Please read the following Procedure: BH Solution for common CBC interferences and pay special attention to the section on Platelet Counts. I have found that Platelet Counts < 100,000 are not being reviewed by smear. ALL platelet counts <100,000 need a smear review, even plt counts that have been running <100,000 must be reviewed.

**Applicability**

This procedure shall apply to Bridgeport Hospital Laboratory- Bridgeport and Milford campus

**Regulatory**

1. This is a moderate complexity test
2. This is an FDA approved test
3. This procedure is applicable to CAP and CLIA regulatory agencies.

**Principle**:

1. Specimens that are markedly icteric, lipemic, hemolyzed, contain RBC agglutinins or have extremely high Glucose levels (>1200mg/dl) may cause interferences such as an increased MCHC and/or MCV when analyzed on an automated cell counter.
2. Specimens that have platelet agglutination due to EDTA induced anti-platelet activity may have spuriously decreased platelet counts.

**Intended Use**

1. Specimens run on the XN automated analyzer with an MCHC >37.5 should assessed for lipemia, RBC agglutination or hemolysis. Specimens with spuriously increased MCV should be assessed for hyperglycemia
2. Specimens that flag with “plt Clumps”, have an asterisk(\*) next to the platelet count or have an abnormal scattergram should be assessed for Platelet clumps or fibrin strands.

**PROCEDURE:**

1. **Suspected Cold Agglutinin**
2. A cold agglutinin should be suspected with an MCHC >37.2, an increased MCV, decreased RBC and HCT.
3. Warm specimen to 37 degrees Celsius for at least 30 minutes in the water bath.(Warming the specimen will reverse the RBC agglutination and normalize the parameters)
4. Run specimen immediately after removing from water bath on the XN
5. If the MCV and MCHC decrease and RBC count increase values from the specimen run at 37 should be reported. (These will be **Run 2** in **WAM**) A comment should be added stating that the specimen was warmed to 37 degrees due to the presence of cold agglutinins. In **WAM** double click in the comment section next to the **RBC** result. A dialogue box with coded comments will pop up. Choose the appropriate comment, select save and then save again. Validate results
6. If the results **DO NOT** correct after 30 minutes rewarm for 60 minutes and go back to step 2.
7. If after warming for 1 hour the Results still do not correct then **DO NOT REPORT** the **RBC, HCT, MCV, MCH and MCHC.** Dash the parameters out and add a comment stating that RBC, MCV, HCT, MCV, MCH, and MCHC not reported due to the presence of a strong cold agglutinin.
8. **Suspected Lipemic Specimen**
9. Occasionally a specimen will have an excessive lipid content and the resulting turbidity will cause an erroneously high hemoglobin. The specimen needs to have the hemoglobin and parameters calculated using hemoglobin (MCH and MCHC) corrected.
10. Spin the specimen in a centrifuge and look at the plasma. If the specimen is lipemic, the plasma will be a milky color
11. The following equation can be used to correct the hemoglobin

**Hgb(g/L) = MCV x RBC/2.98 x 10.**

1. Once the Hgb value is calculated, the MCH and MCHC must be calculated.

**MCH = (HGB/RBC) x 10**

**MCHC = (HGB/HCT) x 100**

1. **Hemolyzed CBC specimens**
2. On occasion CBC results may present with a falsely lower RBC count and hematocrit and possibly higher platelet count due to cell stroma.
3. Spin the specimen in a centrifuge and look at the plasma. If the specimen is hemolyzed, the plasma will be pink or red.
4. In these cases, an investigation of whether these results are due to in vivo or in vitro hemolysis. In vivo cases, these results can be accepted but with in-vitro cases, the sample should be redrawn.
5. **Hyperglycemic Specimens**
6. Patients who have extremely high glucose levels (>1200mg/dl) may have spuriously increased macrocytosis.
7. If glucose interference is confirmed (look up results in beaker) do the following:
8. Dilute the sample with DCL from the XN and incubate for 5 minutes.
9. Run the sample on the XN in manual mode and multiply results by the dilution factor.
10. A comment is put WAM: Results corrected for high glucose.
11. **Spurious Thrombocytopenia**
12. When platelet count is spuriously decreased on a smear estimate and platelet-EDTA induced anti-platelet activity is suspected have the specimen redraw in EDTA (Lavender top tube) and Sodium-Citrate (Blue top tube).
13. Make smears on both specimens and analyze the specimens on the XN analyzer. Compare the results and slide estimates. If EDTA inhibition is truly present, clumps of platelets will be present on the smear of the EDTA tube, while the blue top Sodium Citrate tube will show no clumping.
14. Multiply the platelet count from the blue top tube by 1.1 to obtain the reportable platelet count. All other parameters must be taken from the lavender tube. **ONLY THE PLATELET COUNT** should be taken from the blue top tube. Be sure to replace the platelet count in WAM with the blue top platelet count before validating result.
15. When platelet count is flagged for any reason, <100,000 or there is a significant decrease from the previous results, use the chart below for workflow.
16. ESTIMATE THE PLATELET COUNT USING THE FOLLOWING PROCEDURE:
17. Using oil immersion, count the number of platelets in 10 fields on the feathered edge of the smear. Take the average number of platelets per field and multiply by 20,000.
18. Average # of platelets per field X 20,000 = Estimated platelet count.

