SWSC 2020 On-Demand Meeting Abstracts

17. INCIDENCE OF HYPONATREMIA IN PATIENTS GIVEN LEVETIRACETAM VS PHENYTOIN FOR EARLY POST TRAUMATIC SEIZURE PROPHYLAXIS

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Background: Hyponatremia (serum Na < 135 mEq/L) can occur in up to 13% of traumatic brain injury (TBI) patients. Levetiracetam and phenytoin are comparable for prevention of acute post traumatic seizures (PTS) in TBI patients with intra cranial hemorrhage (ICH). Levetiracetam has the advantage of simpler dosing and does not require monitoring of serum levels. However, levetiracetam-induced hyponatremia has been described in case reports of non-trauma patients. In 2012, our institution transitioned from using phenytoin to levetiracetam for PTS prophylaxis. The goal of this study was to determine whether the use of levetiracetam resulted in higher rates of hyponatremia and its treatment in patients with post-traumatic ICH when compared to phenytoin.

Methods: A retrospective review of patients with an ICH arriving to an ACS verified Level I trauma center from 01/08-12/16 was performed. Patients receiving PTS prevention were included. Exclusions included desmopressin administration, abnormal serum sodium on admission, acute death, prior admission for hyponatremia without ICH, incomplete records, or transfer to another acute care facility. Patients were categorized by their sodium nadir: normal (135-145 mEq/L), mild (130-134 mEq/L), moderate (125-129 mEq/L), or severe (< 125 mEq/L), and analyzed by levetiracetam versus phenytoin. Patients were matched 2:1 based on age and injury severity score (ISS). Treatment for hyponatremia was defined as fluid restriction, enteral NaCl supplements, 2% hypertonic saline, 3% hypertonic saline, and furosemide administration. The latter two items were only considered treatment if they were specifically designated for hyponatremia, not elevated intracranial pressure or fluid overload, respectively.

Results: During the study period, 1735 trauma patients with an ICH received PTS prophylaxis. Of these, 343 were excluded, making a cohort of 1392 patients: 312 received phenytoin and 1080 levetiracetam. 26 phenytoin patients were unable to be matched, leaving 286 phenytoin and 572 levetiracetam patients. Patients were 36±18 years old, had an average ISS of 22±9, and an initial sodium of 139±2. The matched cohorts had similar baseline characteristics (age, gender, ISS), with the exception of the phenytoin group having a slightly higher admission sodium (140 vs. 139, $p< 0.001$). There was no difference in the rate or degree of hyponatremia between the two groups, but treatment was more common in patients who received levetiracetam.

Conclusion: Our data refute the hypothesis that levetiracetam administration in TBI patients increases the incidence of clinically significant hyponatremia. Despite case reports associating levetiracetam administration with hyponatremia in non-trauma patients, there is no clinically relevant difference in the incidence of hyponatremia in patients with traumatic ICH who received levetiracetam vs. phenytoin for PTS prophylaxis. There was an increased rate of intervention for hyponatremia in the levetiracetam group. This may be due to a coincidental paradigm shift for proactive prevention of hyponatremia.

	Phenytoin (n = 286)	Levetiracetam (n = 572)	P value
Na Nadir	135 ± 4	134 ± 4	0.029
Degree of hyponatremia			
Normal (n)	164 (57%)	310 (54%)	0.38
Treated	1 (1%)	13 (4%)	0.028
Mild (n)	92 (32%)	206 (36%)	0.26
Treated	17 (18%)	89 (43%)	<0.001
Moderate (n)	22 (8%)	44 (8%)	1.00
Treated	13 (59%)	37 (84%)	0.025
Severe (n)	8 (3%)	12 (2%)	0.52
Treated	8 (100%)	12 (100%)	-
Na at Discharge	139 ± 3	138 ± 4	<0.001
ICU LOS	7 ± 10	6 ± 8	0.41
Hospital LOS	13 ± 15	11 ± 12	0.67
Mortality	13 (4%)	34 (6%)	0.40