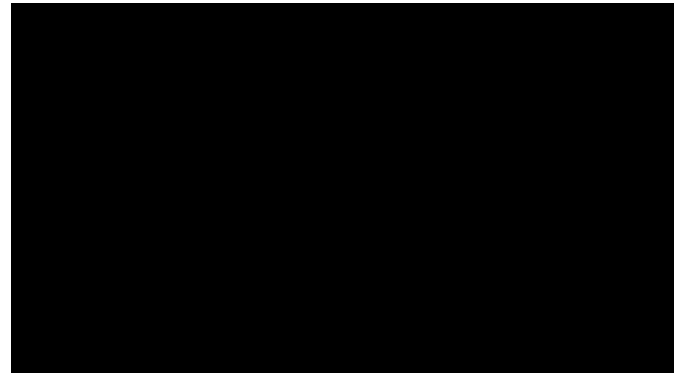


Chapter 2: One More Option to Solve EDTA-PTCP?


Ethylenediaminetetraacetic Acid - Pseudothrombocytopenia (EDTA-PTCP) is a laboratory artifact that may lead to an incorrect evaluation and unnecessary treatment of patients.

Which of the following method (or methods) would you take to correct platelet counts in case of an EDTA-induced platelet aggregation in thrombocytopenia?

- Recheck with blood smear and estimate the platelet count
- Recheck with addition of amikacin
- Recheck after warming at 37°C
- Recheck immediately dilution without any anticoagulant
- Reexamine on another hematology device
- Recheck with other anticoagulants



Professional clinical laboratory doctors pursue accuracy and truth with the highest sense of responsibility. Nowadays, some clinical studies have been conducted to explore EDTA-PTCP solutions, suggesting that Mindray hematology systems with SF Cube technology would be an option to effectively assist lab technicians in identifying correct platelet counts.



Mindray SF-Cube technology: An effective way for correcting platelet count in individuals with EDTA dependent pseudo thrombocytopenia

A Clinical Case Report

The patient here is a 32-year-old female with infertility. After the patient’s EDTA-anticoagulated blood was drawn, it was analyzed within fifty-five minutes, and it showed a low platelet count ($28 \times 10^9/L$). The test was done by the impedance method (PLT-I) on a popular brand’s hematology system (device A). Platelet aggregation was confirmed by microscopic examination of the smear, indicating pseudothrombocytopenia (PTCP). Shortly after, a reexamination of this sample was done using the CDR (PLT-O) method on the Mindray BC-6800Plus. The results showed a markedly higher platelet count with a value of $180 \times 10^9/L$.

It’s suspected that the low platelet count obtained by device A was due to EDTA-induced PTCP. So, the patient was asked to consent for an additional test using a blood sample tube with sodium citrate this time. Thirty minutes after the sample was collected it was then analyzed. The resulting platelet parameters of the blood samples run through various testing methods and devices are listed in Table 1.

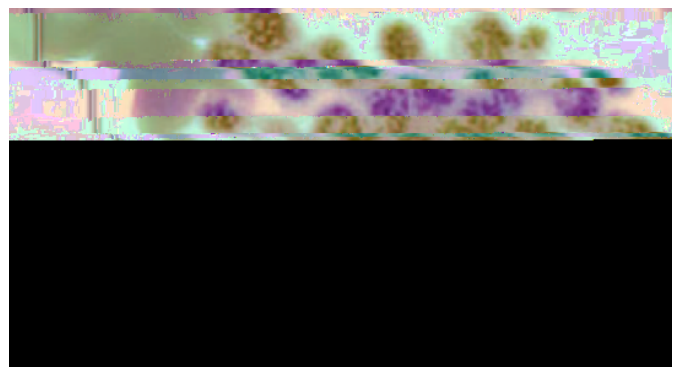


Table 1
Comparison of platelet parameters in EDTA and sodium citrate anticoagulant measured with different methods.

| Platelet parameters | EDTA -anticoagulated | | Sodium citrate-anticoagulated | |
|---------------------------|----------------------|-------------------------------------|-------------------------------|------------------|
| | PLT-I on device A | CDR (PLT-O) of Mindray BC-6800 Plus | PLT-F on device A | Neubauer chamber |
| Count ($\times 10^9/L$) | 28 | 180 | 166 | 176 |
| MPV (fL) | 10.9 | 12.2 | 11.3 | - |
| PDW (fL) | 12.8 | 17.6 | 16.0 | - |

-. Not detected; MPV: mean platelet volume; PDW: platelet distribution width.



One Mainstream Brand's Hematology System's EDTA-PTCP Dissociation Effect: Available with Fluorescent Dye Staining?

Optical fluorescence platelet counting is available in both high-end hematology analyzers (device B) and Mindray BC-6000 series hematology analyzers. In this method, a fluorescent dye is used to stain the nucleic acids in platelets, allowing the recognition of large platelets and excluding non-platelet particles such as erythrocyte debris, micro erythrocytes, or leukocyte debris.

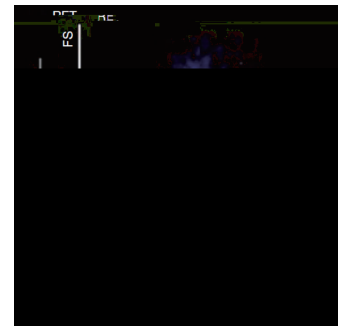
To verify whether the dissociation effect of optical fluorescence platelet counting was dependent on fluorescent dye staining, 17 of those 23 EDTA-PTCP samples in EDTA tubes were also tested on device B's reticulocyte channel and impedance channel. It was found that there was no significant difference between the platelet counts of reticulocyte channel and impedance channel (Figure 3). Only one of the 17 EDTA-PTCP samples showed a dissociation rate of more than 80%, with an average dissociation rate of 56% among all 17 EDTA-PTCP samples (Figure 3).



Figure 3: No dissociation effect of device B's optical fluorescence platelet counting on EDTA-PTCP patients. PLT-I (EDTA), impedance platelet counts of EDTA-PTCP samples in EDTA tubes; PLT-O (EDTA), optical fluorescence platelet counts of EDTA-PTCP samples in EDTA tubes; PLT-I (citrate), impedance platelet counts of EDTA-PTCP samples in citrate tubes; EDTA-PTCP, ethylene diaminetetraacetic acid-dependent pseudo thrombocytopenia.

Conclusion

In summary, the author concludes: Optical fluorescence platelet counting of the BC-6800 hematology analyzer is effective for the correction of spurious low platelet counts in EDTA-PTCP patients, and its dissociation effect on EDTA-PTCP samples is independent of fluorescent dye staining.



In the busy daily work of the laboratory, PTCP is an inevitable trouble. Mindray SF-Cube technology provides PLT-O (based on nucleic acid fluorescent staining and done on the RET channel) to correct PLT counts when there is pseudo-platelet reduction due to EDTA. PLT-O is available on Mindray BC-6000 Series Auto Hematology Analyzer and the CAL 8000/6000 Cellular Analysis Line.

References:

- [1] J. Deng, et al. Mindray SF-Cube technology: An effective way for correcting platelet count in individuals with EDTA dependent pseudo thrombocytopenia. *Clinica Chimica Acta* 502 (2020) 99–101
- [2] Y. Bao, et al. Correction of spurious low platelet counts by optical fluorescence platelet counting of BC-6800 hematology analyzer in EDTA-dependent pseudo thrombocytopenia patients. *Transl Cancer Res* 2020;9(1):166-172

