; 2022.
3. Writing Group; Edaravone (MCI-186) ALS 19 Study Group. *Lancet Neurol*. 2017;16(7):505-512.
4. Rilutek® (riluzole). Package insert. Bridgewater, NJ:Sanofi-Aventis U.S. LLC; 2012.
5. Relyvrio® (sodium phenylbutyrate and taurursodiol). Prescribing Information. Cambridge MA: Amylyx Pharmaceuticals Inc.; September 2022.
6. Berger ML, Sox H, Willke RJ, et al. *Pharmacoepidemiol Drug Saf*. 2017;26:1033-1039.

Acknowledgments

- The authors thank Irene Brody, VMD, PhD, of *p*-value communications, Cedar Knolls, NJ, USA, for providing medical writing support. Editorial support was also provided by *p*-value communications. This support was funded by Mitsubishi Tanabe Pharma America, Inc., Jersey City, NJ, USA, in accordance with Good Publication Practice Guidelines 2022

Disclosures

- MC and PDS are employees of Mitsubishi Tanabe Pharma America, Inc. JZ and YL are employees of Princeton Pharmatech, which has received consultancy fees from Mitsubishi Tanabe Pharma America, Inc.
- This study was sponsored by Mitsubishi Tanabe Pharma America, Inc.

MA-OE-US-0502

Presented at the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 2024 | May 5-8 | Atlanta, GA