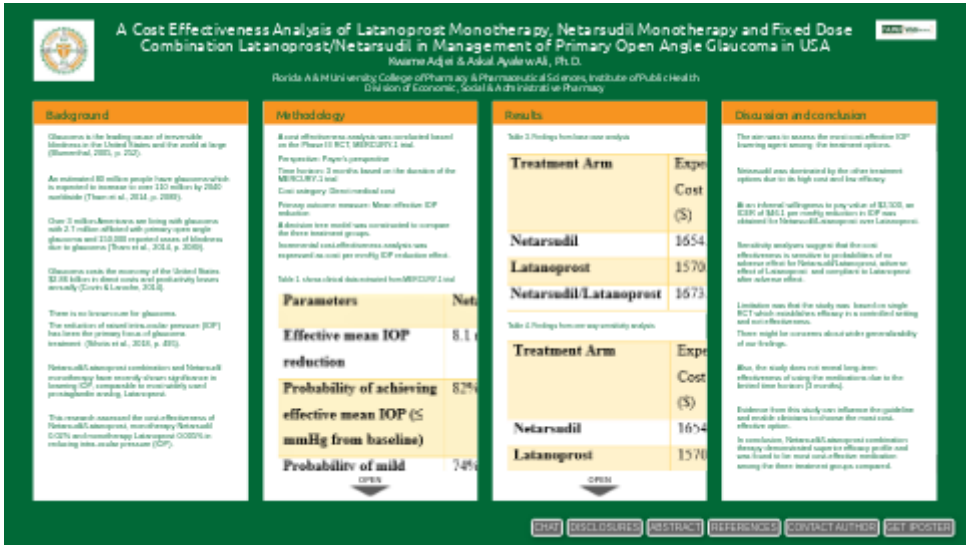
A Cost Effectiveness Analysis of Latanoprost Monotherapy, Netarsudil Monotherapy and Fixed Dose Combination Latanoprost/Netarsudil in Management of Primary Open Angle Glaucoma in USA



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PRESENTED AT:

BACKGROUND

Glaucoma is the leading cause of irreversible blindness in the United States and the world at large (Blumenthal, 2005, p. 252).

An estimated 80 million people have glaucoma which is expected to increase to over 110 million by 2040 worldwide (Tham et al., 2014, p. 2089).

Over 3 million Americans are living with glaucoma with 2.7 million afflicted with primary open angle glaucoma and 150,000 reported cases of blindness due to glaucoma (Tham et al., 2014, p. 2089).

Glaucoma costs the economy of the United States $2.86 billion in direct costs and productivity losses annually (Covin & Laroche, 2014).

There is no known cure for glaucoma.

The reduction of raised intra-ocular pressure (IOP) has been the primary focus of glaucoma treatment (Sihota et al., 2018, p. 495).

Netarsudil/Latanoprost combination and Netarsudil monotherapy have recently shown significance in lowering IOP, comparable to most widely used prostaglandin analog, Latanoprost.

This research assessed the cost-effectiveness of Netarsudil/Latanoprost, monotherapy Netarsudil 0.02% and monotherapy Latanoprost 0.005% in reducing intra-ocular pressure (IOP).

METHODOLOGY

A cost effectiveness analysis was conducted based on the Phase III RCT, MERCURY-1 trial.

Perspective: Payer's perspective

Time horizon: 3 months based on the duration of the MERCURY-1 trial

Cost category: Direct medical cost

Primary outcome measure: Mean effective IOP reduction

A decision tree model was constructed to compare the three treatment groups.

Incremental cost-effectiveness analysis was expressed as cost per mmHg IOP reduction effect.

