



EFFECT OF DEDICATED PHARMACIST INTERVENTION IN NEUROCRITICAL CARE UNIT : BEFORE AND AFTER PARTICIPATING IN MULTIDISCIPLINARY ROUNDS



Eunyoung Sa¹, A Jeong Kim¹, Yoonsook Cho¹, Eun Jeong Cho¹, Eunji Lee¹, Sandy Jeong Rhie²

¹Seoul National University Hospital, Department of Pharmacy, Seoul, Republic of Korea.

²Ehwa Womans University, Department of Pharmacy, Seoul, Republic of Korea.

Objectives

- Few studies have assessed the activities of a designated neurocritical care pharmacist (NCP).
- To evaluate the effect of an dedicated pharmacist's interventions on clinical outcome in neurocritical care unit(NCU).

Methods

- Setting** : Single center, 1800-bed university teaching hospital, 14-bed NCU
- Study design** : A retrospective observational study was conducted to compare
 - pre-designated NCP period (from May 1, 2016 through December 31, 2016)
 - post-designated NCP period (from May 1, 2017 through December 31, 2017) with weekly multidisciplinary rounds
- Inclusion criteria** : adult patients admitted to and discharged from the NCU
- Exclusion criteria** : aged < 19 years at the time of admission and patients who admitted NCU during the both of two phase.
- Primary outcome** : NCU mortality
- Secondary outcome** : NCU length of stay(LOS), Incidence of intervention per 1,000 patient-days by clinical significance, types of interventions and relevant medications
- Two independent NCP assessed the significance of all interventions retrospectively to assure validity of the interpretation.

Results

Table 1. Patient characteristics

	Pre-NCP (n=676)	Post-NCP(n=769)	P
Age, y	55.1 ± 15.0	55.6 ± 15.6	0.436
Sex, n(%)			0.883
Female	356(52.7)	402(52.3)	
Male	320(47.3)	367(47.7)	
Height, cm	162.4 ± 8.9	162.8 ± 9.0	0.444
Weight, kg	63.8 ± 12.1	63.8 ± 12.6	0.867
Clinical department, n(%)			0.004*
Neurosurgery	617(91.3)	665(86.5)	
Neurology	59(8.7)	104(13.5)	
Primary diagnosis, n(%)			
Brain tumor	340(50.3)	343(44.6)	0.031*
Nervous system disorder	226(33.4)	312(40.6)	0.005*
Stroke & Cerebrovascular	43(6.4)	48(6.2)	0.926
Traumatic brain injury	21(3.1)	33(4.3)	0.236
Other	46(6.8)	33(4.3)	0.036*
Charlson Comorbidity Index	2.4 ± 2.3	2.6 ± 2.3	0.146
APACHE II score	18.2 ± 6.6	18.9 ± 6.4	0.013*
NCU LOS, day	3.5 ± 6.4	3.4 ± 8.0	0.012*
NCU mortality, n(%)	16(2.4)	15(2.1)	0.586
Prescriptions per patient	26(5-2,331)	26(1-1,463)	0.223

Table 2. Logistic regression analysis for ICU mortality

	Coefficient	Adjusted OR(95% CI)	P
Presence of NCP	-0.332	0.717(0.311 to 1.654)	0.436
Age	0.025	1.025(0.986 to 1.066)	0.215
Sex	-1.642	0.194(0.068 to 0.553)	0.002*
Weight	-0.044	0.956(0.918 to 0.996)	0.033*
Clinical department			
Neurology	0.330	1.391(0.444 to 4.357)	0.571
Primary diagnosis			
Brain tumor			0.005*
Stroke & Cerebrovascular	1.158	3.185(0.414 to 24.475)	0.266
Nervous system disorder	1.321	3.749(0.859 to 16.352)	0.079
Traumatic brain injury	2.982	19.722(4.134 to 94.083)	<0.001*
Other	1.442	4.23(0.712 to 25.139)	0.113
Charlson Comorbidity Index	-0.021	0.98(0.781 to 1.228)	0.858
APACHE II score	0.154	1.167(1.102 to 1.235)	<0.001*
ICU length of stay(logged)	-0.107	0.899(0.582 to 1.390)	0.632
Prescriptions per patient	0.002	1.002(1.000 to 1.004)	0.047*

Table 3. Inter-rater agreement for ratings of clinical significance of intervention

	Intra-class correlation(95% CI)	P
Average measures	0.931(0.917-0.942)	0.001*

Table 4. Multiple linear regression analysis for ICU length of stay(logged)

	Coefficient(95% CI), day	P
Presence of NCP	-0.077(-0.148 to -0.006)	0.033*
Age	-0.005(-0.008 to -0.001)	0.006*
Sex	-0.049(-0.159 to 0.060)	0.378
Height	0.001(-0.005 to 0.008)	0.683
Weight	-0.004(-0.008 to 0.000)	0.026*
Clinical department		
Neurology	0.091(-0.036 to 0.219)	0.158
Primary diagnosis		
Stroke & Cerebrovascular	0.251(0.090 to 0.413)	0.002*
Nervous system disorder	0.359(0.263 to 0.454)	<0.001*
Traumatic brain injury	0.689(0.498 to 0.881)	<0.001*
Other	0.082(-0.080 to 0.243)	0.320
Charlson Comorbidity Index	0.040(0.013 to 0.066)	0.003*
APACHE II score	0.017(0.011 to 0.022)	<0.001*
Prescriptions per patient	0.004(0.014 to 0.005)	<0.001*

Table 5. Incidence of intervention per 1,000 patient-days by clinical significance