**VERIFICATION OF PLATELET COUNTS FROM THE XN ANALYZER**

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| --- | --- | --- |
| Platelet Issue | Action | Reporting |
| Suspect Flags   * Fragments * Plt clumps * Clot check | * Check for clot * Review smear for plt clumps, fibrin strands, large or giant platelets | Specimen clotted- redraw  Plt clumps   * Plt <100,000, Do not report out.**(using 4 dashes, dash out Plt count in WAM**) Comment “platelet clumps” * plt > 100,000. Report count with comment “platelet count may be spuriously decreased due to plt clumping   Fragments(shistocytes):   * Perform plt estimate. If platelet count is lower that estimate comment “platelet count may be spuriously increased due to presence of shistocytes |
| Platelet Issue | Action | Reporting |
| Abnormal Platelet distribution   * Plt count will have an asterisk (\*) next to the result | * Check specimen for clot * Order a PLT-F in WAM and re-run the specimen. * Plt < 100,000 –make a smear | * Specimen clotted-redraw * PLT-F no (\*) >100,00-report * PLT-F no (\*) <100,000-review smear. Report Plt count with comment”plt count verified by smear” * PLT-F with (\*)-Review smear for plt clumps, fibrin strands, large or giant platelets. * Plt <100,000. Do not report. .**(using 4 dashes, dash out Plt count in WAM** Comment “platelet clumps” or Plt count not reported due presence of fibrin * Plt >100,00 report count with a spuriously decreased comment and reason |
| Platelet count <100,000 | * any plt flag or (\*)and/or abnormal plt scattergram * Check for clot * Make smear and perform estimate * Review smear for plt clumps, fibrin strands, large or giant platelets * flags and normal plt scattergram | * Specimen clotted-redraw * Fibrin or plt clumps: Do not report. .**(using 4 dashes, dash out Plt count in WAM** Comment “platelet clumps” or Plt count not reported due presence of fibrin * Estimate matches automated count- report count with comment “platelet count verified by smear” |
| Platelet count >1,000,000 | * First occurrence or any plt flag or (\*) or abnormal platelet scattergram- review smear and perform plt estimate. * Previously>1,000,000 with no platelet flags or (\*) and normal scattergram | * Plt estimate agrees-call result and report count with comment “plt count verified by smear” * If Plt estimate looks significantly lower than 1,000,000 perform PLT-F even if there is no (\*). * Report PLT F (if there is no (\*). * Report Count |
| Platelet count >4,000,000 | * Above linearity. Perform dilution and rerun Plt count * Review smear | * Report platelet count multiplied by dilution factor |

**Platelet Histograms.**

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| Normal Platelet Histogram |  |
| Abnormal Platelet Histograms |  |

**HISTORY**

1. Effective date: 1/19/2018
2. Restructured verification of platelets into a table format. Added picture examples of normal and abnormal platelet histograms. By Kathy Castillo 5/12/2022
3. Added criteria for PLT <100,000 for outpatients, patients discharged then re-admitted and platelet counts <100,000 not critical then become critical By Kathy Castillo 8/3/2022
4. Updated procedure to YNHHS format. Changed plt <100,000 review criteria to all platelet counts <100,000 must reviewed even if previously <100,000. By K. Castillo 7/2023.