INTRODUCTION

Sepsis is a systemic inflammatory response to infection and a rapidly progressing, life-threatening condition that can lead to organ failure and shock if not treated immediately. The likelihood of developing sepsis increases in patients with hematological malignancies, as systemic chemotherapy results in immune suppression. When neutropenic, the patient is vulnerable to invasive infection which can potentially cause overwhelming sepsis and death. Consequently, early diagnosis of sepsis in these high risk population of patients is very important for reducing mortality and alleviating healthcare costs. MDW is a novel parameter that has been shown to identify sepsis in the emergency department (ED) with good diagnostic accuracy.

METHODS

Patient Enrollment: Subjects were enrolled from EDs at three U.S. academic centers. The study enrolled adults, 18-89 years, whose evaluation included a complete blood count (CBC) with differential upon presentation to the ED. Data on the presence of pre-existing conditions were collected for all enrolled subjects as part of the medical record extraction. We performed a post-hoc analysis of the data that included patients with a pre-existing diagnosis of hematological malignancy and immune suppression. These conditions were selected based on their potential impact to the measurement of MDW.

White Cell Volume Determination: All blood samples were analyzed on a UniCel® DxH 800 Hematology analyzer (Beckman Coulter, Inc.) within 2 hours of collection.

Statistical Approach: Diagnostic ability was evaluated in terms of the area under the curve (AUC) sensitivity, specificity, and analysis of area receiver operating characteristic (ROC) curves.

RESULTS

AUC and ROC curves of malignant and non-malignant groups and subjects with and without immune suppression were not statistically different (Figures 1-2). These results indicate that the diagnostic ability of MDW is the same in both groups with and without the particular pre-existing condition. Furthermore, analyses in a subset of patients with neutropenia (ANC<1500) demonstrated a performance trend that is similar to that of all ED patients with AUC =0.720 (data not shown).

CONCLUSION

In a multi-center prospective clinical trial (2,158 adults), we showed that MDW could be useful for early detection of adults having or developing sepsis in the emergency department. In addition, we observed that the diagnostic ability of MDW to identify septic patients does not seem to be affected in patients with hematological malignancy or immune suppression. Additional studies are needed to further establish performance in these critical populations.

REFERENCES

2. Crouser et. al. CCMEF 2019; Manuscript in Press.