

# Cost-minimisation analysis of aripiprazole (Abilify®) for the treatment of acute bipolar disorder in Hungary

Bence Nagy<sup>1</sup>, Kevin Bowrin<sup>2</sup>, Adam Lloyd<sup>2</sup>, Laura Mungapen<sup>2</sup>, Marc van Baardewijk<sup>3</sup>, Lucie Kutikova<sup>4</sup>, Orsolya Nagy<sup>5</sup>, István Bitter<sup>6</sup>, Csaba M. Bánki<sup>7</sup>

<sup>1</sup>Healthware Consulting Ltd, <sup>2</sup>IMS Health, Health Economics and Outcomes Research, London, UK; Budapest, Hungary, <sup>3</sup>Bristol-Myers Squibb International Corporation, Braine l'Alleud, Belgium, <sup>4</sup>Bristol-Myers Squibb Central Europe, Prague, Czech Republic, <sup>5</sup>Bristol-Myers Squibb, Budapest, Hungary, <sup>6</sup>Semmelweis University, Budapest, Hungary, <sup>7</sup>Sántha Kálmán Mentális Egészségközpont és Szakkórház, Nagykálló, Hungary

## BACKGROUND

- Bipolar I Disorder (BPD) is a chronic and recurrent mental disorder characterized by changes in mood, including periods of highly elevated or irritable mood (manic or hypomanic episodes), and periods of low-energy and sad mood (depressive episodes).
- Olanzapine is the most frequently used second generation antipsychotic in the treatment of moderate to severe manic episodes of Bipolar I Disorder and for relapse prevention of manic episodes in Hungary (1).
- Aripiprazole is a new atypical antipsychotic and has been assessed in the management of acute bipolar mania and relapse prevention in a number of studies (2-10).
- Aripiprazole has recently received a marketing authorization in Europe for use in the treatment of moderate to severe manic episodes in Bipolar I Disorder and for the prevention of a new manic episode in responders (11).

## OBJECTIVE

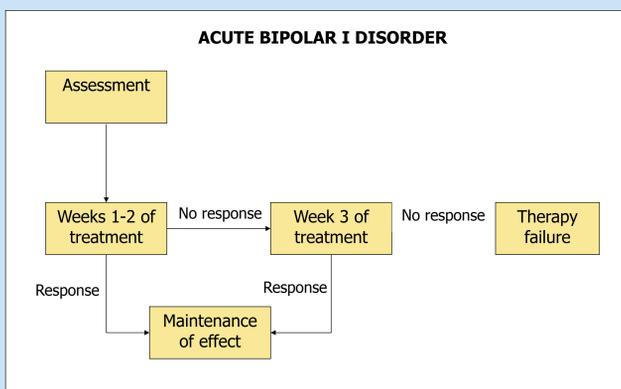
The objective of this study was to undertake a cost-minimisation analysis of aripiprazole in the treatment of moderate to severe manic episodes of BPD compared to olanzapine in the context of the Hungarian health care system.

## METHODS

A Markov model was developed to estimate patient costs and outcomes for 1 year after 3 weeks of treatment. In the acute phase of treatment, patients received either aripiprazole or olanzapine for the management for their mood episode as an inpatient. An incremental cost was computed using the total cost aggregated for aripiprazole and olanzapine.

Patients enter the model while they are hospitalized for an episode of acute mania. Upon entering the model, patients could already be on treatment or be treatment naïve. Health states for the acute phase of model are shown in **Figure 1**.

Figure 1: Patient Flow in the Model



Patients initially receive therapy with either olanzapine or aripiprazole for two weeks (in line with the aripiprazole clinical trials). They may then:

- move to the maintenance of effect phase if they have improved sufficiently to be discharged or,
- continue to receive a third week of treatment.

Patients who receive therapy for a third week may:

- move to the maintenance of effect phase if they have improved sufficiently to be discharged or,
- move to therapy failure state (patients who have failed to respond after 3 weeks of treatment)

## EFFICACY

- Based on a systematic review of the literature Y-MRS response (defined as a reduction of  $\geq 50\%$  in the Y-MRS baseline score) and drop-out rates were chosen as the primary efficacy outcomes. The meta-analysis of pooled trials for aripiprazole (2-6) and olanzapine (12) showed that both response and drop-out rates were not statistically different (**Table 1**). This is consistent with findings from other meta-analyses (13-15). Thus the efficacy of both drugs were assumed to be equal in the analysis.

