A real-world comparison of healthcare expenditures in patients prescribed aripiprazole tablet with sensor and patients prescribed aripiprazole alone (aripiprazole without sensor) in the US

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INTRODUCTION

- Major depressive disorder (MDD), bipolar I disorder (BP I), and schizophrenia are currently estimated to affect approximately 19 million, 7 million, and 2 million people in the US, respectively.[1]
- Persistent use of antipsychotic medications has a significant impact on the effective management of these mental disorders but adherence in patients with psychiatric disorders is often poor, with estimated nonadherence rates ranging from 10% to 60% for patients with MDD, 20% to 60% for patients with BP I, and 34% to 81% for those with schizophrenia.[2–5]
- Nonadherence to treatment potentially results in serious effects such as increased risk for hospitalization, relapse, increased rates of suicide, and increased healthcare costs.[6,7]
- Aripiprazole tablet with sensor (AS) is a drug–device system comprised of aripiprazole tablets embedded with an Ingestible Event Marker sensor to track drug ingestion, mood, rest, and physical activity, and which is indicated for the treatment of adults with schizophrenia, BP I, and MDD.[8,9]
- Real-world comparisons of patients using AS and aripiprazole without sensor (ARI) are lacking.

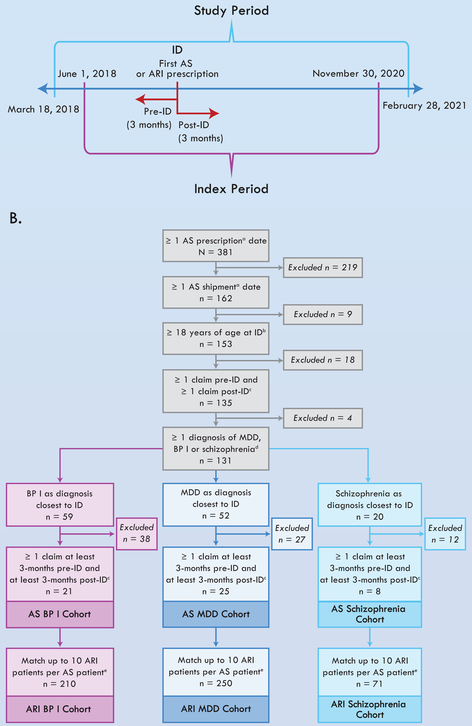
OBJECTIVE

- To describe and compare real-world characteristics, treatment patterns, and healthcare expenditures before and after an index date (ID) in patients prescribed AS versus a matched cohort prescribed ARI.

METHODS

- This was a retrospective descriptive analysis of patients who were prescribed AS or ARI during the study period of March 1, 2018 to February 28, 2021, and who could be linked at the IQVIA claims database level (**Figure 1**).
  - The first AS or ARI prescription date served as the ID. The index period of June 1, 2018 to November 30, 2020, allowed for a minimum of 3 months each for lookback pre-ID and post-ID follow-up.
- Data sources included IQVIA Patient Centric Pharmacy Claims, IQVIA Patient Centric Medical Claims, IQVIA Institutional Medical Claims, and the AS app registry data.
- For clinical characteristics, frequencies and percentages were reported for categorical variables.
- Healthcare expenditures accrued over the pre-ID period and during the post-ID period were compared for the overall cohorts.

Figure 1. A) Study schematic and B) patient selection.

