A comparison of the granulocyte count from the ABX Micros ES60 and the neutrophil count from a 5-part differential analyser

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Aims

The aim of the study is to establish that the granulocyte count of a 3-part differential analyser correlates well when compared to the neutrophil count of a 5-part differential analyser, in the absence of specific flagging.

Objectives

The neutrophil count is an important parameter in determining the treatment outcomes, with regards to chemotherapy, for both oncology and haematology patients and also for some other drug therapies such as Clozapine. It is becoming increasingly popular to make these decisions using point of care testing (POCT) in order to achieve greater efficiency and improve patient pathways.

The HORIBA Medical manufactured ABX Micros ES60 analyser provides a fast laboratory standard full blood count, with a 3-part differential. Combined with the ease of use, small footprint and CPA compliance it sits excellently within the POCT environment

The ABX Micros ES60 produces a granulocyte count, consisting of neutrophils, eosinophils and basophils, as part of the 3-part impedance differential. The neutrophils make up more than 95% of the granulocyte population and therefore the granulocyte count from the ABX Micros ES60 should correlate well with a neutrophil count from a 5-part differential analyser provided that there are no flags alerting the operator of elevated eosinophil or basophil populations. A study to examine the correlation between the neutrophil count from a 5-part differential analyser and the granulocyte count from the ABX Micros ES60 was undertaken.

Methods

A study of 160 samples (100 with no flags related to granulocytes and 60 with specific flags), less than 4 hours old, were processed in duplicate by a 3-part differential analyser (ABX Micros ES60, HORIBA Medical). These samples were then processed in duplicate by a 5-part differential analyser (ABX Pentra DX120, HORIBA Medical) and the results were compared.
The abnormal samples were placed into three categories showing flags related to granulocytes:

Samples with G1 and/or G2 flags

– Indicating eosinophilia, myelocytes or band form neutrophils

Samples with G1 and/or G2 flags plus M2

– Indicating myelocytes, basophilia.

Samples with G3 flag

– Indicating metamyelocytes, many types of Large Immature Cells.

The results were compared by correlation.

Samples with G1 and/or G2 Flags

The flagging indicates the presence of eosinophilia, myelocytes or band form neutrophils, yet there was excellent correlation (R = 0.980 n=20) between the absolute neutrophil count on the 5-part differential analyser and the granulocyte count 3-part differential analyser.
The WBC also gave excellent correlation between the two systems (R = 0.98)

