

COMPARISON OF HEALTHCARE UTILIZATION PATTERNS BETWEEN INTRATHECAL DRUG DELIVERY SYSTEMS AND CONVENTIONAL MEDICAL MANAGEMENT IN THE TREATMENT OF CHRONIC PAIN : RETROSPECTIVE STUDY WITH CLAIMS DATASETS

INTRODUCTION

Intrathecal Drug Delivery System(IDDS) has demonstrated reduction in systematic opioid consumption for the treatment of chronic pain. This study was to compare healthcare utilization patterns among non-cancer related chronic pain patients who were receiving either IDDS or Conventional Medical Management(CMM).

METHODS

This was a retrospective study using the National Health Insurance Service data, a nationally representative claims dataset from 2013 to 2018. Patients were assigned to IDDS and CMM, matched 1:3 based on age, sex, Charlson Comorbidity Index, and 1-year average daily morphine milligram equivalents(MME) before index date using propensity score. The daily MME, log-transformed medical expenditure, the number of ER visits and hospitalizations for the two groups were compared. As a sub-group analysis, clinical and cost-effective outcomes were assessed pre and post the implantation. All datasets were checked with normality test before conducting Wilcoxon rank-sum test.

Table 1. Patient characteristics at baseline

Variables	Before Propensity Score Matching				After Propensity Score Matching			
	Overall (N=2,774)	IDDS (N=2,774)	CMM (N=1,273)	P-value	Overall (N=82)	IDDS (N=23)	CMM (N=59)	P-value
Age, mean(SD)	58.26 ± 15.15	47.9 ± 11.94	58.49 ± 15.14	0.0002	47.90 ± 13.23	48.96 ± 12.98	47.49 ± 13.42	0.6553
Male	596 (45.78%)	18 (62.07%)	578 (45.4%)	0.0749	49 (59.76%)	14 (60.87%)	35 (59.32%)	0.8979
MME before index date(SD)	36.24 ± 62.31	151.5 ± 129.5	33.62 ± 57.38	<0.0001	117.05 ± 142.89	123.30 ± 121.5	114.60 ± 151.3	0.8055
CCI index								
0	773 (59.37%)	16 (55.17%)	757 (59.47%)	0.6416	55 (67.07%)	12 (52.17%)	43 (72.88%)	0.0731
1	228 (17.51%)	5 (17.24%)	223 (17.52%)	0.9691	12 (14.63%)	5 (21.74%)	7 (11.86%)	0.3025+
2	158 (12.14%)	5 (17.24%)	153 (12.02%)	0.3852+	11 (13.41%)	4 (17.39%)	7 (11.86%)	0.4925+
≥ 3	143 (10.98%)	3 (10.34%)	140 (11.00%)	1+	4 (4.88%)	2 (8.70%)	2 (3.39%)	0.3123+
Chronic Pulmonary Disease	182 (13.98%)	6 (20.69%)	176 (13.83%)	0.2796+	12 (14.63%)	5 (21.74%)	7 (11.86%)	0.3025+
Mild Liver Disease	77 (5.91%)	5 (17.24%)	72 (5.66%)	0.0246+	6 (7.32%)	3 (13.04%)	3 (5.08%)	0.3423+
Diabetes	169 (12.98%)	2 (6.90%)	167 (13.12%)	0.5723+	6 (7.32%)	2 (8.70%)	4 (6.78%)	1.0000+
Hemiplegia, Paraplegia	24 (1.84%)	2 (6.90%)	22 (1.73%)	0.0977+	3 (3.66%)	2 (8.70%)	1 (1.69%)	0.1866+
Hospitalizations before index date(SD)	0.49 (1.86%)	2.07 (3.59%)	0.46 (1.79%)	0.0229	1.29 (2.83%)	1.74 (3.03%)	1.12 (2.75%)	0.3751

* MME: Morphine Milligram Equivalent; +Fisher's Exact test ; p< 0.05 indicates significant difference

RESULTS

Total of 82 patients were assigned to IDDS(n=23) or CMM(n=59) group. IDDS had a significantly lower mean daily MME(mg per day) compared to that of CMM group after index date at 6 months(81.57 vs. 129.13; mean difference=47.55, 95% CI -14.16-109.6, p=0.0375), 12 months(53.17 vs. 123.88; mean difference=70.71, 95% CI 19.93-121.5, p=0.0077)(Fig 1). Patients who underwent implantation of IDDS had significantly higher number of visits to ER at 6 months(p=0.0012) and 12 months(p<0.0001). Hospitalizations and log-transformed medical expenditure did not show significant differences between two groups. The average daily MME was significantly reduced after implantation in the sub-group analysis through the follow-up period(mean difference=41.75; 95% CI=12.76 -70.75, p=0.0068 at 6 months, 48.7; 95% CI=15.30-82.10, p=0.0067 at 12 months). Total medical expenditure was decreased at 6 months compared to pre-implantation and is statistically significant. (Table 2, 3)

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DISCUSSION

IDDS implantation demonstrated significant pain relief through opioid reduction compared to CMM treatment of chronic pain patients. There was no evidence that IDDS could reduce hospitalization or medical expenditure compared to CMM in this study.