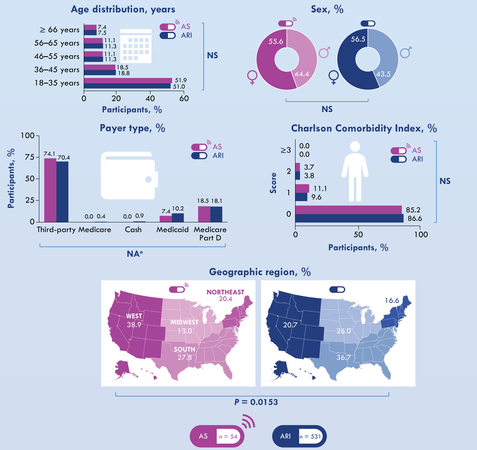


[a]From AS registry data.
[b]ID as the date of first prescription. For AS patients, this was the first AS prescription in the ID period; for ARI patients, this was the first ARI prescription in the ID period.
[c]From IQVIA claims data.
[d]From either the AS registry or IQVIA claims data.
[e]Matched on primary indication, index month, age category, sex, pre-ID Charlson Comorbidity Index score, and duration of prior aripiprazole treatment history based on 3-month time intervals.
ARI, aripiprazole without sensor; AS, aripiprazole with sensor; BP I, bipolar I disorder; ID, index date; MDD, major depressive disorder.

RESULTS

- Around half (52% of AS and 51% of matched ARI) of the patients included were aged 18–35 years old ($P = 0.9127$) and 56% and 57% of AS and ARI patients were women, respectively ($P = 0.3208$, **Figure 2**).
- More AS than ARI patients were from the Northeast (20% vs 17%) and Western (39% vs 21%) regions of the US ($P = 0.0153$, **Figure 2**).
- Most had third-party insurance (74% of AS and 70% of matched ARI patients), followed by Medicare Part D, and then Medicaid (**Figure 2**).

Figure 2. Baseline patient characteristics



[a]Model did not converge.

- Post ID, all-cause medical charges doubled in the AS cohort, while decreasing by 24% in the ARI cohort ($P = 0.2678$; standardized mean difference [stdiff] = 0.18, **Table 1**).
  - The increase in medical charges in the AS cohort was driven by all-cause outpatient visits; the large standard deviation suggests that the increase in mean costs may be due to outlier patients with high nonpsychiatric medical costs.
- Post-ID, the mean psychiatric nonpharmacy medical charges in the AS cohort decreased by 70% compared with a 22% decrease in the ARI cohort ($P = 0.5829$; stdiff = 0.05, **Table 1**).
- Total pharmacy charges slightly increased post-ID in AS patients and decreased in ARI patients ($P = 0.1653$; stdiff = 0.21); increases in pharmacy costs were driven by psychiatric medications ($P = 0.0320$; stdiff = 0.3536, **Table 2**).

Table 1. Nonpharmacy medical charges pre-ID and post-ID, by cohort.

Parameter	AS cohort (n = 54)			ARI cohort (n = 531)			*P*-value	Standard mean difference
	Pre-ID	Post-ID	Difference	Pre-ID	Post-ID	Difference		
Total all-cause[a] medical charges, US dollars								
Mean	4622	9600	4978	6043	4606	−1473	0.2678	0.18242
SD	10 528	42 900	43 339	20 543	17 169	24 391		
Total psychiatric-related[a] medical charges, US dollars								
Mean	2225	670	−1570	3302	2585	−137	0.5829	0.05227
SD	6784	1526	6366	17 838	14 728	21 747		
All-cause inpatient charges among all patients, US dollars[b]								
Mean	705	1047	342	1643	838	−806		
SD	3157	7628	8327	9133	6767	11082		
Among patients with ≥ 1 inpatient visit, valid n	5	2	1	44	28	12	0.3497	0.11714
Mean	7611	28 270	−17 237	19 833	15 884	5296		
SD	8145	39 306	NA	25 671	25 514	17 831		
All-cause outpatient charges among all patients, US dollars								
Mean	3592	8420	4828	4191	3549	−642		
SD	8368	40 508	40 556	12 272	11 672	14 897		
Among patients with ≥ 1 outpatient visit, valid n	37	35	34	398	352	320	NA[c]	0.17904
Mean	5243	12 991	9239	5591	5353	−60		
SD	9706	49 968	50 050	13 900	14 001	17 304		
Psychiatric-related outpatient charges among all patients, US dollars								
Mean	1479	647	−833	2018	1845	−173		
SD	3813	1526	3343	9546	8820	11 692		
Among patients with ≥ 1 outpatient visit, valid n	24	20	18	280	240	198	0.3839	0.07676
Mean	3328	1746	−2303	3826	4082	935		
SD	5204	2115	5575	12 891	12 781	15 794		
All-cause emergency department charges among all patients, US dollars[b]								
Mean	325	133	−192	208	220	12		
SD	1016	642	910	823	936	961		
Among patients with ≥ 1 emergency department visit, valid n	7	3	2	71	56	22	0.1146	0.21738
Mean	2505	2392	345	1558	2086	150		
SD	1660	1681	236	1731	2117	2360		

[a]Includes inpatient, outpatient, and emergency department charges. [b]Inpatient or emergency department charges may be missing / underrepresented. [c]Model did not converge.