With G1 and/or G2 Flags — Neutrophil ABX Pentra DX120 vs Granulocyte ABX Micros ES60. R=0,980. Series1
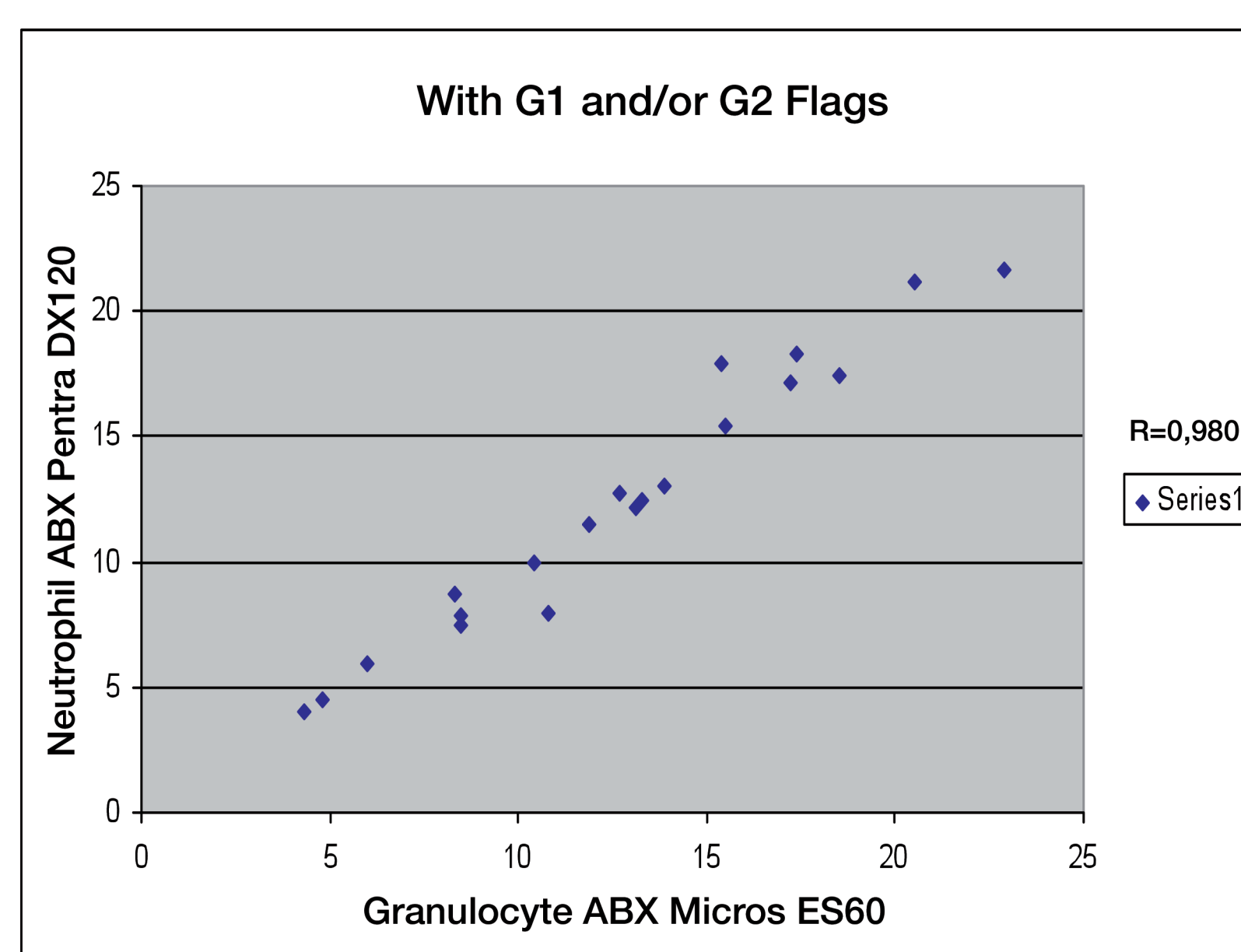
Samples with G3 Flag

The flagging indicates the presence of metamyelocytes and many types of Large Immature Cells. The correlation was good (R = 0.984   n=20) between the absolute neutrophil count on the 5-part differential analyser and the granulocyte count 3-part differential analyser, with very few outliers.
The WBC also gave excellent correlation between the two systems (R = 0.996)

