Economic Evaluation of Fingolimod Compared to Interferon-β1a in the Treatment of Pediatric-onset Multiple Sclerosis (PoMS) in Mexico

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Introduction

The overall incidence of pediatric-onset multiple sclerosis (PoMS) is estimated to range from 0.13 to 0.51 per 100 000 children-year.[1] Pediatric patients with relapsing MS are generally managed with first-line agents approved for use in adults with MS such as interferon (IFN) β. Data on the treatment of PoMS is mainly supported by observational open-label studies. PARADIG*MS* is the first randomized clinical trial to assess the efficacy of two disease modifying treatments for PoMS.[2,3] This study showed superior reduction with fingolimod treatment in annualized relapse rate (82% relative reduction, p<0.001) compared with IFN β-1a at up to 24 months.[4]

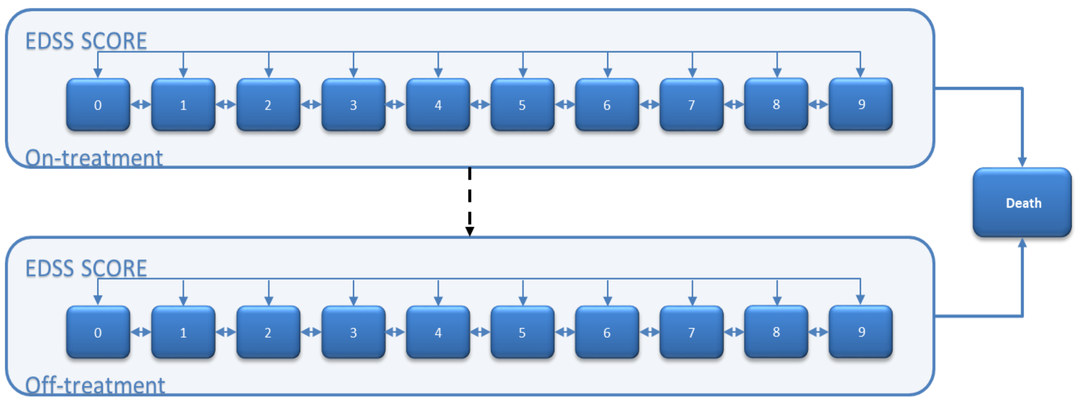
Objective

To compare the cost effectiveness of fingolimod and interferon (IFN)-β1a as first-line therapies in the management of PoMS in the Mexican social security context.

Methods

We used the simplified version of a previously developed Markov model, adapted to the Mexican public health care setting. The model considers 11 health states based on the Expanded Disability Status Scale (EDSS): 0–9 for relapsing PoMS and Death.

Figure 1. Schematic diagram of the Markov model



Annualized relapse rates were extracted from the PARADIG*MS* study and mortality was estimated using Mexican local data.[4,5] For disability progression, the adult natural course of the disease was transformed to properly reflect the pediatric population, while relative treatment effects were obtained from the PARADIG*MS* trial and published mixed treatment comparisons.[6,7]

Costs and resource use were extracted from a Delphi panel, and Mexican price sources.[8-10] An average relapse cost of MXN 121,067 was estimated for pediatric patients. Excluding resources related to relapse, the total annual cost per EDSS level was MXN 107,185, MXN 520,675 and MXN 827,336 for mild, moderate and severe disability, respectively. When patients move upwards on the disease severity scale, total direct cost per year was significantly increased.

Table 1. Resource utilization and cost per year in each EDSS level

	Mild (EDSS 0-3.5)	Moderate (EDSS 4-6.5)	Severe (EDSS 7-9)	Unit cost (MXN)	Mild cost (MXN)	Moderate cost (MXN)	Severe cost (MXN)
Inpatient care (day)	0	3	6	$8,333	$0	$24,999	$49,998
Emergency service	0	1	2	$3,089	$0	$3,089	$6,178
Outpatient visits	8	10	13	$2,122	$16,976	$21,220	$27,586
Physiotherapy	10	156	260	$2,608	$26,080	$406,848	$678,080
Psychological therapy	52	52	52	$1,222	$63,544	$63,544	$63,544
Laboratory tests	3	5	10	$195	$585	$975	$1,950

Delphi Panel, and DOF, 2019.

Costs and benefits were discounted at 5%, with a time horizon of 8 years. The primary outcome was incremental cost-effectiveness ratio (ICER) measured in Mexican pesos (MXN) per relapse avoided. Sensitivity analyses were performed to assess the robustness of the model estimations. Budget impact analysis was also estimated for the social security system in Mexico.

Results

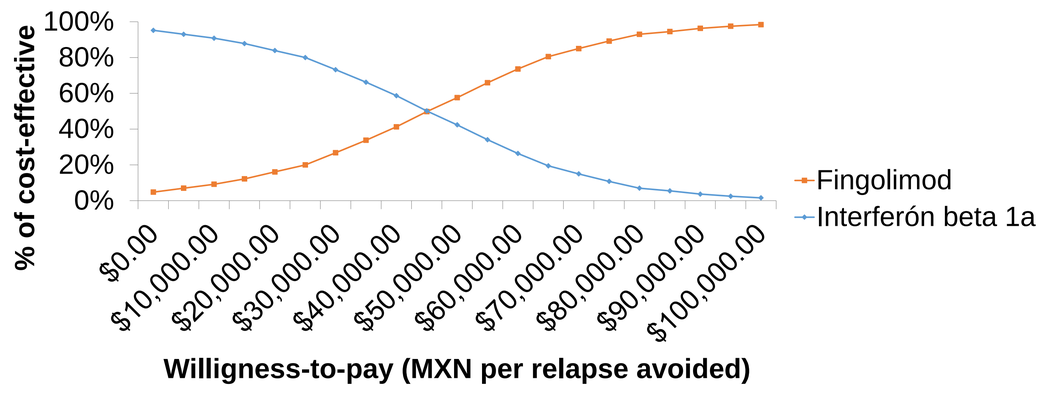
In comparison with IFN-β1a, fingolimod was associated with a reduction of 5.6 relapses over 8 years with an associated incremental cost of MXN 190,805, corresponding to an ICER of MXN 33,998 per relapse avoided.

Table 2. Cost-Effectiveness analysis results

Comparator	Total cost (MXN)	Incremental cost	Total relapses	Relapses avoided	ICER
IFN-β1a	2,521,413		7.506		
Fingolimod	2,712,217	190,805	1.893	-5.612	33,998

Probabilistic sensitivity analysis demonstrated fingolimod was cost-effective in 100% of the simulations, assuming a willingness-to-pay threshold of MXN 188,974 per relapse avoided (1 GDP per capita).

Figure 1. Cost-effectiveness acceptability curve



Conclusions

- Fingolimod is cost-effective for the treatment of PoMS, compared to IFN-β1a, in the Mexican public health care context, given that it registered one of the highest relapse reductions in the MS clinical literature.

References

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Disclosures

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