	Pre-NCP (n=676)	Post-NCP(n=769)	P
Incidence of intervention per 1,000 patient-days	72.3	110.8	<0.001*
Very significant	5.1	9.6	0.074
Significant	17.4	41.3	<0.001*
Somewhat significant	29.8	31.0	0.812
No significance	20.0	29.0	0.044*

Table 6. Frequency of pharmacist's interventions by type

	Total	Pre-NCP (n=676)	Post-NCP(n=769)
Change to alternative drug	120(26.1)	55(32.4)	65(22.4)
Drug discontinuation	48(10.4)	11(6.5)	37(12.8)
Drug initiation	11(2.4)	0(0)	11(3.8)
Dose adjustments	97(21.1)	31(18.2)	66(22.8)
Adjustment of administration	79(17.2)	37(21.8)	42(14.5)
Recommendation or modification of laboratory monitoring	9(2.0)	0(0)	9(3.1)
Change insurance code	3(0.7)	0(0)	3(1.0)
Adjustment of parenteral/enteral nutrition	16(3.5)	1(0.6)	15(5.2)
Pharmacokinetics advice	2(0.4)	0(0)	2(0.7)
Provision of drug information	19(4.1)	0(0)	19(6.6)
Other	56(12.2)	35(20.6)	21(7.2)

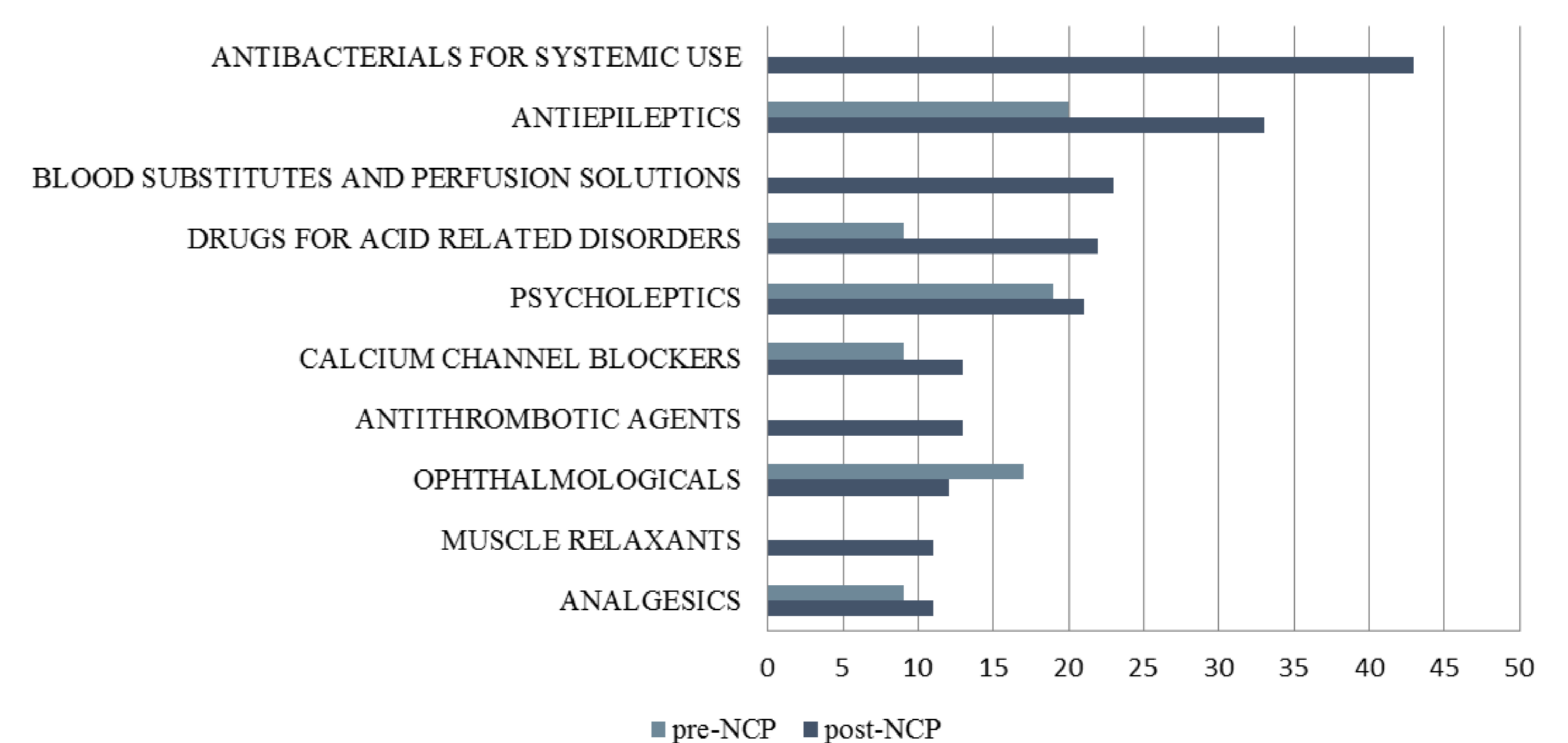


Figure 1. The Top 10 most frequently intervened medication type classified by ATC system

Discussion

- The presence of NCP showed a tendency to reduce ICU mortality, decreased ICU length of stay.
- The incidence of intervention per 1,000 patient-days and incidences of clinically significant interventions were higher in the post-NCP period.
- Among the top 10 frequently intervened medications in post-NCP period, no intervention during pre-NCP period were documented in 6 medication type.

Conclusion

The presence of the designated NCP pharmacist had a positive impact on the patients care in neurocritical care units. It also associated with significantly reduced ICU length of stay.