Figure 1. Average daily Morphine Milligram Equivalent(mg/day) for 6-month and 12-month

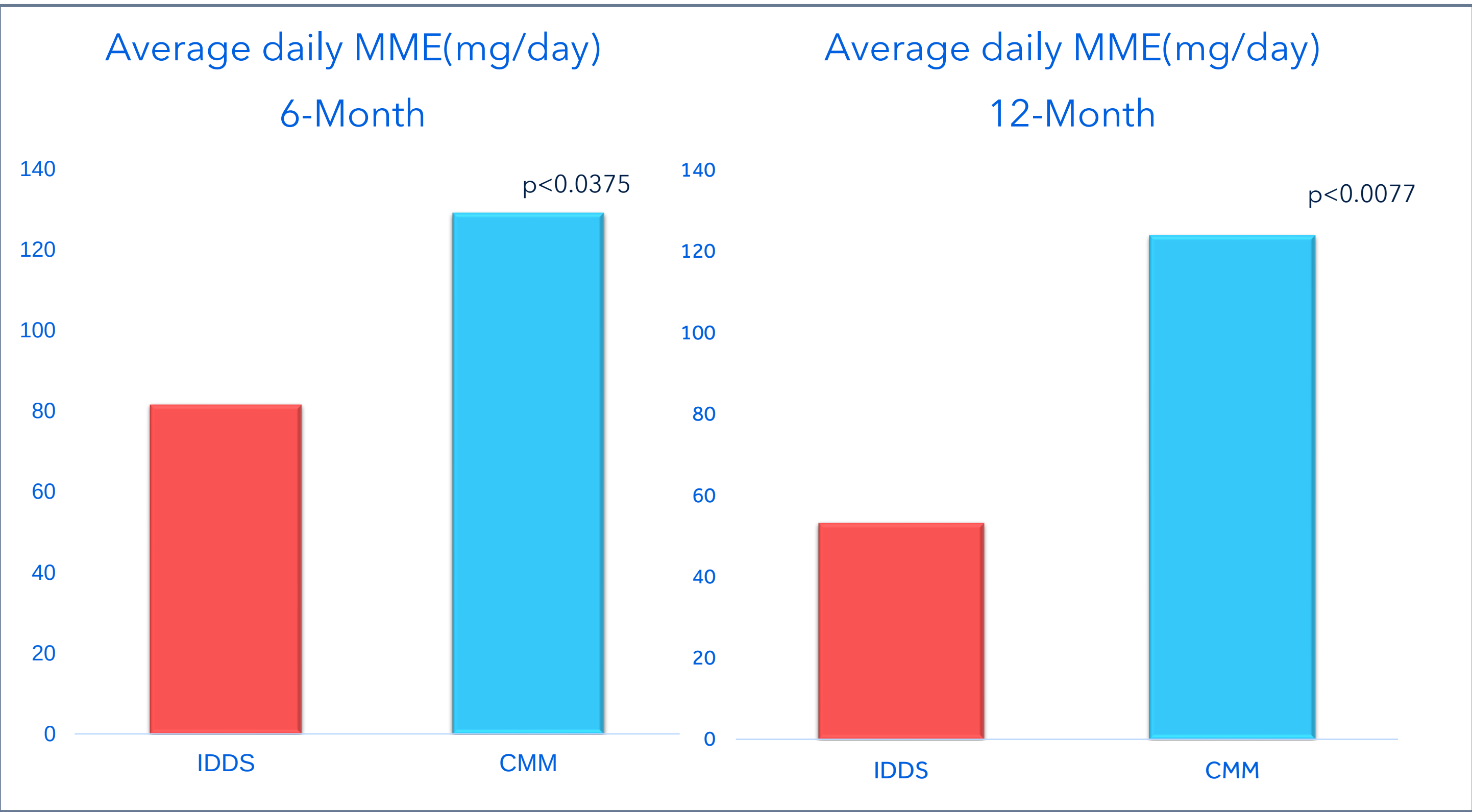


Table 2. 6-month primary outcomes for Intrathecal Drug Delivery System(IDDS) vs. Comprehensive Medical Management(CMM)

	IDDS (n=23)	CMM (n=59)	P-value
Hospitalizations(SD)	0.35 ± 1.03	0.34 ± 0.78	0.5198*
Emergency room visit(SD)	0.70 ± 1.89	0.00	0.0012*
Total medical expenditure for 6 months(SD)	1,821,178 ± 2,912,131	1,518,195 ± 2,118,713	0.4396+

* Wilcoxon rank sums test; +Student's t-test (log-transformed) ; p< 0.05 indicates significant difference

Table 3. 12-month primary outcomes for Intrathecal Drug Delivery System(IDDS) vs. Comprehensive Medical Management(CMM)

	IDDS (n=19)	CMM (n=58)	P-value
Hospitalizations (SD)	1.53 ± 2.65	0.81 ± 1.78	0.2668*
Emergency room visit (SD)	2.26 ± 5.05	0.00	<0.0001*
Total medical expenditure for 12 months(SD)	4,141,243 ± 6,530,916	3,144,586 ± 4,608,093	0.1771+

* Wilcoxon rank sums test; +Student's t-test (log-transformed) ; p< 0.05 indicates significant difference