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The usefulness of the extended differential parameters as a biomarker of bacteraemia at Chris Hani Baragwanath Academic Hospital

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ABSTRACT

Introduction:

Extended differential parameters are generated with the automated differential count by Sysmex XN-series automated haematology analysers. Within the extended differential parameters generated are the immature granulocyte count, the neutrophil fluorescent light intensity (NE-SFL) and the neutrophil fluorescent light distribution width (NE-WY), which have been proposed as early biomarkers of bacteraemia. This study aimed to evaluate the NE-SFL, NE-WY and immature granulocyte percentage in comparison to neutrophil CD64 expression, a high quality but expensive sepsis biomarker, among patients with suspected bacterial sepsis at the Chris Hani Baragwanath Academic Hospital in Johannesburg, South Africa.

Methods:

A daily search of the laboratory information system from the 22/08/2019 to 08/10/2019 identified samples submitted for a blood culture and a concurrent full blood count. An automated differential count using a Sysmex XN-9000 haematology analyser and neutrophil CD64 expression by flow cytometry were run on the residual sample.

Results:

A total of 151 samples were collected, of which 87 were excluded due to equivocal results with regards to the presence of bacterial infection. The remaining 64 samples included 21 with bacteraemia, 19 with evidence of non-bacteraemic infection and 9 with no evidence of infection. The extended differential parameters were all significantly higher among patients with bacteraemia as compared to those without infection, and on receiver operating characteristic (ROC) curve analyses, all showed good performance (Area under the curve (AUC) >0.8). Overall, the NE-SFL performed best, with an AUC of 0.87, sensitivity of 85.7% and specificity of 89.1% (cut-off value 49.75). In comparison to neutrophil CD64 expression, the NE-SFL showed moderate agreement (kappa=0.51).

Conclusion: In this study, the NE-SFL showed promise as an inexpensive biomarker of bacteraemia in the resource constrained setting.

Keywords:

Sepsis biomarkers, Extended differential parameters, Sysmex, Tuberculosis, bacteraemia.