Disposition is Not Correlated with Several Markers Subclinical Inflammation in Pediatric Emergency Department Patients With Suicidal Ideations

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INTRODUCTION

- Research examining correlations between depression, suicidality, and markers of subclinical inflammation has found a correlation between abnormal markers of subclinical inflammation and depression along with increased subclinical inflammation and suicidality.
- There is a growing body of evidence that the severity of this inflammation may worsen with severity of psychiatric illness and improve with treatment[1].
- Markers such as the neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio, mean platelet volume, and leukocyte number are obtained from the CBC panel which is a frequently ordered test in the emergency department to facilitate medical screening and evaluation of psychiatric complaints.
- No study to our knowledge specifically evaluates the correlation between depression and these subclinical markers of inflammation in the ED population.
- This could provide a potentially valuable tool in the assessment and decision making of whether to admit/discharge a psychiatric patient.

MATERIALS & METHODS

- Pediatric patients from admitted and discharge groups (under 18yo) were randomly selected from the group of patients presenting to the Vidant Emergency Department from 2016 to 2019 with the 2021 ICD-10-CM diagnosis code R45.851 (suicidal ideations).
- Primary variables analyzed were retrieved from the Vidant electronic health records. These primary variables are emergency department disposition (admitted/discharged), neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio, mean platelet volume, and leukocyte number.
- Other variables analyzed were time of the lab blood draw, age, gender , past history of unipolar depression, current SSRI use, and positive urine drug screen (excluding cannabis).
- A comparison of the variables was made between the admitted and discharged groups using multiple linear regression analysis to evaluate group differences in these subclinical inflammatory markers.

HYPOTHESIS

- We predict that we will find elevation of the markers of inflammatory examined in the admitted group compared to the discharged group.

RESULTS

Dependent Variable Mean Values by Independent Categorical Variables

		Neutrophil Lymphocyte Ratio	Platelet Lymphocyte Ratio	Leukocyte Number (Cells / mL)	Mean Platelet Volume (femtoliters)
Disposition	Discharged	1.94	121.14	8.17	8.86
	Admitted	1.90	118.89	8.37	8.73
Time	AM	2.03	140.28	7.96	8.59
	PM	1.90	115.23	8.32	8.86
Gender	Male	1.40	101.68	8.61	8.58
	Female	2.16	128.54	8.09	8.91
Depression History	Present	2.45	124.47	9.25	8.93
	Absent	1.55	117.20	7.54	8.72
SSRI use	Present	1.92	110.17	9.15	8.88
	Absent	1.92	125.55	7.78	8.77
Positive Drug Screen	Present	3.99	136.74	12.36	8.84
	Absent	1.72	118.59	7.84	8.80

- The primary variable assessed (ED Disposition) did not make any statistically significant difference. The overall regressions showed that the assessed variables did explain a significant amount of the variance in neutrophil-to-lymphocyte ratio ($R2 = 0.464$, $F (7, 47) = 5.807$, $p < 0.001$) and leukocyte number ($R2 = 0.255$, $F (7, 47) = 2.299$, $p = 0.042$). They do not explain a significant amount of the variance in platelet-to-lymphocyte ratio ($R2 = 0.192$, $F (7, 47) = 1.594$, $p = 0.161$) or mean platelet volume ($R2 = 0.048$, $F (7, 47) = 0.339$, $p < 0.932$). Only positive urine drug screen ($\beta = 0.488$, $p < 0.001$) and gender ($\beta = 0.243$, $p = 0.049$) significantly predicted neutrophil-to-lymphocyte ratio. Neutrophil-to-lymphocyte ratio was higher on average in patient's who had a positive drug screen and in females. Only Gender significantly predicted platelet-to-lymphocyte ratio ($\beta = 0.318$, $p = 0.036$). Platelet-to-lymphocyte ratio was higher on average in females. Only positive urine drug screen ($\beta = 0.384$, $p = 0.006$) predicted leukocyte number. Leukocyte number was higher on average in patient's who had a positive drug screen. No variable significantly predicted mean platelet volume ($ps > 0.05$). Leukocyte number and mean platelet volume tend to decrease with increasing age. Mean platelet volume is increased with the presence of hypertension.

DISCUSSION

- This project is still in progress which is likely a major contributing factor to the current findings.
- A significant weakness in this study is our small sample size.
- We did not find any significant correlation for objective subclinical inflammatory markers to be used as a tool in making disposition decisions.
- A factor noticed while conducting the study was a high prevalence of these patients having ADHD, which may explain the positive urine drug screen significant predictors due to treatment with stimulants in these patients potentially causing a change in these inflammatory markers.
- The significant predictors in gender can also likely be explained by the smaller number of males in the analyzed groups leading to over representation of possible outlier data points.
- Due to the high prevalence of ADHD noticed during data collection and knowing there is correlation between ADHD and depression[3], it would be interesting to conduct further studies into whether the condition itself or the medication is the root cause for this correlation.

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