

Does Hyponatremia Influence Outcomes in Acute Pulmonary Embolism? The Dayton VA Medical Center Experience 2013-2022

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BACKGROUND

- Hyponatremia ($\text{Na} \leq 135$ mmol/L) is common in hospitalized patients and may indicate poor prognosis in acute PE.
- Approximately 20% of acute PE cases present with hyponatremia.
- The 2019 ESC Guidelines emphasize risk stratification based on hemodynamic stability, right ventricular dysfunction (imaging & biomarkers), and clinical presentation.
- Additional prognostic markers, such as hyponatremia can enhance the identification of patients that are at higher risk of adverse outcomes.
- By understanding the predictive value of hyponatremia, PE management strategies can be enhanced, and early intervention can be supported.

PURPOSE

This study aimed to assess the impact of hyponatremia on outcomes in PE patients at the Dayton VA over 10 years.

METHODS

- Between 2013-2022, 375 cases of acute PE at the Dayton VA were identified using ICD-9/10 codes.
- Categorized by 2019 ESC PE risk classes with 195 low-risk and 180 intermediate-low, intermediate-high, or high risk (combined)
- Comparison of Hyponatremia ($\text{Na} \leq 135$) and Normonatremia ($\text{Na} > 135$) groups

RESULTS

Acute Pulmonary Embolism: Hyponatremia vs Normonatremia										
Risk Stratification (% total)	Age, years Median (IQR)	COPD N (%)	CAD/CMP N (%)	Cancer N (%)	LOS, days Median (IQR)	LOC, N (%) Outpatient	LOC, N (%) Ward	LOC, N (%) TCU-MICU	Readmit ≤ 30 days N (%)	Death ≤ 30 days N (%)
Low-Risk $\text{Na} \leq 135$ N = 37 (19%)	63 (54-73)	13 (35%)	5 (13.5%)	3 (8%)	4 (2-6)	3 (8%)	24 (65%)	10 (27%)	8 (21.6%)	0
Low-Risk $\text{Na} > 135$ N = 158	66 (55-71)	60 (38%)	44 (27.8%)	32 (20.2%)	3 (2-5.5)	18 (11.4%)	103 (65.2%)	37 (23.4%)	17 (10.7%)	6 (3.8%)
ILR-IHR-HR $\text{Na} \leq 135$ N = 32 (18%)	69 (58-74.5)	21 (65.6%)	13 (40.6%)	12 (37.5%)	3.5 (2-10.5)	0	13 (40.6%)	19 (59.4%)	7 (21.8%)	5 (15.6%)
ILR-IHR-HR $\text{Na} > 135$ N = 148	70 (63.5-76.5)	61 (41.2%)	57 (38.5%)	28 (18.9%)	5 (3-8)	2 – ILR (1.4%)	52 (35.1%)	94 (63.5%)	24 (16.2%)	21 (14.2%)

CMP	Cardiomyopathy
LOC	Level of Care
LOS	Length of Stay
ILR	Intermediate Low-Risk
IHR	Intermediate High-Risk
HR	High-Risk (N =6; Hyponatremia 3, Normonatremia 3)
TCU	Transitional Care Unit/Step-down ICU

- Hyponatremia prevalence was 19% in low risk & 18% in intermediate/high risk.
- 30-day readmission was higher in hyponatremic patients across all risk strata in comparison to normonatremic patients.
- 30-day mortality was higher in hyponatremic ILR/IHR/HR patients in comparison to normonatremic patients.

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DISCUSSION

- Hyponatremia was linked to higher readmission rates across both risk strata but was not associated with increased 30-day mortality.
- In the intermediate/high-risk patients, hyponatremia was correlated with elevated 30-day mortality and high chronic disease burden.
- By considering acute PE as a diagnosis, early interventions can be utilized to potentially prevent increased morbidities & mortalities.
- This retrospective study suggests that hyponatremia may reflect more severe underlying illness or volume status shifts in PE patients.

FUTURE DIRECTIONS

- Implement prospective studies to validate hyponatremia as a prognostic marker in PE.
- There is a need to investigate mechanisms that connect hyponatremia with adverse outcomes, such as RV dysfunction and neurohormonal activation.
- Develop discharge protocols that target PE patients who present with hyponatremia for close follow-up to reduce future readmissions and potential adverse effects.

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