BIOS 667 Group Project

Lily Bai Nathalie Blasco Yihao Peng Lauren Rackley Sirui Wu

2025-11-10

week	site	id	treat	age	sex	twstrs
0	1	1	2	65	1	32
2	1	1	2	65	1	30
4	1	1	2	65	1	24
8	1	1	2	65	1	37
12	1	1	2	65	1	39
16	1	1	2	65	1	36

Introduction

The purpose of this project is to examine the effects of botulism toxin type B (BotB) to treat cervical dystonia over time. Cervical dystonia (CD) is a chronic neurological disorder, in which patients have painful involuntary contractions in neck muscles. CD is more prevalent in women (Jankovic et al., 2023). The prevalence of CD is estimated to be 28-183 cases per million. The data comes from a multicenter randomized clinical trial for cervical dystonia patients with 9 U.S. sites. Botulism toxin types A and B are first-line treatments for CD (Wetmore et al., 2025). The treatment groups included in the study were placebo, 5000 U BotB, and 10000 U BotB. The response variable is Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) total score, which ranges from 0 to 85 and is comprised of disability (0-30), pain (0-20), and severity (0-35) subscores. Only total score is included in this data.The TWSTRS score was measured at week 0 (baseline), and 2,4,6,8,12, and 16 weeks after treatment start. Site is included in the dataset but no further details about site were included in the available dataset documentation.

Methods

Study Population

Inclusion and exclusion criteria for the trial were not available. Duration of CD and age at onset were not known. The study included 109 patients (67 (61%)) females.The mean age was 56 (12). Median age was 56 years. The mean TWSTRS score at baseline was 46 (10). It was not known if the patients received prior BotB treatments. Information about the randomization schedule was not provided.

Statistical Analyses

Number of observations, mean, median, standard deviation (SD), minimum (min) and maximum (max) were provided for age. Mean and SD were calculated for TWSTRS score at baseline. Frequencies and percentages were reported for categorical variables. GLM, GLMM, and GEE models were fit using TWSTRS total score as the response variable and blank, blank, blank as covariates.

Listing 1. TWSTRS scores for 109 patients with CD at weeks 2,4,8,12,16

ID	Group	Age	Sex	Week 2	Week 4	Week 8	Week 12	Week 16
1	5000 U	65	Female	30	24	37	39	36
2	10000 U	70	Female	26	27	41	65	67
3	5000 U	64	Female	20	23	26	35	35
4	Placebo	59	Female	61	64	62		
5	10000 U	76	Female	35	48	49	41	51
6	10000 U	59	Female	34	43	48	48	51
7	5000 U	72	Male	32	32	43	42	46
8	Placebo	40	Male	33	21	27	32	38
9	5000 U	52	Female	32	34	35	37	36
10	Placebo	47	Male	10	31	32	6	14

Results

Clear Figures/tables describing and summarizing key outcomes/variables Clear Figures/table illustrating results that directly addresses question(s) Proper and clear descriptions of results based on figures and tables, along with diagnostics Code chunks should be hidden in the document, with only text, figures, and tables showing

Table 1: Patient Characteristics at Baseline

Characteristic	Overall N = 109	Placebo N = 36	BotB 5000 U N = 36	BotB 10000 U N = 37	p-value
Sex					0.0706
Female	67 (61%)	21 (58%)	18 (50%)	28 (76%)	
Male	42 (39%)	15 (42%)	18 (50%)	9 (24%)	
Age (years)					0.6198
No. obs.	109	36	36	37	
Mean (SD)	56 (12)	54 (12)	57 (12)	56 (12)	
Median	56	56	57	54	
Min, Max	26, 83	26, 79	35, 83	34, 76	
TWSTRS total score at baseline					0.3307
Mean (SD)	46 (10)	44 (9)	46 (10)	47 (10)	

[1] BotB = botulinum toxin type B; TWSTRS = Toronto Western Spasmodic Torticollis Rating Scale.

[2] Pearson's Chi-squared test; Kruskal-Wallis rank sum test

Discussion

Summarization of main points, conclusions based in results Summarization of the various models applied, which ones you prefer and base your interpretations off of and why Discussion of limitations if any

References

Add references here later