Diagnosis of Infection Utilizing Accellix CD64

C. L. Sprung [1], R. C. Morales [1], H. Kasdan [2], T. Volker [2], A. Reiter [2], Y. Cohen [2], Y. Himmel [2], J. Meissonnier [2]

[1] Hadassah Hebrew University Medical Center, Jerusalem, Israel, [2] LeukoDx, Jerusalem, Israel

Introduction

Differentiating infected or non- infected patients in the ICU can be very difficult. The Accellix CD64 Assay, identifies whether or not a patient is infected within 25 minutes. The CD64 marker measures neutrophil activation rapidly thus enabling early treatment. CD64 is constitutively expressed on the cell surface of PMNs at low levels in patients without infections. When pathogens invade the circulation, expression of CD64 on neutrophils increases dramatically at a very early step of the immune host response. The purpose of this study was to evaluate the Accellix CD64 instrument in ICU patients with and without infections.

Methods

Infected and non-infected ICU patients (ICU) and normal volunteers (C) had CD64 levels measured by the Accellix CD64 instrument using a sample of patient blood (30-50 µL). Measurements were calculated as 'CD64 index'(ratio between the fluorescence of the PMN population and the fluorescence of control beads). The Accellix system is composed of two main components, a disposable cartridge and a reader.

Accellix Cartridge

All pre-analytical and analytical processing are performed within the Accellix CD64 cartridge. The user adds a drop of blood into the sample port and places the cartridge into the reader; no further user intervention is required. The cartridge contains all the needed reagents, control material as well as an integrated flow cell. Once the blood is added, cells are labelled with multiple antibodies conjugated with differentiating fluorescent tags. Once the sample processing is complete, the sample flows through a dedicated reading channel where data are acquired. Analytical data processing utilizing proprietary algorithms provide final answers on the screen.

Accellix Reader

Controls the microfluidics in the cartridge and the sequence of events of the sample handling. Detects the fluorescent signals as the sample flows through the flow cell due to: Diode excitation laser, PMT Array detects fluorescence at eight wavelengths using optical grating. This cartridge-based platform provides rapid results, is available 24/7 and is easy to use by any clinical staff and lab technicians.

Results

A total of 92 subjects were studied; 54 in the ICU (ICU) and 38 controls (C). CD64 Index levels were higher (mean ± SEM) in the ICU definite infection (2.24±0.48), ICU probable infection patients (1.54±0.7) than ICU no infection (0.65±0.17) and normal control patients (0.53±0.02). Definite vs. no infection: $P<0.001$, Definite vs. healthy: $P<0.0001$, Probable vs. healthy: $P<0.005$.

CD64 Index levels were higher (mean ± SEM) in ICU definite infection plus ICU probable infection patients (1.99 ± 0.40) compared to ICU possible infections plus ICU no infection (0.64±0.16), $p < 0.005$.

Conclusion

CD64 index levels are higher in infected than non-infected ICU patients. The simplicity of its handling and rapid turnaround time makes Accellix CD64 a promising assay for differentiating infected from non-infected patients in critical settings such as the emergency room and ICU.

References

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