

Incidence, Associated Factors and Outcomes of Posterior reversible encephalopathy syndrome (PRES) in Pediatric Hospitalizations.

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Background: PRES is a recently recognized distinct clinic-radiological disease over the recent decades, characterized by potentially reversible vasogenic edema of brain with preferential involvement of the posterior cortex. Clinical signs include cephalalgia, visual disturbances, alteration in mental status, focal neurological deficits and seizures. PRES has been reported in children, but most data are from single center retrospective studies and focused on a specific subset of patients such as hypertension, renal insufficiency, sickle cell disease, organ transplantation etc. However, the incidence in the general pediatric population is not known.

Objective: To analyze the incidence and associated contributing factors of PRES among inpatient pediatric hospitalizations.

Design/Methods:

We analyzed the data from Agency for Healthcare Research and Quality (AHRQ) sponsored 2016 Kids' Inpatient Database (KID). The KID 2016 was created from a stratified, random sample of discharges from all community, non-rehabilitation hospitals which amounts to 88% of the total hospitals in US. Kid databases are released almost every 3 years and for this study we analyzed 2016 KID database for PRES related hospitalization as it employed ICD 10 CM for coding purpose and has a specific code for PRES (No available in ICD9 CM codes). Based on literature review, we identified 10 factors/diagnosis associated with PRES and then queried the database for the presence or absence of these variables in patients with PRES. Common childhood cancers including leukemia/lymphomas, hepatoblastoma, neuroblastoma, primary CNS tumors and osteosarcoma were included for analysis. Our study received institutional review board approval from the Metro Health Medical Center and was deemed exempt from participation consent.

Results: A total of 825 pediatric hospitalizations were observed during the study period. Table. 1 describes the baseline demographics of the study population. Adolescents and females are more prone to develop PRES. As described in literature, we identified a significant association between PRES and hypertension as well as renal disorders (Table. 2). Using conditional multivariable logistic regression, adjusted odds ratios and CI were determined for all associated comorbid conditions (Table. 3).

Conclusion(s): This is the first study to evaluate various comorbid conditions/risk factors in a large cohort of pediatric patients. Females, adolescents, hypertension, renal disorders are associated with PRES. Knowledge about these risk factors is essential for identifying the at-risk population and paves way for more research to understand this complex condition.

Table 1: Demographic data of the study population.

Variables	0-5 years	6-12 years	13-20 years	Total	Controls	P value
Population (weighted estimates)	106	289	430	825	2295395	<0.001
Gender Male	46	116	136	298	998789	<0.001
Female	60	173	294	527	1296033	
Race						
White	40	100	146	286	1037228	<0.001
Black	15	50	126	191	404084	
Hispanic	25	85	84	194	485104	
Others	IS	25	36	69	190333	
Missing	17	29	37	83	178645	
Insurance						
Public	54	146	234	434	1265222	0.3
Private	43	118	162	323	861048	
Uninsured	IS	26	34	69	169125	
Median Household Income						
\$1-24,999	28	93	149	270	763739	0.8
\$25,000-34,999	20	70	103	193	563286	
\$35,000-44,999	31	65	99	195	517774	
45,000 or more	22	52	74	148	416705	
Admission						
Non elective	86	232	366	684	1780350	<0.001
Elective	20	58	62	140	507094	
Location of hospital						
Northeast	19	56	76	151	398382	0.6
Midwest	29	78	99	206	502517	
South	28	94	168	290	898475	
West	29	62	87	178	496020	

Table 2: Univariate analysis of conditions associated with PRES|

S. NO	Factors	PRES	Control	Odds Ratio	Lower CI	Upper CI	p Value
1	Solid Organ Tx Status	29	10961	7.59	5.23	11.004	<0.001
2	Bone Marrow Transplant	39	6709	16.927	12.26	23.36	<0.001
3	Hypertension	270	47945	22.8	19.71	26.38	<0.001
4	Renal Disorder	400	88338	23.51	20.51	26.96	<0.001
5	Immunodeficiency, Primary	28	6707	11.9	8.21	17.488	<0.001
6	Malignancies	15	15389	2.747	1.648	4.57	<0.001
7	Sepsis	48	36901	3.78	2.82	5.06	<0.001
8	Systemic Connective Tissue Disorder	66	11229	17.68	13.74	22.76	<0.001
9	Blood Transfusion	85	45998	5.617	4.45	7.032	<0.001
10	Hypomagnesemia	73	18148	12.181	9.57	15.5	<0.001
11	Severe Sepsis/MODS	48	15061	9.35	6.98	12.52	<0.001
12	Sickle cell anemia	50	40848	3.56	2.67	4.74	<0.001

Table 3 shows the adjusted odds ratio (aOR) and confidence intervals of factors associated with PRES.

Variables	aOR	Lower Confidence Interval	Upper Confidence Interval	P value
Age (in years)	1.022	1.011	1.033	<0.001
Male	0.655	0.566	0.758	<0.001
Race				0.002
Black VS white	1.231	0.891	1.701	0.207
Hispanic VS white	0.825	0.633	1.077	0.157
Other VS white	1.012	0.761	1.345	0.934
Solid Transplantation	1.4	0.956	2.052	0.084
Bone Marrow Transplant	3.568	2.505	5.082	<0.001
Hypertension	9.204	7.836	10.811	<0.001
Renal Disorder	13.054	11.204	15.209	<0.001
Immunodeficiency	2.827	1.872	4.269	<0.001
Malignancy	2.511	1.502	4.197	<0.001
Systemic Connective Disorder	5.676	4.318	7.46	<0.001
Blood Transfusion	1.864	1.462	2.377	<0.001
Hypomagnesemia	2.154	1.656	2.803	<0.001
Anemia	1.087	0.851	1.389	0.506
Severe Sepsis	1.619	1.138	2.305	0.007
Sickle Cell Anemia	2.957	2.151	4.065	<0.001
Sepsis	0.74	0.522	1.048	0.089

Table 4: Outcomes (LOS, in hospital death, disability, costs) in PRES in comparison with all inpatient discharges

S. NO	Parameters	PRES	Controls	p Value
1	LOS Mean +/- SE	18.28+/-1	4.2+/-0.05	<0.001
2	Charge	309273+/-23276	42635+/-86.5	<0.001
3	Severity			
	No Loss of function	0	1491	<0.001
	Minor	Censored	971166	
	Moderate	37	8900672	
	Major	370	338709	
	Extreme	416	93356	
4	Disposition			
	Home	679	2129900	<0.001
	Home with Home health	71	58919	
	Transfer out	44	84074	
5	Mortality	26/825 (3.2%)	8341/2293556 (0.4%)	<0.001

Risk of various factors associated with PRES in hospitalized children

Chart Area

