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Adherence to Treatment of Growth Hormone Deficient and Small for Gestational Age Patients Naïve to Easypod™ in Mexico: Final Results of the Easypod™ Connect Observational Study (ECOS)

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INTRODUCTION

- The easypod™ auto-injector device is designed to make daily administration of recombinant human growth hormone (r-hGH) comfortable and easier to patients.
- Easypod™ device delivers pre-set doses of r-hGH (Saizen®) and stores a digital record of adherence to therapy that can be shared with healthcare providers for evaluation.
- The easypod™ auto-injector device is designed to make daily administration of recombinant human growth hormone (r-hGH) comfortable and easier to patients by delivering pre-set doses of r-hGH (Saizen®).
- Furthermore, easypod™ is integrated into an e-Health ecosystem for management of growth disorders treated with Saizen (r-hGH) available to healthcare professionals through a secure web solution.

OBJECTIVES

- To assess adherence to r-hGH therapy delivered via the easypod™ device in easypod™-naïve patients according to the approved pediatric indications for Saizen® in Mexico: growth hormone deficiency (GHD) or born small for gestational age (SGA).
- To evaluate the association of therapy adherence with growth outcomes.

METHODS

Study Design

- ECOS (NCT01555528) is a multicenter (24 countries), 5-year, longitudinal, observational study, which aims to evaluate country-specific adherence to r-hGH therapy prescribed via the easypod™ electromechanical auto-injector device.
- Herein we present the subanalysis for the Mexican population included in ECOS.

Endpoints

- The primary endpoint was the recorded adherence at yearly intervals.
- Secondary endpoints were height velocity, height velocity standard deviation scores (SDS), height, height SDS, as well as IGF-1 concentrations after each year of treatment.

Variables

- Demographic, auxological and diagnostic data were obtained from medical notes, with adherence data obtained directly from the patients' easypod™ records.
- Adherence was determined as the percentage adherence over time (number of days with injections received divided by the number of days with injections planned).

Data Analysis

- Correlations between adherence and growth outcomes were calculated using Spearman's product-moment correlation.

Table 1. Demographic characteristics of the Mexican patients included in ECOS.

	GHD (n=118)	SGA (n=24)	TS (n=5)	Overall N=148
Age, years				
Mean (SD)	9.95 (3.52)	10.13 (2.40)	8.60 (4.88)	9.96 (3.41)
Median	10.5	10	10	10
Min; Max	1; 18	5; 15	3; 14	1; 18
Sex, n (%)				
Female	50 (42.4)	9 (37.5)	5 (100)	64 (43.2)
Male	68 (57.6)	15 (62.5)	0	84 (56.8)
Ethnicity, n (%)				
Caucasian	5 (4.2)	1 (4.2)	0	6 (4.1)
Other	113 (95.8)	23 (95.8)	5 (100)	142 (95.9)

RESULTS

- The Complete Analysis Set included 148 Mexican patients (mean age: 9.96±3.41 years, 56.8% male, mean height at baseline 124.88±18.95 cm): 118 with GHD, 24 SGA, 5 with Turner Syndrome (TS) and 1 other/missing (Table 1).
- A total of 105 (71.4%) patients were also GH-naïve. Overall median adherence was >90% over the first year of treatment and >80% over 4 years (Figure 1).
- Adherence was not different by r-hGH indication (Figure 2).
- Both median and mean adherence were maintained above 80% over three years (Figure 1).
- At 1-year follow-up, mean change in height was 8.78±2.20 cm, whereas mean height velocity was 8.80±1.94 cm per year. In all, 84.7% patients had normal IGF-1 concentrations at 1-year follow-up (Table 2).

Figure 1. Adherence to r-hGH therapy delivered via the easypod™ device.

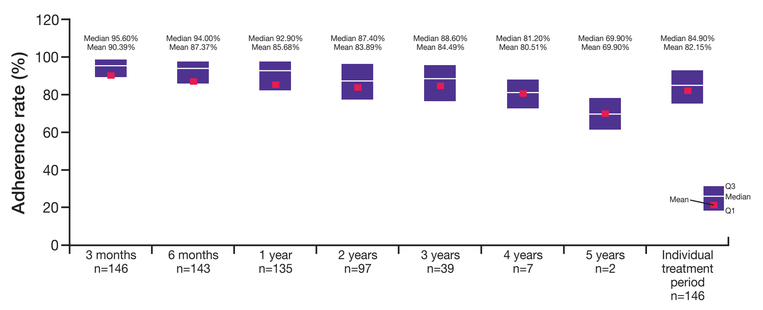

Figure 2. Adherence to r-hGH therapy delivered via the easypod™ device, according to indication.

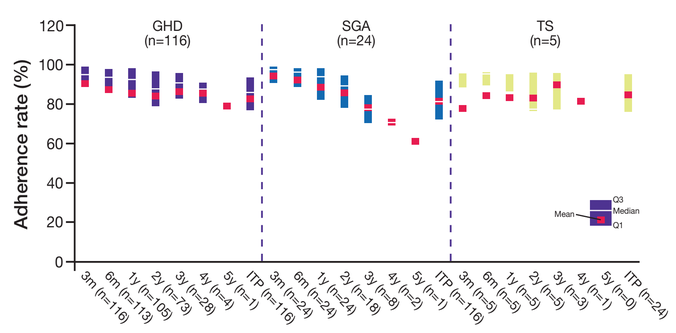

Table 2. Growth outcomes at 1-year follow-up.