Cases were noted, however, of isolated poor correlation which indicates that care should be taken when interpreting results.
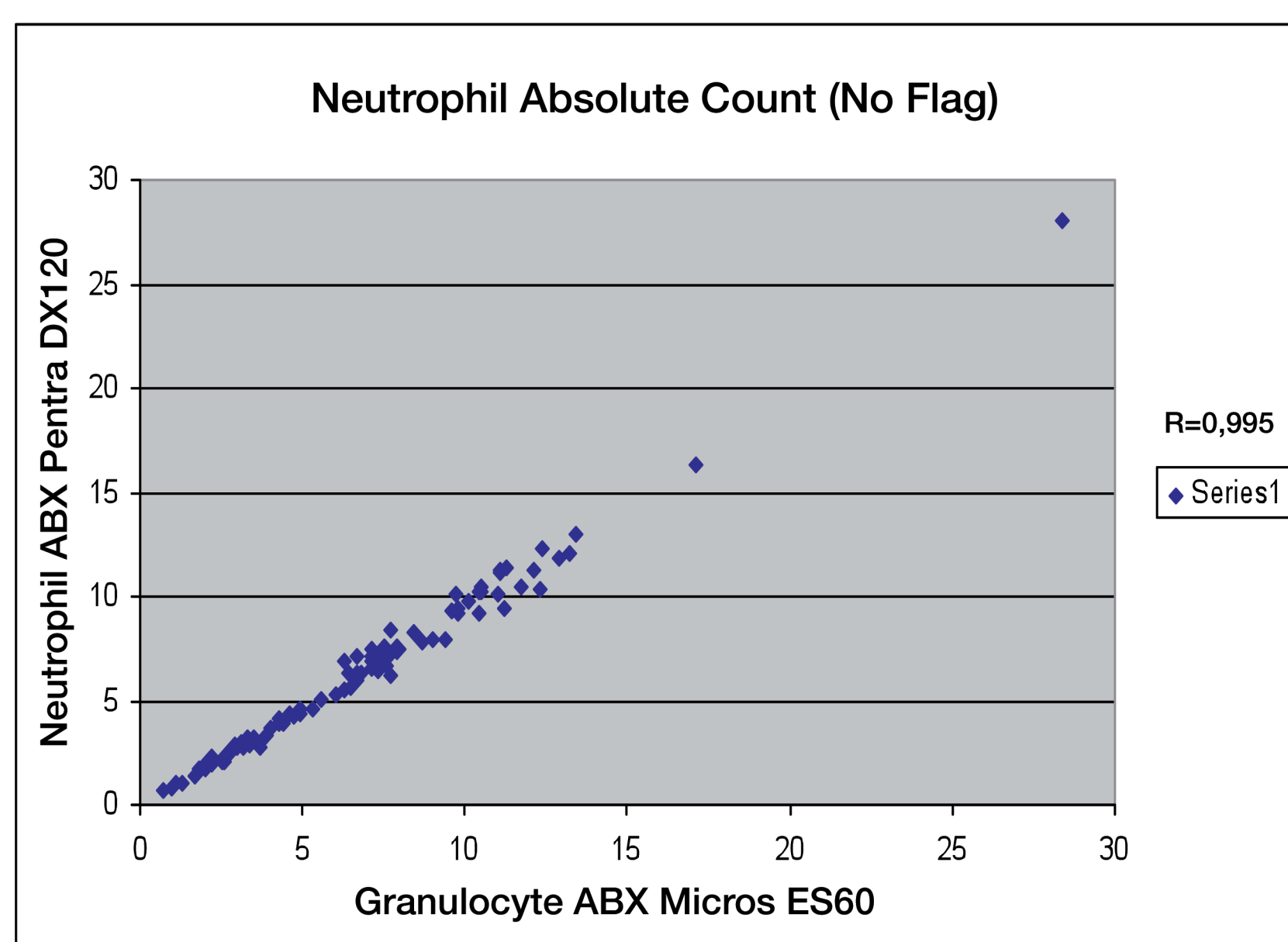