Table 1. shows clinical data extracted from MERCURY-1 trial

Parameters	Netarsudil/Latanoprost	Netarsudil 0.02%	Latanoprost 0.005%
Effective mean IOP reduction	8.1 mmHg	5.5 mmHg	6.4 mmHg
Probability of achieving effective mean IOP (≤ mmHg from baseline)	82%	54%	69%
Probability of mild adverse event	74%	63%	41%
Probability of noncompliant after adverse event	17%	14%	0%

Table 2. shows cost categories used in decision tree analysis

Parameters	Netarsudil/ Latanoprost	Netarsudil 0.02%	Latanoprost 0.005%	Sources of data and notes
Drug costs per month	136.87 USD	130.59 USD	102.61 USD	(Netarsudil/Latanoprost:Drug information, 2020) (Netarsudil: Drug Information, 2020) (Latanoprost: Drug Information, 2020)
Average costs of ophthalmologist per visit	307 USD	307 USD	307 USD	(Machlin & Mitchell, 2020)
Average costs of eye examinations per procedure	114 USD	114 USD	114 USD	(How Much Does Glaucoma Treatment Cost? 2020)
Total costs per month	557.87 USD	551.59 USD	523.61 USD	—
Costs at the end of month 3	1673.61 USD	1654.77 USD	1570.83 USD	—

RESULTS

Table 3. Findings from base case analysis

Treatment Arm	Expected Cost ($)	Expected Effectiveness (mmHg)	Incremental Cost ($)	Incremental Effectiveness (mmHg)	ICER ($/mmHg)	Dominance
Netarsudil	1654.73	2.959	___	___	___	Dominated
Latanoprost	1570.83	4.48	-83.94	1.521	___	
Netarsudil/Latanoprost	1673.61	6.71	102.78	2.23	**46.1**	

Table 4. Findings from one way sensitivity analysis

Treatment Arm	Expected Cost ($)	Expected Effectiveness (mmHg)	Incremental Cost ($)	Incremental Effectiveness (mmHg)	ICER ($/mmHg)	Dominance
Netarsudil	1654.73	2.5743	___	___	___	Dominated
Latanoprost	1570.83	3.71	-83.94	0.967	___	
Netarsudil/Latanoprost	1673.61	5.898	102.78	2.188	**46.9**	