	GHD (n=116)	SGA (n=24)	TS (n=5)	Overall N=146
Height (cm) at Baseline				
Mean (SD)	124.94 (19.69)	126.70 (13.03)	110.30 (22.06)	124.88 (18.95)
Median (IQR)	127.80 (114.05-137.60)	126.20 (122.50-135.55)	124.50 (95.00-124.80)	127 (114.50-137.00)
Change in height (cm)				
Mean (SD)	8.81 (2.27)	8.72 (1.91)	8.26 (2.49)	8.78 (2.20)
Median (IQR)	8.70 (7.50-10.25)	9.10 (7.55-9.55)	8.60 (8.50-9.00)	8.95 (7.50-10.20)
Height (SDS) at Baseline				
Mean (SD)	−2.17 (0.98)	−1.93 (0.76)	−3.36 (1.06)	−2.17 (0.97)
Median (IQR)	−2.06 (−2.06 - −1.72)	−1.89 (−2.43 - −1.55)	−3.10 (−3.79 - −2.58)	−2.08 (−2.61 - −1.72)
Change in height (SDS)				
Mean (SD)	0.58 (0.35)	0.51 (0.30)	0.63 (0.42)	0.57 (0.34)
Median (IQR)	0.56 (0.36-0.76)	0.44 (0.32-0.76)	0.80 (0.40-0.88)	0.54 (0.36-0.77)
Height velocity (cm/year)				
Mean (SD)	8.81 (2.06)	8.87 (1.39)	8.11 (1.71)	8.80 (1.94)
Median (IQR)	8.86 (7.61-10.22)	8.87 (8.13-9.61)	8.31 (8.11-8.77)	8.82 (7.65-9.96)
Height velocity SDS				
Mean (SD)	2.97 (2.62)	2.64 (1.97)	0.64 (1.65)	2.85 (2.51)
Median (IQR)	3.04 (1.58-4.17)	2.65 (1.54-3.71)	1.05 (−0.60-1.88)	2.91 (1.49-4.07)
1-year IGF-1 standard score, %				
Abnormal low	9.6	16.7	0	10.2
Normal	86.5	66.7	100	84.7
Abnormal high	3.8	16.7	0	5.1
Missing	64	18	4	87

- Statistically significant correlations were observed with change in height (p=0.0030), change in height SDS (p=0.0053), height velocity (p=0.0339), and height velocity SDS (p=0.0267) (Table 3).

Table 3. Spearman's correlation of therapy adherence with growth outcomes at 1-year follow-up.

	GHD (n=116)	SGA (n=24)	TS (n=5)	Overall N=146
Change in height (cm)				
n	105	24	5	135
Spearman's product-moment correlation	0.235	0.576	−0.300	0.254
P value	0.0158	0.0032	0.6238	0.0030
Change in height SDS				
n	105	24	5	135
Spearman's product-moment correlation	0.215	0.376	−0.500	0.239
p value	0.0280	0.0704	0.3910	0.0053
Height velocity (cm/yr)				
n	105	24	5	135
Spearman's product-moment correlation	0.158	0.551	−0.300	0.183
p value	0.1063	0.0052	0.6238	0.0339
Height velocity SDS				
n	102	24	4	131
Spearman's product-moment correlation	0.187	0.184	0.200	0.194
p value	0.0605	0.3896	0.8000	0.0267

Table 4. Correlation of adherence rate and growth outcome after 1 year follow-up, by growth hormone defficiency category.

	Idiopathic isolated GHD (n=13)	Other GHD causes (n=92)	Overall N=105 (n=5)
Change in height (cm)			
n (missing)	13 (0)	92 (0)	105 (0)
Spearman's product-moment correlation	0.055	0.146	0.150
P value	0.8581	0.1645	0.1255
Change in height SDS			
n (missing)	13 (0)	92 (0)	105 (0)
Spearman's product-moment correlation	0.105	0.150	0.147
p value	0.7339	0.1538	0.1340
Height velocity (cm/yr)			
n (missing)	13 (0)	92 (0)	105 (0)
Spearman's product-moment correlation	0.344	0.090	0.094
p value	0.2500	0.3913	0.3392
Height velocity SDS			
n (missing)	12 (1)	90 (2)	102 (3)
Spearman's product-moment correlation	0.123	0.148	0.147
p value	0.7043	0.1645	0.1416

CONCLUSIONS

- **ECOS has produced robust, real-time adherence data in patients receiving Saizen® via easypod™ and provided useful insights into growth response to Saizen® treatment.**
- **Adherence rates with the easypod™ device are high and maintained over time in GHD and SGA easypod™-naïve Mexican patients.**
- **The positive correlations between adherence and growth outcomes suggest an influence of adherence on treatment outcomes.**

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DISCLOSURES

The authors declare no conflicts of interest.

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