With G3 Flag — Neutrophil ABX Pentra DX120 vs Granulocyte ABX Micros ES60. R=0,984. Series1
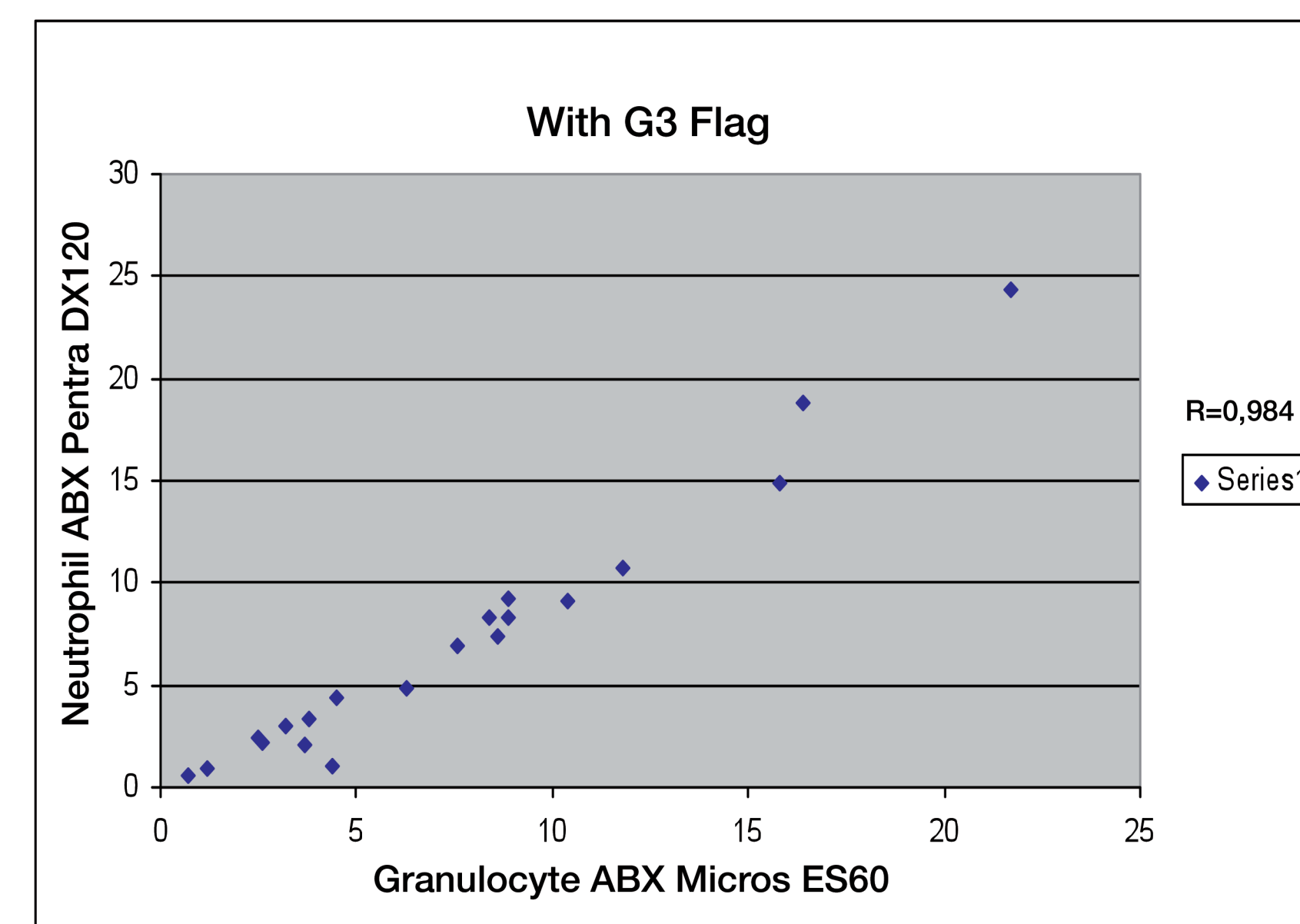
Results

Samples with no granulocyte related Flags

Samples without the flags related to granulocytes showed excellent correlation between the neutrophil count on the 5-part differential analyser and the granulocyte count of the 3-part differential analyser (R = 0.995 n=100).
The WBC also gave excellent correlation between the two systems (R = 0.997)

Neutrophil Absolute Count (No Flag) — Neutrophil ABX Pentra DX120 vs Granulocyte ABX Micros ES60. R=0,995. Series1

Samples with G1 and/or G2 Flags plus M2

The flagging indicates the presence of myelocytes or basophilia. The correlation between the absolute neutrophil count on the 5-part differential analyser and the granulocyte count 3-part differential analyser was not as good as without the M2 flag (R = 0.931 n = 20) with several outliers.
The WBC, however, gave excellent correlation between the two systems (R = 0.998)