ARI, aripiprazole without sensor; AS, aripiprazole with sensor; ID, index date; SD, standard deviation.

Table 2. Pharmacy charges pre-ID and post-ID, by cohort.

Parameter	AS cohort (n = 54)			ARI cohort (n = 531)			*P*-value	Standard mean difference
	Pre-ID	Post-ID	Difference	Pre-ID	Post-ID	Difference		
Total pharmacy charges among all patients, US dollars								
Mean	3339	3511	172	1890	1521	−369		
SD	6099	5883	2783	4423	3753	2246		
Among patients with ≥ 1 pharmacy claim, valid n	54	54	54	531	503	531	0.1653	0.21407
Mean	3339	3511	172	1890	1605	−336		
SD	6099	5883	2783	4423	3838	2224		
Total psychiatric-related pharmacy charges among all patients, US dollars								
Mean	1019	1439	420	743	545	−198		
SD	1944	1895	2075	1733	1373	1344		
Among patients with ≥ 1 pharmacy claim, valid n	54	53	54	530	473	531	0.0320	0.35357
Mean	1019	1467	429	744	612	−104		
SD	1944	1903	2094	1735	1440	1156		
Total non-psychiatric-related pharmacy costs among all patients, US dollars								
Mean	2320	2072	−248	1147	976	−171		
SD	5632	5690	2014	4015	3485	1774		
Among patients with ≥ 1 pharmacy claim, valid n	52	51	52	451	446	484	0.7867	0.04039
Mean	2409	2194	−262	1350	1162	−213		
SD	5722	5834	2073	4325	3774	2001		

ARI, aripiprazole without sensor; AS, aripiprazole with sensor; ID, index date; SD, standard deviation.

LIMITATIONS

- The study is limited to patients who had a prescription and received a shipment of AS; however, actual use of the AS system was not confirmed.
- Claims for AS were not observed in the pharmacy claims database, probably due to AS being dispensed exclusively by a specialty pharmacy.
- The sample size was small, limited by the number of patients in the AS cohort and data that could be extracted from the AS registry.
- Healthcare that occurs outside of the systems and providers reporting to the data source may not be captured, and nuances of patient care that are not billable are not available.
  - Inpatient and emergency department charges may be missing and therefore underestimated.
- The medical expenditures in this study were captured as charges rather than costs. Charges may overestimate the true paid amounts.
- While there appeared to be an increase in all-cause medical charges in AS patients, these results may be due to outliers.
  - Outliers were not excluded due to the small sample size.
- The pre-ID lookback and post-ID follow-up periods were set at the minimal period of 3 months each due to a significant drop in sample size when longer requirements were explored.
- The impacts of COVID-19 restrictions or other access barriers to AS use, healthcare resource utilization overall, and patient insurance coverage are also unknown.

CONCLUSIONS

- Results from this real-world comparative analysis suggest that AS may have clinical benefit resulting in decreased psychiatric medical charges.
- Future analyses using a larger sample size, longer follow-up, and confirmation of AS use are warranted.
  - Separate analyses for each indication (MDD, BP I, and schizophrenia) are also needed.
- Given the relatively small sample size, results may not generalize to all AS users.

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Disclosures

DHB is an employee of Otsuka Pharmaceutical Development & Commercialization, Inc. **MG, MY, JH,** and **C-CC** are employees of IQVIA, which was contracted by Otsuka Pharmaceutical Development & Commercialization, Inc. to conduct the research.

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