Table 1: Meta-analysis of YMRS Response and Drop-out Rates

Y-MRS Response 1-3 weeks	Relative risk Mean (95% CI)	Indirect Comparisons	Relative risk Mean (95% CI)
ARI vs placebo (2-6) OLA vs placebo (12)	1.59 (1.39 to 1.80) 2.00 (1.22 to 3.27)	ARI vs OLA	0.79 (1.35 to 0.44)
Drop out at week 3	Relative risk Mean (95% CI)	Indirect Comparisons	Relative risk Mean (95% CI)
ARI vs placebo (2-6) OLA vs placebo (12)	0.85 (0.75 to 0.96) 0.59 (0.42 to 0.83)	ARI vs OLA	1.43 (2.17 to 0.95)

ARI = aripiprazole; OLA = olanzapine

- Transition probabilities for Y-MRS response and drop-out rates were obtained from aripiprazole clinical trials (2-6). The number of responders were estimated at 25% in the first week, 44% the second week, and 48% in the third week. For drop-out, 17% of patients discontinued after the first week of treatment and 31% at weeks 2 and 3.

## COSTS

- Frequency of use of laboratory tests and number of visits to the psychiatrist and nurse were based on estimates from two national key opinion leaders in bipolar disorder in Hungary (1).
- Drug, laboratory test, inpatient (DRG) costs and costs of hourly rates of healthcare professionals were taken from Hungarian national databases (16;17) (**Table 2**).

Table 2: Direct Costs and Healthcare Resource Use

Direct costs		
Drugs	Cost/day (Ft)	
Aripiprazole 15mg	1014.67	
Olanzapine 15mg	1558.84	
Inpatient (DRG) Cost		
Psychiatric inpatient care (826A and 826B)	189.688 Ft	
Healthcare professionals	Cost/hour (Ft)	Annual Frequency*
Psychiatrist	1688.94	12
Nurse	830.05	4
Laboratory Test	Cost/test (Ft)	Annual Frequency*
Full blood count	219	2
Glucose	37.96	2
Serum lithium concentration	78.84	
Blood, urea and electrolytes	1259.98	2
Urine – general tests	789.86	2
Leucocytes and trombocytes	219	2

\*Based on estimates from key opinion leaders

- Based on these costs, cost for different health states was calculated (**Table 3**).

Table 3: Weekly Drug, Healthcare Professional and Laboratory Costs

Treatment	Olanzapine	Aripiprazole
Overall Costs/Week	10,912 Ft	7,103 Ft

## RESULTS

- Assuming maximum of 3 weeks of drug treatment per Hungarian treatment guidelines (18), adjusting for drop-out and projecting other healthcare costs for 1 year, the overall cost of treating one patient with olanzapine was estimated at 25,527 Ft/year, while aripiprazole treatment was associated with a cost of 21,938 Ft/year (**Table 4**).

Table 4: Annual Incremental Costs Aripiprazole vs. Olanzapine per Patient

	Olanzapine	Aripiprazole	Aripiprazole vs. Olanzapine
Costs	25,527Ft	21,938Ft	-3,588Ft
ICER			Cost-saving

- Comparing olanzapine treatment with aripiprazole resulted in a cost-saving of 3,588 Ft per patient/year.
- The key reason for differences in cost between aripiprazole and olanzapine is difference in drug cost.

## CONCLUSION

This analysis indicates that in the treatment of moderate to severe manic episodes in bipolar I disorder, aripiprazole compared to olanzapine is cost-saving, e.g. provides same effectiveness at lower costs.