With G1 and/or G2 flags plus M2 — Neutrophil ABX Pentra DX120 vs Granulocyte ABX Micros ES60. R=0,931. Series1
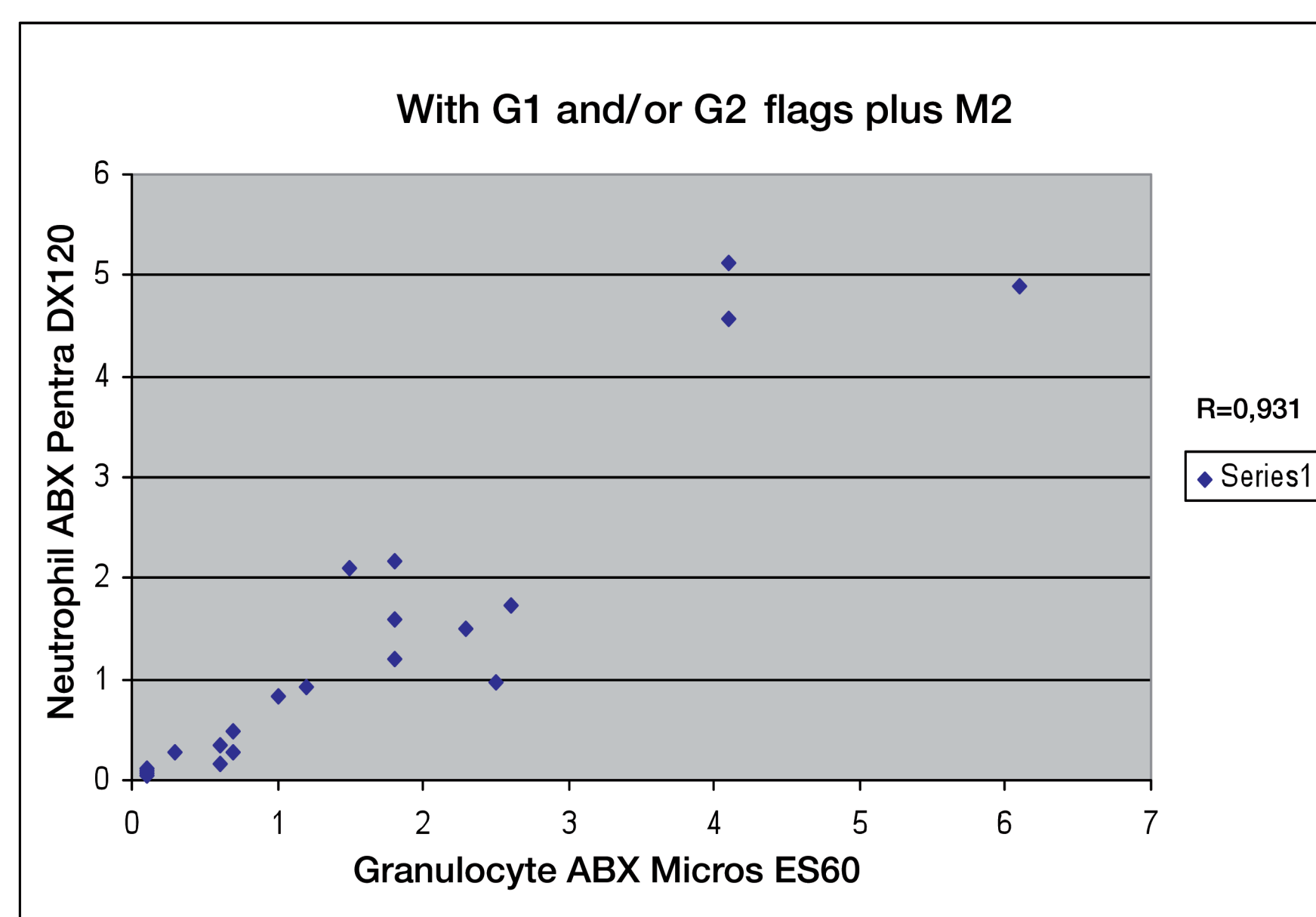
Conclusions

These results show an excellent correlation (R = 0.9885) between the granulocyte count from the ABX Micros ES60 and the neutrophil count from the 5-part differential analyser.
This suggests that the ABX Micros ES60 granulocyte count could be confidently taken as the neutrophil count in therapeutic drug monitoring, provided that no M2 alarms are triggered. Care should be taken with G1 flags, however, as these may be due to the presence of the relatively rare occurrence of eosinophilia. An addition flag, L1, (which suspect the presence of platelet aggregates or NRBC and are not granulocyte related) were seen in the 100 normal samples and showed no effect on the correlation of the WBC.