

Budgetary impact analysis of alteplase - recombinant tissue plasminogen activator (rtPA) - as a thrombolytic treatment for acute ischemic stroke in Colombia

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Objective

- Thrombolysis is effective for treating acute ischemic stroke. Trials have evaluated its effectiveness at 90, 180 and 270 minutes after stroke. The objective of the study was to evaluate the clinical and budgetary impact of increasing the proportion of thrombolized acute ischemic stroke patients in Colombia

Methods

Figure 1. Model structure

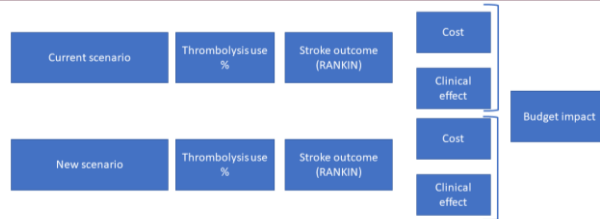


Table 1. Market share of the technologies

Current scenario					
	Year 1	Year 2	Year 3	Year 4	Year 5
Thrombolized patients (%)	8%	9%	10%	11%	12%
Alteplase	2,618	3,001	3,398	3,809	4,234
Conservative management only	30,109	30,347	30,584	30,819	31,052
New scenario					
	Year 1	Year 2	Year 3	Year 4	Year 5
Thrombolized patients (%)	16%	18%	20%	22%	24%
Alteplase	5,236	6,003	6,796	7,618	8,469
Conservative management only	27,491	27,346	27,186	27,010	26,817

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Table 2. Costs related to thrombolysis

Cost category	Minimum	Maximum	Average	Source
Treatment costs				
Conservative treatment	415.31	561.69	438.32	[22]
Alteplase - rtPA	607.29	853.23	647.00	[22]
Administration costs				
Intravenous thrombolysis	98.49	116.61	102.43	ISS+30%
Follow-up costs				
Additional follow-up	217.65	257.70	226.36	[22]

- We developed a budget impact modal estimating with a 5-year time horizon from the perspective of the third-party payer in Colombia.
- We obtained epidemiological data from local sources and published studies. We established healthcare resource utilization with base case with local clinical experts and costing was performed with local tariff manuals.
- Efficacy data was extracted from published literature.
- We considered three windows for treatment initiation: 0-90, 91-180, and 181-270 minutes. Costs were expressed in US dollars of 2020. (2020, 1 USD = \$3,693.36 COP)

Results

Table 3. budgetary analysis of ischemic stroke in a 5-year time horizon

	0-90 minutes	91-180 minutes	181-270 minutes
Current scenario	\$ 282,399,907	\$ 293,441,882	\$ 242,995,643
New scenario	\$ 297,925,556	\$ 310,107,186	\$ 259,958,874
Annual BI	\$ 15,525,649	\$ 16,665,304	\$ 16,963,231
Relative annual BI	5.5%	5.7%	7.0%
BIA details			
Acquisition	\$ 11,038,558	\$ 11,038,558	\$ 11,038,558
Administration	\$ 1,747,528	\$ 1,747,528	\$ 1,747,528
Follow-up	\$ 3,861,977	\$ 3,861,977	\$ 3,861,977
Favorable outcome	\$ 236,146	\$ 845,158	\$ 264,417
Unfavorable outcome	-\$ 2,689,831	-\$ 2,599,914	-\$ 865,202
Adverse events	\$ 1,831,582	\$ 2,529,748	\$ 1,179,959
Rehabilitation	-\$ 500,311	-\$ 757,752	-\$ 264,006
Difference of events			
Without sequelae (Rankin 0-1)	1,872	2,151	1,245
With sequelae (Rankin 2-5)	-1,721	-2,594	-1,007
Deaths (Rankin 6)	-151	443	-239

Results

Table 4. 5-year cumulative budgetary impact and sensitivity analysis

Analysis	Budget impact (USD\$)	Relative change	Events avoided (Sequelae and deaths)
Analysis 0-90 min (10% vs 22%)	\$ 15,525,649	5.5%	-1,872
Price of intervention - minimum	\$ 14,848,134	5.3%	-1,872
Price of intervention - maximum	\$ 19,044,230	6.7%	-1,872
Cost of events - Minimum	\$ 15,376,894	5.7%	-1,872
Cost of events - Maximum	\$ 15,555,260	4.4%	-1,872
New scenario (10% vs 45%)	\$ 47,087,685	16.7%	-5,659
Analysis 91-180 min (10% vs 22%)	\$ 16,665,304	5.7%	-2,151
Price of intervention - minimum	\$ 15,987,789	5.5%	-2,151
Price of intervention - maximum	\$ 20,183,885	6.8%	-2,151
Cost of events - Minimum	\$ 16,476,677	5.9%	-2,151
Cost of events - Maximum	\$ 16,792,655	4.5%	-2,151
New scenario (10% vs 45%)	\$ 50,615,362	17.2%	-6,502
Analysis 181-270 min (10% vs 22%)	\$ 16,963,231	7.0%	-1,245
Price of intervention - minimum	\$ 16,285,717	6.7%	-1,245
Price of intervention - maximum	\$ 20,481,813	8.3%	-1,245
Cost of events - Minimum	\$ 16,729,331	7.2%	-1,245
Cost of events - Maximum	\$ 17,795,993	5.8%	-1,245
New scenario (10% vs 45%)	\$ 51,356,524	21.1%	-3,764
Changes at the start of treatment			
NINDS (0-180 min)	\$ 17,110,335	5.6%	-2,218
Lee et al (181-270 min)	\$ 17,200,906	6.4%	-1,174

Conclusion

- From the perspective evaluated, doubling the number of patients with AIS who are thrombolized would lead to reductions in the number of patients with sequelae and would require a budgetary effort of 5.5-7.0%. The early initiation of treatment (0-180minutes) gives an additional benefit in reducing the number of sequelae and a lower budgetary impact than initiation within the last time window (181-270minutes).