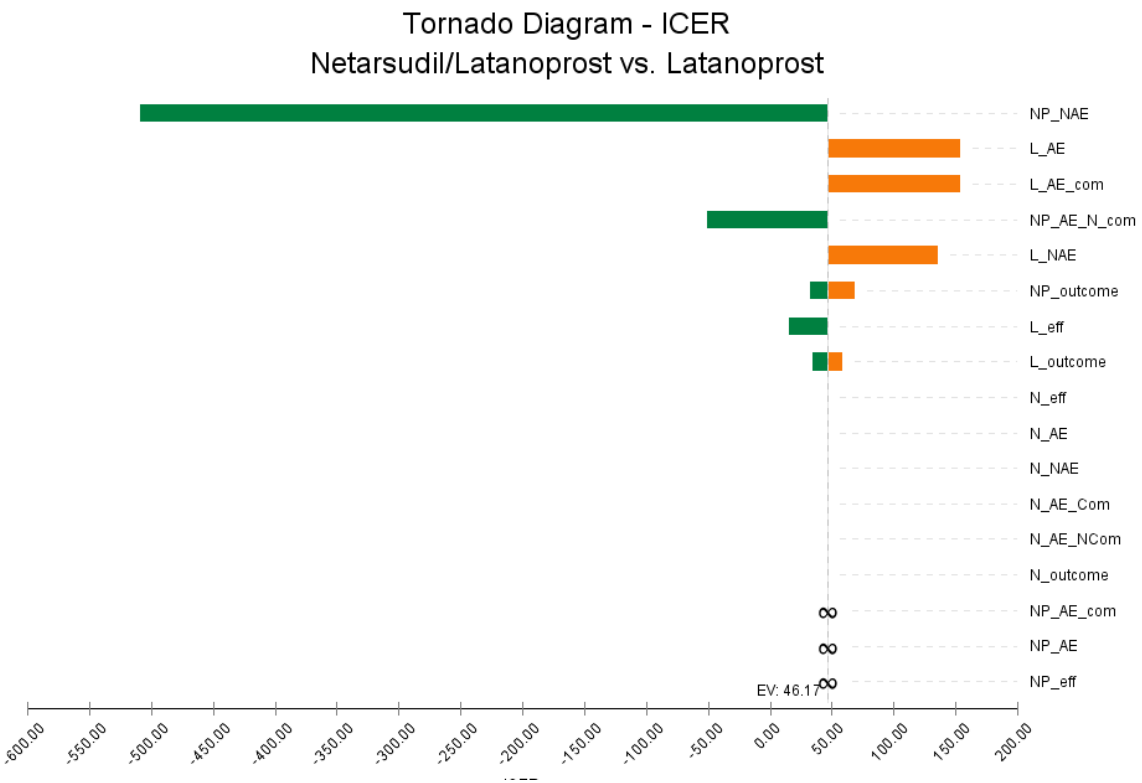

Figure 1. One-way sensitivity analysis tornado diagram that summarizes the effect of variation in key model parameter one at a time on the model outcome. The parameters are sorted in descending order by their outcome impact. Longer bars show the greatest impact on results. Vertical line represents the base case results. N indicates Netarsudil; NP, Netarsudil/Latanoprost; L, Latanoprost; AE, Adverse effects, NAE, no adverse effects; Com, compliant; Eff, effectiveness

DISCUSSION AND CONCLUSION

The aim was to assess the most cost-effective IOP lowering agent among the treatment options.

Netarsudil was dominated by the other treatment options due to its high cost and low efficacy.

At an informal willingness to pay value of $2,500, an ICER of $46.1 per mmHg reduction in IOP was obtained for Netarsudil/Latanoprost over Latanoprost.

Sensitivity analyses suggest that the cost effectiveness is sensitive to probabilities of no adverse effect for Netarsudil/Latanoprost, adverse effect of Latanoprost and compliant to Latanoprost after adverse effect.

Limitation was that the study was based on single RCT which establishes efficacy in a controlled setting and not effectiveness.

There might be concerns about wider generalizability of our findings.

Also, the study does not reveal long-term effectiveness of using the medications due to the limited time horizon (3 months).

Evidence from this study can influence the guideline and enable clinicians to choose the most cost-effective option.

In conclusion, Netarsudil/Latanoprost combination therapy demonstrated superior efficacy profile and was found to be most cost-effective medication among the three treatment groups compared.

DISCLOSURES

There is no financial interest or relationship to disclose

ABSTRACT

OBJECTIVE: Netarsudil and recently approved fixed dose combination (FDC) Netarsudil/Latanoprost have shown significant effect of lowering intra-ocular pressure in glaucoma comparable to most widely used prostaglandin analog, Latanoprost. This research aims to assess the cost-effectiveness of FDC Netarsudil/Latanoprost, monotherapy Netarsudil 0.02% and monotherapy Latanoprost 0.005% in reducing intra-ocular pressure (IOP).

METHOD: Clinical data was directly extracted from the MERCURY-1 trial. The primary outcome measure of this study was the mean IOP reduction effect in mmHg. Costs were assessed from the perspective of US healthcare system with a 3 months' time horizon. A decision tree model was constructed comparing treatment groups. Incremental cost effectiveness ratio was compared to an informal willingness to pay of $2,500 per mmHg reduction in IOP.

RESULTS: The expected cost per patient were $1673.61, $1654.73 and $1570.83 for Netarsudil/Latanoprost, Netarsudil and Latanoprost respectively. The expected effectiveness expressed as mean reduction in IOP were 6.71 mmHg, 2.96 mmHg and 4.48 mmHg for Netarsudil/Latanoprost, Netarsudil and Latanoprost respectively. Netarsudil was dominated due to its high cost and low efficacy. In the cost effectiveness analysis, incremental cost of $102.78, incremental effectiveness of 2.23 mmHg reduction in IOP with an incremental cost effectiveness ratio of $46.1 per mmHg reduction in IOP were obtained for Netarsudil/Latanoprost over Latanoprost monotherapy. At an informal willingness to pay value set at $2,500, Netarsudil/Latanoprost is more cost effective than Latanoprost monotherapy. Sensitivity analyses suggest that the cost effectiveness is sensitive to probabilities of no adverse effect for Netarsudil/Latanoprost, adverse effect of Latanoprost and compliant to Latanoprost after adverse effect.

CONCLUSION: Considering the direct medical cost of treatment option and the assumption of clinical success at 3 months decision point, Netarsudil/Latanoprost demonstrated superior efficacy profile and was found to be most cost-effective medication among the three treatment groups compared.

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