## REFERENCES

- Interviews with key opinion leaders, March- April 2008.
- Keck PE, Jr, Marcus R, Tourkodimitris S, Ali M, Liebeskind A, Saha A et al. A placebo-controlled, double-blind study of the efficacy and safety of aripiprazole in patients with acute bipolar mania. *Am J Psychiatry* 2003; 160(9):1651-1658.
- Sachs G, Sanchez R, Marcus R, Stock E, McQuade R, Carson W et al. Aripiprazole in the treatment of acute manic or mixed episodes in patients with bipolar I disorder: a 3-week placebo-controlled study. *Journal of psychopharmacology* 2006; 20:536-546.
- Keck PE, Orsulak PJ, Cutler AJ, Sanchez R, Torbeyns A, Marcus RN, McQuade RD, Carson WH. Aripiprazole monotherapy in the treatment of acute bipolar I mania: A randomized, double-blind, placebo- and lithium-controlled study. *J Affect Disord.* 2009 Jan;112(1-3):36-49.
- Dillenschneider A, Sanchez R, McQuade R, D., and Torbeyns A. Aripiprazole monotherapy in acute bipolar I mania: a randomized, placebo- and haloperidol-controlled study (CN138-162). Presented at West European Societies of Biological Psychiatry Meeting, Strasbourg, France, Dec 13-15 2007.
- A multicenter, randomised, double-blind study of flexible doses of Aripiprazole versus placebo in the treatment of hospitalised patients with acute mania-Clinical phase III. Clinical study report CN138009. 21-4-2003.
- Vieta E, Tjoen C, McQuade RD, Carson WH, Marcus RN, Sanchez R, Owen R, Nameche L. Efficacy of Adjunctive Aripiprazole to Either Valproate or Lithium in Bipolar Mania Patients Partially Nonresponsive to Valproate/Lithium Monotherapy: A Placebo-Controlled Study. *Am J Psychiatry* 2007; AiA:1-9.
- Vieta E, Bourin M, Sanchez R, Marcus R, Stock E, McQuade R et al. Effectiveness of aripiprazole v. haloperidol in acute bipolar mania: double-blind, randomised, comparative 12-week trial. *Br J Psychiatry* 2005; 187:235-42.:235-242.
- Keck PE, Jr, Calabrese JR, McQuade RD, Carson WH, Carlson BX, Rollin LM et al. A randomized, double-blind, placebo-controlled 26-week trial of aripiprazole in recently manic patients with bipolar I disorder. *J Clin Psychiatry* 2006; 67(4):626-637.
- Keck PE, Jr, Calabrese JR, McIntyre RS, McQuade RD, Carson WH, Eudicone JM et al. Aripiprazole monotherapy for maintenance therapy in bipolar I disorder: a 100-week, double-blind study versus placebo. *J Clin Psychiatry* 2007; 68(10):1480-1491.
- <http://emc.medicines.org.uk/> (Abilify SmPC)
- Tohen M, Sanger TM, McElroy SL, Tollefson GD, Chengappa KN, Daniel DG et al. Olanzapine versus placebo in the treatment of acute mania. Olanzapine HGEH Study Group. *Am J Psychiatry* 1999.
- Smith LA, Cornelius V, Warnock A, Tacchi MJ, Taylor D. Pharmacological interventions for acute bipolar mania: a systematic review of randomized placebo-controlled trials. *Bipolar Disord* 2007; 9(6):551-60.
- Derry S, Moore RA. Atypical antipsychotics in bipolar disorder: systematic review of randomised trials. *BMC Psychiatry* 2007; 7:40.
- Perlis RH, Welge JA, Vornik LA, Hirschfeld RM, Keck PE Jr. Atypical antipsychotics in the treatment of mania: a meta-analysis of randomized, placebo-controlled trials. *J Clin Psychiatry* 2006; 67(4):509-16.
- Országos Egészségbiztosítási Pénztár. Hungarian National Health Insurance Fund. Unit costs in Hungary 2008.<http://www.oep.hu/>.
- ESKI. [www.eski.hu](http://www.eski.hu)
- Az irányelvet írták, Dr Rihmer Zoltán, Dr Pestaloty Péter. Bipoláris Betegségek-Diagnosztikai és Terápiás Protokoll. *Pszichiatria* 2007.: A helyes referencia az Egészségügyi Közlöny (vs Eü Min honlapon is megtalálható)